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# Profiling of Cafe Business in Talavera, Nueva Ecija: A Basis for Development of a Standardized Checklist of Minimum Requirements for Starting Up a Coffee Shop Business

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***Abstract***— *This study aimed to profile the coffee shops in Talavera, Nueva Ecija, to develop a standardized checklist for aspiring entrepreneurs. The researchers surveyed 10 coffee shop owners in the municipality of Talavera. Through surveys, the researchers delved into the Owner's Demographic, Business details, Financial Requirements, and other requirements needed to consider starting up a coffee shop. Furthermore, through accurate analysis, the data obtained from the coffee shop owners are arranged to derive key insights. By analyzing this data, the study identifies best practices associated with start-up coffee shops' profitability in Talavera. These findings were translated into a standardized checklist outlining essential procedures including the lists of equipment needed, financial requirements, and the Traditional and Social Media Marketing techniques. This standardized checklist served as a valuable tool for aspiring and existing coffee shop owners in Talavera, streamlining operations, ensuring consistency, and contributing to business success.*

***Keywords*— Coffee shop, Checklist, Startup, Operations, Financial Requirements, Marketing Strategies**

## I. INTRODUCTION

In today's world, coffee shops have emerged as more than just places to grab a cup of coffee; they are vibrant hubs of social interaction, creativity, and relaxation. The aroma of freshly brewed coffee, the soft hum of conversations, and the comforting ambiance of these establishments have made them integral parts of our daily lives. It has become a social and cultural phenomenon, shaping communities, and influencing consumer preferences. According to (International Coffee Council, 2018), the Asian coffee market has increasingly become the focus of the world coffee industry in recent years. Additionally, the findings of the study conducted by (Kantar

Worldpanel Philippines, 2014), stated that Filipinos have shifted from being moderate to heavy coffee drinkers. Hence, the café industry in the Philippines is rapidly expanding, drawing more Filipinos to indulge to come and enjoy in various decorative coffee establishments.

While major metropolitan areas often serve as the focal point of coffee culture discussions, smaller towns and regions are increasingly becoming significant players in this industry. In the prosperous province of Nueva Ecija, specifically in the municipality of Talavera, there are a growing number of local cafés that have been operating in these past years.

Hence, this study is significant as it offers practical guidance to individuals interested in entering the café industry in Talavera, Nueva Ecija. By examining existing café establishments systematically, including their operational practices, marketing strategies, and adherence to regulations in order to pinpoint the essential components required for a successful start- up. Additionally, the creation of a standardized checklist derived from this study provided a clear basis for prospective café owners to navigate the complexities of initiating and managing a coffee shop business effectively.

Therefore, this research aims to bridge a critical gap in the existing literature by providing practical guidance to individuals aspiring to venture into the café industry in Talavera, Nueva Ecija. Through in-depth data collection and analysis, it seeks to offer actionable recommendations and tools that empower prospective café owners while contributing to the sustainable economic development of Talavera, Nueva Ecija

**OBJECTIVE OF THE STUDY**

This study aims to contribute to the understanding the Coffee Shop Businesses in Talavera, Nueva Ecija. The objectives of the study include profiling the coffee shop, identifying implication of this study to the business industry and lastly, to provide a manual of operation for coffee shop business based on the result of the study.

**Statement of the Problem**

The research primary objective is to Profile the Coffee Shop Business Talavera, Nueva Ecija. To achieve this goal, the research sought to study the following:

1. How may the respondents be described in terms of:

1.1 age;

1.2 gender;

1.3 income;

1.4 employment;

1.5 civil status;

1.6 educational attainment;

1.7 number of years' experience validity of a coffee shop ;

1.8 form of business?

2. How may the profile of the coffee shop be described in terms of:

2.1 number of years of operation;

2.2 facilities, equipment and materials;

2.3 starting capital;

2.4 types of products and services offered to customers;

2.5 manpower requirement;

2.6 average number of customers per month;

2.7 average net profit per month;

2.8 average monthly operating cost;

2.9 marketing strategies;

2.10 legal requirements;

2.11 return on investment (ROI)?

3. What is the implication of this study based on the findings?

4. To provide a manual of operation for coffee shop business based on the results of the study.

## II. RESEARCH METHODOLOGY

The study employed a quantitative research design, specifically using descriptive research to systematically describe the population, situation, and phenomena related to customer preferences in coffee shops. Conducted in Talavera, Nueva Ecija, the research targeted owners and managers of ten selected coffee shops. Simple random sampling was utilized to ensure unbiased data collection from a homogeneous population. Respondents provided insights based on their experience in the coffee business. Data was gathered through a survey questionnaire, with the study obtaining the necessary permissions from research instructors and advisors. The data analysis involved frequency and percentage calculations, with the formula $\% = f/n \times 100$ used to determine the percentage responses. Additionally, the weighted mean was calculated using a Likert scale to assess respondents' perceptions on a scale from 1 (Not Necessary) to 4 (Absolutely Necessary). The reliability and validity of the questionnaire were ensured through approval from research advisors and instructors. This thorough methodology aimed to develop a standardized checklist of minimum requirements for starting a coffee shop business.

## III. RESULTS AND DISCUSSIONS

This chapter presents and discusses the result, analysis, and data interpretation based on the response of the 10 owners/managers of coffee shops in this study entitled Profiling of Cafe Business in Talavera, Nueva Ecija: A Basis for Development of Standardized Checklist of Minimum Requirement for Starting up a Coffee Shop Business. The results are presented and discussed based on the sequence of the statement of the problem.

**1. Description of the Respondents**

The demographic profile of the coffee shop owners/managers are described in terms of Age, Gender, Income, Employment, Civil Status, Educational Attainment, and Number of Years of experience validity of a Coffee Shop.

1.1 **Age**

*Table 1.1 Frequency and Percentage Distribution as to the Age of the Respondents*

| Age of the Respondents | Frequency | Percentage |
|---|---|---|
| 18-30 | 7 | 70% |
| 31-40 | 3 | 30% |
| 41-50 | 0 | 0 |
| 51 and Above | 0 | 0 |
| Total | 10 | 100% |

Table 1.1 describes the demographic profile of the respondents. It can be observed that out of ten (10) respondents answered that there are seven (7) respondents with an average of 70% representing the ages 18-30. There are three (3) respondents with an average of 30% that are 31-40 years of age. Hence, the ages 41-50 and 51 and Above years of age have no respondents.

This implies that the respondents ages between 18 and 30 with a percentage of (70%) have a high level of involvement and interest in the survey topic among this demographic group. Furthermore, it broadens the viewpoints of the younger and middle-aged coffee shop owners. Overall, the data shows that younger adults are positively participating to conversations and decision-making processes surrounding the subject matter of the poll. (Entrepreneurship in the Philippines, n.d.) says that over half of the Filipino entrepreneurs is between the ages of 18 and 44.

1.2 **Gender**

*Table 1.2 Frequency and Percentage Distribution as to the Gender of the Respondents*

| Gender of the Respondents | Frequency | Percentage |
|---|---|---|
| Male | 1 | 10% |
| Female | 9 | 90% |
| LGBTQ+ | 0 | 0 |
| Total | 10 | 100% |

Table 1.2 shows the gender of the respondents. It can be observed that out of the ten (10) respondents who answered, there is one (1) respondent with an average of 10% is male. Lastly, there are nine (9) respondents with an average of 90% are females.

Table 1.2 implies that there is a high participation of females resulting in a (90%) percentage that demonstrates a dynamic effort towards gender, and it ensures a diverse interpretation of survey data The significant presence of females indicates a recognition of the importance of their viewpoints and experiences in shaping the outcomes of the survey, leading to more comprehensive insights. Overall, the data reflects a successful engagement of females in contributing to discussions on the survey topic. According to Entrepreneurship in the Philippines, (n.d.) women represent a greater number of young entrepreneurs than existing business owners.

1.3 **Income**

*Table 1.3 Frequency and Percentage Distribution as to the Monthly Income of the Respondents*

| Income of the Respondents | Frequency | Percentage |
|---|---|---|
| 50,000 and Below | 0 | 0 |
| 51,000-80,000 | 9 | 90% |
| 81,000-100,000 | 1 | 10% |
| 101,000 and Above | 0 | 0 |
| Total | 10 | 100% |

Table 1.3 shows the income of the respondents. It can be observed that out of ten (10) respondents, there are nine (9) respondents with an average of 90% that earn around 51,000-80,000 monthly. While there is one (1) respondent with an average of 10% that earns up to 81,000-100,000. Hence, the income of 50,000 and below and 101,000 and above has no response, and the percentage is 0.

Table 1.3 indicates that some individuals have the means to meet their needs comfortably and potentially have disposable income resulting in a positive trend of financial stability among the surveyed population, with 90% of respondents having incomes ranging from 51,000 to 80,000 units. The presence of one respondent with a higher income level further reflects financial diversity within the sample. Overall, the data suggests a level of economic well-being that can contribute to consumer confidence and overall prosperity. According to (Isla, 2023) in the Philippines, a coffee shop's anticipated daily sales can vary from ₱13,500 to ₱63,000. Undoubtedly, opening a coffee shop requires a substantial investment. However, if you'd rather start small, someone could always set up a pop-up or mobile coffee shop in an unutilized garden or garage. It's a very economical and distinctive way to own a coffee business, and it costs a lot less.

1.4 **Employment**

*Table 1.4 Frequency and Percentage Distribution as to* *the Employment Status of the Respondents*

| Employment of the Respondents | Frequency | Percentage |
|---|---|---|
| Student | 0 | 0 |
| Unemployed | 0 | 0 |
| Self-Employed/ Freelancer | 7 | 70% |
| Employed | 3 | 30% |
| Total | 10 | 100% |

Table 1.4 shows the Employment status of the respondents. It can be observed that out of ten (10) respondents, there are seven (7) respondents with an average of 70% that are Self-employed/Freelancer. There are three (3) respondents with an average of 30% that are currently employed. Hence, the student and unemployed status has no response, and the percentage is 0.

Table 1.4 implies a positive trend in the coffee shop industry toward self-employment and entrepreneurship. The majority of the respondents said they were freelancers or self-employed, showing a significant preference of the respondents for independent work. Furthermore, this data depicts a positive atmosphere that there are no such specific skills required in starting up a coffee shop and that people can follow their dreams of becoming entrepreneurs and opening their coffee shops. Furthermore, the fact that 30% of the respondents are employed in different work highlights the diversity of the workforce in the coffee shop industry. That implies the coffee shop business is a lively and inclusive place to work with plenty of chances for employment and entrepreneurship. Based on the SkillsYouNeed, (n.d.) entrepreneurs, freelancers, and self-employed people all work for themselves. They operate or run their firm, which can be anything from a simple one-man show providing expert services, dog walking, decorating, or other services, to a business established to produce and market a recently established piece of technology developed by the owner.

1.5 **Civil Status**

*Table 1.5 Frequency and Percentage Distribution as to the Civil Status of the Respondents*

| Civil Status of the Respondents | Frequency | Percentage |
|---|---|---|
| Single | 8 | 80% |
| Married | 2 | 20% |
| Widowed | 0 | 0 |
| Total | 10 | 100% |

Table 1.5 shows the Civil status of the respondents. It can be observed that out of ten (10) respondents, there are eight (8) respondents with an average of 80% that have the status of being single. While there are two (2) respondents with an average of 20% that have the status of being married. Hence, the status of being widowed has no response, and the percentage is 0.

This implies that among the respondents the highest is single with an average of (80%) which indicates a demographic keen on personal and professional development. This focuses on personal growth and career advancement. Lastly, it values personal motivation and connection with other people, making a diverse and dynamic workplace. (Adam, 2023) mentions that people who are single or who have not got married usually have full control over everything that they own, including their finances. They are not constrained by spousal duties or the legal rights that come with marriage. They are free to make decisions regarding their belongings, healthcare, and other private matters without the assistance or consent of a spouse.

1.6 **Educational Attainment**

*Table 1.6 Frequency and Percentage Distribution as to the Educational Attainment of the Respondents*

| Educational Attainment of the Respondents | Frequency | Percentage |
|---|---|---|
| High School Graduate | 1 | 10% |
| Vocational Course | 2 | 20% |
| Bachelor's Degree Holder | 7 | 70% |
| Master of Arts | 0 | 0 |
| Doctor of Philosophy | 0 | 0 |
| Total | 10 | 100% |

Table 1.6 shows the educational attainment of the respondents. It can be observed that out of ten (10) respondents, there is one (1) respondent with an average of 10% that is a high school graduate. While there are two (2) respondents with an average of 20% that attained a vocational course. Additionally, there are seven (7) respondents with an average of 70% that have obtained a bachelor's degree. Hence, the Master of Arts and Doctor of Philosophy have no respondents, and the percentage is 0.

This implies to the respondents that their credentials and future contributions are positively reflected. the highest being those with a bachelor's degree (70%), suggesting that the workforce is likely to benefit from a motivated and educated population. All things considered, increased wealth for society can result from a diversity of information, abilities, personal development, and societal improvement. According to (Chun, 2023), a master's degree in business administration is also advantageous for development as a small business owner. MBA programs also offer specializations in areas like marketing, accounting, and finance, which can be useful when launching a firm.

*Table 1.7 Number of Years' Experience Validity of a Coffee Shop*

| No. of Experience validity of a coffee shop | Frequency | Percentage |
|---|---|---|
| 1-3 Years | 8 | 80% |
| 4-6 Years | 1 | 10% |
| 7 and Above | 1 | 10% |
| **Total** | **10** | **100%** |

Table 1.7 shows the number of experience validity of a coffee shop of the respondents. It can be observed that out of ten (10) respondents answered that there are eight (8) respondents with an average of 80% that have 1-3 years of experience validity of a coffee shop. While there is one (1) 4-6 years and 7 and above years' experience validity of coffee shop with an average of 10%.

The highest percentage among the respondents is the (80%) being the 1-3 years no. of experience validity of coffee shops implies that a thriving market with unique and fresh ideas becomes a positive landscape resulting in sustainability and success within the industry. It also fosters a competitive environment, benefiting consumers and entrepreneurs.

### 1.8 Form of Business

*Table 1.8 Frequency and Percentage Distribution as to the Coffee Shops as to the Form of Business*

| Form of Business | Frequency | Percentage |
|---|---|---|
| Sole proprietorship | 2 | 20% |
| Partnership | 7 | 70% |
| Corporation | 0 | 0 |
| Others: Franchise | 1 | 10% |
| Total | 10 | 100% |

Table 1.8 shows the Form of business of the respondents. It can be observed that out of ten (10) respondents answered that there are seven (7) forms of business with an average of 70% that has formed a Partnership. While there are two (2) Sole proprietorship forms of business with an average of 20%. Additionally, there is one (1) Franchise form of business with an average of 10%. Hence, the corporation has no respondents, and the percentage is 0.

This implies the variety of coffee shop business structure, with partnership having the highest percentage (70%) that highlights the industry's diversity. because partnership gives opportunities to uprising entrepreneurs and enlightens their knowledge of the coffee shop industry. Overall, this type of business form greatly increases the success rate of established coffee shops, this variety of business structures supports the vitality and expansion of the coffee shop industry. (Reis, 2023) says that establishing a coffee shop is an exciting endeavor, but deciding whether to go it alone or hire a partner can be challenging at times. Benefits of opening a coffee business with a partner include having someone to split the costs and workload with. Partners with complementary abilities can also make the firm function more easily and effectively.

## 2. Profile of the Coffee Shops

*Table 2.1 Number of years of Operation*

| No. of years of Operation | Frequency | Percentage |
|---|---|---|
| 1-5 Years | 9 | 90% |
| 6-10 Years | 0 | 0 |
| 11-15 Years | 0 | 0 |
| 16 and above | 0 | 0 |
| Others: 3 Months | 1 | 10% |
| Total | 10 | 100% |

Table 2.1 shows the Number of years of operation. It can be observed that out of ten (10) respondents answered that there are nine (9) operating businesses with an average of 90% ranging from 1-5 years. While there is one (1) respondent said that they are operating a business with an average of 10% that ranges from 3 months. Hence, the 6-10 years, 11-15 years, and 16 and above have no response, and the percentage is 0.

This implies how long a coffee shop has been operating with the majority of 1-5 years having a percentage of (90%). This emphasizes that it is easily accessible in the entrepreneurship sector because with the changing environment, it is accessible to new participants and contributes to the diverse coffee culture, with people being able to adapt and venture out to establish themselves successfully.

According to Barlow & Barlow (2023), about the initial costs of starting their operations, which include equipment purchases and lease agreements, coffee shop owners may see a decrease in revenue during the first one to five years of business. However, when they develop loyal customers and optimize their operations, these coffee shops usually enjoy a notable increase in annual revenues after five years.

*Table 2.2 Facilities, equipment, and materials*

| Coffee Shop Equipment | Weighted Mean | Verbal Interpretation |
|---|---|---|
| Coffee Machines are necessary for the operation of a coffee shop. | 2.2 | Somewhat Necessary |
| Espresso Machines are crucial for a coffee shop's beverage quality. | 2.8 | Necessary |
| Grinders are important for fresh coffee preparation. | 3.1 | Necessary |
| Brewing Equipment is essential for a variety of coffee offerings. | 3.7 | Absolutely Necessary |
| Refrigerators are needed to store perishables and cold beverages. | 3.4 | Necessary |
| Milk Frothers are required for making specialty coffee drinks. | 3.7 | Absolutely Necessary |
| Milk Pitchers are necessary for serving milk-based coffee drinks. | 3.7 | Absolutely Necessary |
| Toasters are important for offering food items alongside beverages. | 3.1 | Necessary |
| A Blender is essential for preparing a variety of blended beverages. | 1.3 | Not Necessary |
| A Sealing Machine is important for ensuring the quality and safety of to-go beverages. | 1.3 | Not Necessary |
| A French Press is necessary for offering high-quality cold brew coffee. | 1.3 | Not Necessary |
| A Jigger is crucial for measuring ingredients accurately for consistent coffee drinks. | 4.0 | Absolutely Necessary |
| A Bar Spoon is essential for mixing beverages properly. | 4.0 | Absolutely Necessary |

As shown in table 2.2, Most of this coffee shop equipment is necessary for starting up a coffee shop business. It can be seen in the table above that most of the coffee shop equipment used by the coffee shop was marked as necessary to absolutely necessary with a weighted mean of ranging from 2.8 to 4.0

It can be seen that five out of the 14 statements gained the highest weighted mean ranging from 3.7 to 4.0 with a verbal interpretation of Absolutely necessary. The first one asks about whether the jigger is crucial for measuring ingredients accurately for consistent coffee drinks. The respondents gave an average weighted mean of 4.0 which falls under the category of "absolutely necessary". This means that all the respondents answered that the jigger is absolutely necessary for it being crucial for measuring ingredients accurately for consistent coffee drinks. Followed by the question of whether a Bar Spoon is essential for mixing beverages properly. The respondents gave an average weighted mean of 4.0, which also falls under the category of "absolutely necessary". This indicates that all the respondents answered that it is absolutely necessary for a bar spoon to be essential for mixing beverages properly.

Lastly, the "blender is essential for preparing a variety of blended beverages, sealing machine is important for ensuring the quality and safety of to-go beverages and the French press is necessary for offering high-quality cold brew coffee" obtained a weighted mean of 1.3 which means that most of the respondents answered that blender, sealing machine and French press is not necessary equipment for starting up a coffee shop business.

This indicates that the highest coffee shop equipment that is a must need are the jigger and bar spoon with it having a weighted mean of 4.0, focusing on this fine equipment indicates dedication of quality control and the client's happiness. These evaluations show that industries work together to keep up-to-date facilities, guarantee top-notch beverage selection, and improve the experience of visiting coffee shops. (Tom, 2016) said that Jiggers, a shortened term for "thingamajiggers," represent the most accurate method for measuring liquids unless one has mastered the art of counting pours. These small, two-sided conical vessels serve as precise measuring tools, typically available in standard measurements, although buyers should verify before purchase. The speaker's initial jigger was an unmarked 1 oz by 1.5 oz, sizes that are both practical but not commonly found together; standard jiggers usually offer a single unit and its double. The .5 oz by 1 oz and 3/4 oz by 1.5 oz sizes are arguably the most practical, although 1 oz by 2 oz variants are also available. Professional bartenders often have these three jiggers readily available at each bar station for efficient measurement. Moreover, Bar spoons, perfect for mixing cocktails, boast a lengthy spiraled handle culminating in a shallow bowl. The spiral design aids in effortless spinning on the user's fingertips during stirring, with the objective being to ensure the spoon's back consistently touches the edge of the mixing glass. When executed correctly, stirring involves a smooth back-and-forth movement of the fingers as the spoon revolves in the hand (T, 2016).

*Table 2.2.1 Interpretation of the Likert scale questions as to the Coffee Shop Facilities Requisite*

| **Coffee Shop Facilities** | **Weighted Mean** | **Verbal Interpretation** |
|---|---|---|
| Display Cases are important for showcasing food items. | 3.7 | Absolutely Necessary |
| Tables and Chairs are necessary for customers to have a comfortable experience. | 4.0 | Absolutely Necessary |
| Bar Stools are important for seating at the coffee bar. | 3.7 | Absolutely Necessary |
| Outdoor Seating is necessary for the coffee shop's ambiance. | 2.8 | Necessary |
| Restrooms are crucial for customer convenience. | 4.0 | Absolutely Necessary |

As shown in Table 2.2.1 Most of these coffee shop facilities are requisite for starting up a coffee shop business. It can be seen from the table above that most of the coffee shop facilities used by the coffee shop were marked as absolutely necessary with a weighted mean of ranging from 2.8 to 4.0.

The coffee shop facilities “tables and chairs are necessary for customers to have a comfortable experience and restrooms are crucial for customer convenience” obtained a weighted mean of 4.0 which means that all of the respondents answered that the tables and chairs are absolutely necessary for customers to have a comfortable experience as well as restrooms being absolutely necessary and crucial for customer convenience.

Furthermore, the “display cases are important for showcasing food items and bar stools are important for seating at the coffee bar” gained a weighted mean of 3.7 which means that the respondents answered that the display cases are absolutely necessary for showcasing food items as well as bar stools being absolutely necessary for seating at the coffee bar.

Lastly, the “outdoor seating is necessary for the coffee shop’s ambiance” obtained a weighted mean of 2.8 indicating that most of the respondents answered that outdoor seating is indeed necessary for the coffee shop’s ambiance.

A strong dedication to both customer happiness and corporate success is evident in the interpretation of Likert scale responses evaluating coffee shop amenities in Table 2.2.1. The importance of basic amenities like bathrooms, bar stools, tables and chairs, and display cases in improving the overall customer experience is highlighted by their vital necessity. Even though outside seating was rated somewhat lower, the fact that it was thought to be necessary indicates how important ambiance is. All things considered, giving these facilities first priority shows how committed the sector is to making warm environments, encouraging client loyalty, and guaranteeing long-term success. According to *Coffee Shop Furniture: 8 Tips For Furnishing Your Coffee House* (N.D.) When selecting the furniture items to put in, coffee shop tables and chairs ought to accommodate all customers. For customers who want to relax and enjoy a coffee, a cozy armchair is the ideal option; for casual customers, dining chairs are ideal for grabbing a fast bite. If they want to watch the world go by from a window table, chairs are also perfect. In addition, Interior (2022) said that coffee tables come in a variety of shapes and sizes, but they always have the same purpose: to act as a surface for items like coffee cups and magazines. Coffee tables are usually made of wood or glass, and many of them have shelves or other storage areas for added convenience. They can also be used as a temporary workspace for crafts or tasks. However, Establishments that sell food and beverages are urged to provide restrooms for their customers as part of providing excellent customer service (Ashby, 2024). Some larger, chain coffee shops regularly have restrooms, whereas smaller, independent coffee shops could not have them due to space issues or other reasons.

*Table 2.2.2 Interpretation of the Likert scale questions as to the Coffee Shop Materials Needed*

| **Coffee Shop Materials** | **Weighted Mean** | **Verbal Interpretation** |
|---|---|---|
| Cups (Espresso, Coffee, and Cold Beverages) are essential for serving drinks. | 4.0 | Absolutely Necessary |
| Saucers are important for the presentation of drinks. | 4.0 | Absolutely Necessary |
| Plates are necessary for serving food items. | 4.0 | Absolutely Necessary |
| Bowls are important for a variety of menu options. | 2.8 | Necessary |
| Stirrers/Straws are essential for customers' use. | 4.0 | Absolutely Necessary |
| Utensils (Spoons, Fork, and Butter Knife) are necessary for the consumption of food. | 4.0 | Absolutely Necessary |
| Napkins are crucial for maintaining cleanliness. | 4.0 | Absolutely Necessary |
| **Point of Sale System** | **Weighted Mean** | **Verbal Interpretation** |
| Touch Screen Registers are important for efficient transactions. | 1.6 | Somewhat Necessary |
| Receipt Printers are necessary for providing customers with transaction details. | 1.9 | Somewhat Necessary |
| Cash Drawers are crucial for handling cash payments. | 4.0 | Absolutely Necessary |
| Using Pen and Paper for recording sales and orders is... | 4.0 | Absolutely Necessary |
| **Technology** | **Weighted Mean** | **Verbal Interpretation** |

| | | |
|---|---|---|
| Wi-Fi is necessary for customer satisfaction and convenience. | 2.8 | Necessary |
| A Music System is important for creating a pleasant atmosphere. | 4.0 | Absolutely Necessary |
| CCTV is crucial for the security and monitoring of the coffee shop. | 4.0 | Absolutely Necessary |
| **Decorations** | **Weighted Mean** | **Verbal Interpretation** |
| Wall Arts are important for the coffee shop's aesthetic. | 3.7 | Absolutely Necessary |
| Planters are necessary for enhancing the ambiance. | 2.8 | Necessary |
| Lighting Fixtures are crucial for the coffee shop's visibility and atmosphere. | 3.7 | Absolutely Necessary |
| **Miscellaneous** | **Weighted Mean** | **Verbal Interpretation** |
| A Menu board is essential for informing customers about offerings. | 3.7 | Absolutely Necessary |
| Cleanliness and effective cleaning supplies are essential for maintaining hygiene standards in the coffee shop | 4.0 | Absolutely Necessary |
| Professional and suitable uniforms are essential for creating a positive impression and maintaining a professional image among customers | 4.0 | Absolutely Necessary |

As shown in table 2.2.2 Most of these coffee shop materials are needed for starting up a coffee shop business. It can be seen from the table above that most of the coffee shop materials used by the coffee shop were marked as absolutely necessary with a weighted mean of ranging from 3.7 to 4.0.

The coffee shop materials "Cups (Espresso, Coffee, and Cold Beverages) are essential for serving drinks, Saucers are important for the presentation of drinks, Plates are necessary for serving food items, Stirrers/Straws are essential for customers' use, Utensils (Spoons, Fork, and Butter Knife) are necessary for the consumption of food and Napkins are crucial for maintaining cleanliness" obtained a weighted mean of 4.0 which means that most of the respondents answered that it is absolutely necessary and essential to use cups, plates, saucers, stirrers/straws, utensils, and napkins.

The point-of-sale system "Using Pen and Paper for recording sales and orders is... and Cash Drawers are crucial for handling cash payments" obtained a weighted mean of 4.0 which means that it is absolutely necessary to use pen and paper for recording sales and orders as well as cash drawers for handling cash payments.

The Technology as to the materials needed "Music System is important for creating a pleasant atmosphere and CCTV is crucial for the security and monitoring of the coffee shop" obtained a weighted mean of 4.0 which means that the majority of the respondents that is absolutely necessary for the music system to create a pleasant atmosphere and for the CCTV to have security and to monitor the coffee shop. Lastly, the "Wi-Fi is necessary for customer satisfaction and convenience" gained a weighted mean of 2.8 in which it means that WIFI is indeed necessary for customer satisfaction and convenience.

The decorations as to the materials needed "Wall Arts are important for the coffee shop's aesthetic and Lighting Fixtures are crucial for the coffee shop's visibility and atmosphere" obtained a weighted mean of 3.7 which means that the majority of the respondents answered it is absolutely necessary that wall arts are important for the coffee shop's aesthetic and Lighting Fixtures are indeed crucial for the coffee shop's visibility and atmosphere. Lastly, the "Planters are necessary for enhancing the ambiance" obtained a weighted mean of 2.8 which means that planters are indeed necessary for enhancing the ambiance of the coffee shop.

The miscellaneous materials needed "Cleanliness and effective cleaning supplies are essential for maintaining hygiene standards in the coffee shop and Professional and suitable uniforms are essential for creating a positive impression and maintaining a professional image among customers" obtained a weighted mean of 4.0 which majority of the respondents answered that it is absolutely necessary for cleaning supplies being essential for maintaining hygiene standards in the coffee shop and for the Professional and suitable uniforms are absolutely necessary for creating a positive impression and maintaining a professional image among customers. Lastly, the "A Menu board is essential for informing customers about offerings" gained a weighted mean of 3.7 which it means that a menu board is absolutely necessary for informing customers about offerings.

This indicates coffee shop materials, technology, decorations, and miscellaneous items show a strong dedication to atmosphere, operational effectiveness, and customer happiness. The absolute necessity of technology components, ornamental elements, miscellaneous things, and essential materials is emphasized by their crucial function in providing customer service, guaranteeing security, improving ambiance, and upholding professionalism. These evaluations demonstrate a thorough strategy for ensuring that patrons have a pleasant experience and that the coffee shop remains hospitable.

In Coffee Shop Materials, Calvine's Coffee (2023) said that in serving customers who prefer to enjoy their beverages in the shop, it's essential to have a variety of ceramic coffee mugs and tea cups available. These come in different shapes and sizes to accommodate their preferences. Furthermore, A cup and saucer set is a stylish and practical inclusion in any kitchen or dining area. It usually includes a cup and a saucer meant to hold the cup. While it's commonly used for serving tea or coffee, it is versatile enough to accommodate other hot or cold drinks. These sets are available in various styles, colors, and materials, including porcelain, bone china, ceramic, and glass. Each material offers distinct features like durability, heat resistance, and weight (Sharma, 2023). However, (Calvine's Coffee, 2023) to accommodate customers who like to customize their drinks with sugar and creamer, it's important to have straws and stirrers on hand. These items help customers blend their beverages to their liking. Also, as per (Calvine's Coffee, 2023) spoons are available in a variety of sizes, shapes, designs, and materials to ensure they perform their intended function effectively. With over 61 different types of spoons available, they have a wide range of options to choose from. In addition, to brew the perfect cup of coffee, having the right tools is essential. Coffee utensils, such as espresso tampers, frothing pitchers, knock boxes, measuring spoons and cups, portion scales, tea ball infusers, lemon wedge bags, syrup pumps, and frothing thermometers, are crucial for achieving quality, consistency, and customer satisfaction in any coffee shop. These tools help with everything from preparing espresso shots to foaming milk, collecting used grounds, ensuring precise measurements, managing inventory, infusing flavors, and monitoring beverage temperature. Overall, coffee utensils are indispensable for creating delicious and satisfying beverages for customers as stated by Calvine's Coffee (2023). Hence, according to (Scyphus, 2020) napkins contribute to the visual appeal of a coffee establishment, enhancing table settings with color and sophistication. It's important to ensure that each table is equipped with napkins to elevate the interior design. Customers visiting acoffee business expect exceptional service and strive to maintain their impeccable appearance and cleanliness throughout the day. This helps prevent unexpected spills or snack crumbs on their clothing.

In terms of Point of Sale, In the study of Boyarsky (2023) while many coffee shops still use pen and paper to take orders, having a good point of sale (POS) system is becoming more important. These systems let customers order ahead of time, making it easy for them to grab their coffee and leave. They also have reward programs to turn occasional customers into regulars. However, as stated in the article About Cash Drawers(n.d.) a cash drawer is a place where employees store money during their shift. At the start of the shift, it's filled with coins and bills for making change. The money going in and out is tracked to ensure accuracy. If a coffee shop's cash register isn't connected to a real cash drawer, they use virtual "user wallets" instead. Employees may use these wallets if they're responsible for their cash during a shift. Connecting a physical cash drawer to the register allows for better tracking of sales and is a smart option for businesses using cash drawers.

For the technology, Guru ( 2024) states that music has the potential to be a very effective instrument for coffee shops to affect the behavior and decisions of its patrons. Studies reveal that a variety of characteristics, including tempo, genre, lyrics, and more, can have a direct effect on a customer's decision on what to buy, how long to stay, and how they feel. This makes it possible for astute café operators to deliberately construct playlists that complement their services and corporate image. In addition, Excellent security cameras in cafes and restaurants can help prevent a variety of incidents like theft, vandalism, and staff misbehavior, (Adminbp, & Adminbp., 2023.). Additionally, integrating access control features into the restaurant's security system allows for better monitoring of who enters the premises, where they are permitted to go, and when.

In terms of Decorations in Coffee Shops, In the article by (Coffee Shop Lighting Ideas: Tips to Make Amazing, 2024) it suggests that adding artwork to a coffee shop can make it look better. Art pieces can catch people's attention and make the place more interesting. Also, (Coffee Shop Lighting Ideas: Tips to Make Amazing (2024) states that using special lights instead of regular ones can make the café feel cozy. These unique lights have cool designs that create a warm atmosphere. By adding these special touches, the coffee shop looks more attractive and unique. It's also a good idea to put up a creative sign outside to make the café stand out even more.

And lastly for the Miscellaneous, to ensure compliance with federal, state, and local food safety regulations, it's essential to have all the necessary cleaning supplies stocked in the coffee shop. Meeting these regulations is crucial for maintaining food safety standards. The primary aim is to prepare the coffee shop for food safety inspections. This involves keeping a supply of necessary items and training staff in their proper use. Essential supplies like bar cloths, red sani-buckets, and sanitizing solutions should be readily accessible to ensure food safety, as highlighted by (Martinez, 2023). However, In the article of (Staff Uniforms for Cafe's, Deli's, and Coffee Shops – Banksford UK, n.d) it's mentioned that having the right branding and staff uniform is crucial for businesses like coffee shops, delis, or sandwich bars. Ensuring that the staff has the appropriate attire is important because they represent the company and contribute to its reputation.

### 2.3 Starting Capital

*Table 2.3. Frequency and Percentage Distribution of Coffee Shops as to the Starting Capital*

| Starting Capital | Frequency | Percentage |
|---|---|---|
| 250,000-500,000 | 4 | 40% |
| 501,000-750,000 | 1 | 10% |
| 751,000-1,000,000 | 1 | 10% |
| 1,000,000 and Above | 3 | 30% |
| **Others:** 100,000 | 1 | 10% |
| **Total** | **10** | **100%** |

Table 2.3 shows the starting capital. It can be observed that out of ten (10) respondents answered that there are four (4) starting capital with an average of 40% which is ₱250,000-500,000. There are three (3) respondents with an average of 30% state that have a starting capital of ₱1,000,000 and above. Lastly, there is one (1) respondent each with an average of 10% that answered their starting capital range from ₱501,000-750,000, ₱751,000-750,000, and ₱100,000.

Table 2.3, which displays the initial capital distribution among coffee shops, illustrates the varied entrepreneurial landscape present in the market. With varied investment amounts ranging from ₱100,000 to more than ₱ 1,000,000, the data shows that anyone with different financial resources can start a coffee business. This diversity presents an opportunity for both small-scale and bigger companies to succeed in the coffee market, fostering entrepreneurship and adding to the industry's vibrancy and grow potential. According to (Nayaka and Kartika, 2018), the heart of businesses is their capital. Furthermore, a business cannot start operations without capital since it cannot buy staff, real estate, machinery, or supporting technology (Mahayasa and Yuliarmi, 2017).

### 2.4 Types of Products and Services Offered to the Customers

*Table 2.4 Interpretation of the Likert scale questions as to the Types of Products and Services Offered to the Customers*

| Specialty Drinks | Weighted Mean | Verbal Interpretation |
|---|---|---|
| Offering Espresso is essential for our customers' satisfaction. | 2.8 | Necessary |

| | | |
|---|---|---|
| Providing Cappuccino is crucial to meet the expected variety of coffee drinks. | 2.5 | Necessary |
| Serving Latte is necessary for our coffee shop's menu. | 3.1 | Necessary |
| Including Americano on the menu is important for customer choice. | 2.5 | Necessary |
| Mocha is an essential offering for attracting chocolate and coffee lovers. | 3.1 | Necessary |
| Macchiato is a crucial item for a diverse specialty coffee menu. | 3.7 | Absolutely Necessary |
| Flat White is necessary to cater to customers who prefer this style. | 2.2 | Somewhat Necessary |
| Cold Brew is important for serving customers who enjoy cold coffee. | 2.8 | Necessary |
| Iced Coffee is essential for meeting the needs of customers who prefer cold drinks. | 3.4 | Absolutely Necessary |
| Frappe is a crucial item for attracting customers who enjoy blended icy beverages. | 2.8 | Necessary |
| Non-Caffeine Drinks are necessary to provide options for non-coffee drinkers. | 4.0 | Absolutely Necessary |

As shown in Table 2.4 Most of these products and offered to customers for starting up a coffee shop business. It can be seen from the table above that most of the products and services used by the coffee shop were marked as necessary to absolutely necessary with a weighted mean of ranging from 2.8 to 4.0.

The types of specialty drinks offered to the customers “Non-Caffeine Drinks are necessary to provide options for non-coffee drinkers” obtained a weighted mean of 4.0 which means that all the respondents answered that non-caffeine drinks are absolutely necessary to provide options for non-coffee drinkers. Furthermore,

Lastly, the “Flat White is necessary to cater to customers who prefer this style” gained a weighted mean of 2.2 which means that the respondents answered that flat white is somewhat necessary to cater to the customers who prefer this style.

This implies that the coffee shop sector takes a customer-centric strategy, emphasizing satisfaction and accommodating a range of tastes. Espresso, cappuccino, and latte are considered essential coffee offerings, demonstrating a dedication to serving a diverse menu. The emphasis on non-caffeine beverages also emphasizes diversity and serving a diverse clientele. All things considered, these evaluations highlight how committed the sector is to satisfying client demands and guaranteeing a satisfying experience for every customer. While coffee and espresso remain essential, offering a variety of beverages can attract more customers to a café or coffee shop.

Options like tea, hot chocolate, herbal teas, and hot apple cider can cater to different preferences and occasions. Serving non-caffeine drinks can accommodate companions who don't drink coffee or parents seeking options for their children. Expanding the menu to include a range of beverages beyond coffee is a strategic business move that can enhance customer satisfaction and attract a broader customer according to (Bailey, 2022).

*Table 2.4.1 Interpretation of the Likert scale questions as to the Types of Pastries and Snacks offered to the customers*

| Pastries and Snacks | Weighted Mean | Verbal Interpretation |
|---|---|---|
| Croissants are essential to complement our coffee offerings. | 2.2 | Somewhat Necessary |
| Muffins are crucial for providing a quick snack option. | 2.8 | Necessary |
| Scones are necessary for a complete coffee shop experience. | 1.3 | Not Necessary |
| Cookies are important for customers who want a sweet treat. | 2.2 | Somewhat Necessary |
| Brownies are essential for catering to chocolate lovers. | 2.2 | Somewhat Necessary |
| Sandwiches are crucial for customers seeking a hearty option. | 3.1 | Necessary |
| Nachos are necessary for a diverse snack menu | 2.5 | Necessary |
| Wraps are important for providing a healthy snack option. | 2.2 | Somewhat Necessary |
| Fries are essential to offer a popular savory snack. | 3.1 | Necessary |
| Including Pasta is essential for a coffee shop that serves substantial food items. | 1.6 | Somewhat Necessary |
| Serving Corn Dog is crucial for attracting customers who prefer classic snack items. | 1.3 | Not Necessary |
| Waffles are necessary for offering a versatile snack that pairs well with coffee. | 1.6 | Somewhat Necessary |
| Croffles are important for a unique and trendy pastry option. | 1.3 | Not Necessary |
| Pancakes are essential for a complete breakfast menu offering. | 1.3 | Not Necessary |

As shown in table 2.4.1, Most of these types of pastries and snacks are necessary for a coffee shop business. It can be seen from the table above that most of the pastries and snacks used by the coffee shop were marked as somewhat necessary to necessary with a weighted mean of ranging from 1.6 to 3.1.

The types of snacks and pastries "Sandwiches are crucial for customers seeking a hearty option and Fries are essential to offer a popular savory snack" obtained a weighted mean of 3.1 which means that some of the respondents answered that sandwiches and fries are necessary for customers seeking a hearty option and it is essential to offer a popular savory snack.

Lastly, the "Scones are necessary for a complete coffee shop experience, Serving Corn Dog is crucial for attracting customers who prefer classic snack items, Croffles are important for a unique and trendy pastry option and Pancakes are essential for a complete breakfast menu offering obtained a weighted mean of 1.3 in which the respondents answered that scones, corn dog, croffles and pancakes are not necessary for pastries and snack options.

This implies that most foods are considered vital, such as sandwiches, nachos, and fries, while some, like scones and pancakes, are ranked as neither necessary nor partly necessary. This implies that the goal should be to offer filling, flavorful selections that go well with the coffee menu. Furthermore, products like brownies, cookies, and muffins are acknowledged as crucial for providing sweet pleasures, whilst wraps serve as a solution for consumers looking for healthy solutions. The overall goal of this strategy is to satisfy a wide range of consumer tastes and raise satisfaction, which helps the coffee shop succeed. According to (Seattlecoffeesecene, 2021) sandwiches prove to be an excellent addition to any coffee shop menu, catering to the lunch crowd and driving sales post the usual morning coffee rush. Their presence can effectively enhance profits and contribute to the overall lunchtime revenue. They stand out as one of the top food choices to consider offering at a coffee shop. Furthermore, French fries are slices of potatoes that are fried until crispy. They're usually salty and can be eaten with ketchup or mayonnaise. In Canada, there's a dish called poutine, where fries are topped with cheese and gravy (Tikkanen, 2024).

*Table 2.4.2. Interpretation of the Likert scale questions as to the Kinds of Breakfast and Lunch Menu to the Consumers*

| Breakfast and Lunch Menu | Weighted Mean | Verbal Interpretation |
|---|---|---|
| Silog Meals are crucial for customers who desire a hearty breakfast or lunch. | 2.2 | Somewhat Necessary |
| Rice Meals are necessary to satisfy those who prefer a substantial meal. | 2.2 | Somewhat Necessary |
| Granola Parfaits are essential for a quick and healthy meal option. | 1.3 | Not Necessary |
| Salads are crucial for catering to customers looking for lighter fares. | 2.2 | Somewhat Necessary |

As shown in table 2.4.2, Most of these kinds of breakfast and lunch menu to the consumer are necessary for a coffee shop business. It can be seen from the table above that most of the breakfast and lunch menus used by the coffee shop were marked as somewhat necessary with a weighted mean of 2.2

The kinds of breakfast and lunch menu to the consumers "Silog Meals are crucial for customers who desire a hearty breakfast or lunch, Rice Meals are necessary to satisfy those who prefer a substantial meal. and Salads are crucial for catering to customers looking for lighter fares" obtained a weighted mean of 2.2 which means that the majority of the respondents answered that having silog meals, rice meals, and salads is somewhat necessary. Additionally, the "Granola Parfaits are essential for a quick and healthy meal option" gained a weighted mean of 1.3 which means that respondents answered that granola parfaits are not necessary for a meal option.

This implies careful consideration of the varied interests of the customer base. Certain options, such as granola parfaits, are considered unnecessary, but other options, like salads, rice meals, and silog meals, are considered fairly important or required. This demonstrates a dedication to providing substantial and robust meal options in addition to lighter dishes, satisfying a variety of dietary requirements and preferences. The overall goal of this strategy is to increase client loyalty and contentment, which helps the coffee shop succeed. (Ting, 2018) said that the term "silog" originates from "sinangag at itlog" (garlic fried rice and egg), encompassing various dishes within the silog category. The distinction between each dish lies in the accompanying items served alongside the garlic fried rice and sunny-side-up eggs. Furthermore, as per the insights shared by (Ward, 2024) soups and salads remain a timeless choice for any café business, regardless of its theme or location. Offering a diverse selection of soups and salads that complement each other and other items on the menu is highly recommended. It's advisable to have a minimum of four options available for each category.

*Table 2.4.3. Interpretation of the Likert scale questions as to the Services Offered*

| Catering Services | Weighted Mean | Verbal Interpretation |
|---|---|---|
| A coffee Service for Events is essential for expanding our market reach. | 2.2 | Somewhat Necessary |

| | | |
|---|---|---|
| Boxed Lunches are crucial for serving groups and business meetings. | 2.2 | Somewhat Necessary |
| Dessert Platters are necessary for catering to sweet tooth cravings at events. | 1.9 | Somewhat Necessary |
| Corporate Meetings catering is important for establishing business client relationships. | 1.9 | Somewhat Necessary |
| Private Parties catering is essential for tapping into the celebrations market. | 2.2 | Somewhat Necessary |
| Coffee Deliveries are crucial for reaching customers outside the shop. | 2.8 | Necessary |

As shown in table 2.4.3, most of the services offered are necessary for a coffee shop business. It can be seen from the table above that most of the services offered by the coffee shop were marked as somewhat necessary with a weighted mean of ranging from 1.9 to 2.2.

The service offered “Coffee Deliveries are crucial for reaching customers outside the shop” gained a weighted mean of 2.8 which means that respondents answered that coffee deliveries are necessary for reaching customers outside the shop.

Lastly, the “Dessert Platters are necessary for catering to sweet tooth cravings at events and Corporate Meetings catering is important for establishing business client relationships” gained a weighted mean of 1.9 which means that the respondents answered that dessert platters and corporate meeting falls under the category of “somewhat necessary”.

This implies that catering services point to good chances for the coffee shop to grow its clientele and improve market share. While certain services, like dessert platters and catering for corporate meetings, are thought to be somewhat necessary, other services, like packed lunches, coffee deliveries, and event coffee service, are thought to be essential or indispensable. This implies an understanding of the value of providing a variety of catering choices to accommodate various client requirements and events.

Thus, it is possible to contact clients outside of the shop's physical location by highlighting services like coffee deliveries and event catering, which can open up new markets and increase revenue streams. Overall, these evaluations show a readiness to change and be creative, which enhances the coffee shop's standing in the community and fosters long term success. In recent times, the demand for coffee delivery services has surged due to individuals' busy lifestyles and their preference for the convenience of having coffee delivered to their doorstep. Whether it's a hot latte for the morning or an iced coffee for the afternoon, the desire for coffee delivery is on the rise. (Avvale, n.d.)

### 2.5 Manpower Requirement

*Table 2.5 Frequency and Percentage of Coffee Shops as to the Manpower Requirement*

| Manpower Requirement | Frequency | Percentage |
|---|---|---|
| 1 Employee | 0 | 0 |
| 2 Employees | 0 | 0 |
| 3 Employees | 7 | 70% |
| 4 Employees | 3 | 30% |
| 5 and Above Employees | 0 | 0 |
| **Total** | **10** | **100%** |

Table 2.5 shows the Required Manpower for a Coffee Shop. It can be observed that seven (7) with an average of 70% of respondents answered that the manpower required for a coffee shop are 3 employees. Furthermore, three (3) with an average of 30% of respondents answered that the manpower required for a coffee shop is 4 Employees. Hence, the 1 employee, 2 employees and 5 and above have no response, and the percentage is 0.

This implies an effective and flexible approach to labor management by showing that the great majority of coffee shops employ between one and five people. This lean staffing strategy fosters a close-knit work environment that is ideal for delivering individualized customer care, while also allowing for flexibility in responding to changing demands. All things considered, the data shows how resilient the sector is and how well it can uphold standards of quality while maximizing operating effectiveness. According to (Mcdonaldpaper, 2022) In running a coffee shop, employees are crucial. Without them, the business wouldn't exist. Even small cafes can be tough to manage alone. Furthermore, deciding how many staff members to hire and what jobs they'll do can be difficult. The owner needs to figure out the right number of people to run the shop smoothly and which roles they should take on. As the business grows, owners might need more staff, but when they're starting, someone's probably need to hire baristas, a manager, and an accountant or service crew. According to (Careers, 2023) the average monthly salary of Barista in Cabanatuan is ₱10,650. Moreover, as per (Careers, 2024) the service crew's monthly salary in Cabanatuan is ₱12,602. And also, the monthly salary for a Manager in Cabanatuan is ₱17,289 (Careers, 2024).

### 2.6 Average Number of Customers

*Table 2.6 Frequency and Percentage of Coffee Shops as to the Average Number of Customers per Month*

| Average No. of Customers /month | Frequency | Percentage |
|---|---|---|
| 20-40 Customers | 0 | 0 |
| 41-60 Customers | 2 | 20% |
| 61-80 Customers | 1 | 10% |
| 81-100 Customers | 1 | 10% |
| 101 and Above | 6 | 60% |
| **Total** | **10** | **100%** |

Table 2.6 shows the average number of customers per month. It can be observed that out of ten (10) respondents answered that there are six (6) with an average of 60% saying that their average number of customers is 101 and above. While there are two (2) with an average of 20% that answered their average number of customers per month ranges from 41-60 customers. Additionally, there is one (1) respondent each with an average of 10% that answered their average number. of customers range from 61-80 customers and 81-100 customers. Hence, the 20-40 customers have no respondent, and the percentage is 0.

This implies that most coffee shops have 101 or more customers per month, which indicates a robust customer and a significant demand for their coffee services. Furthermore, the existence of businesses that serve 41–100 customers per month demonstrates the industry's flexibility in accommodating a wide range of consumer tastes. The data points to a booming coffee shop industry that offers prospects for growth and success overall. In the study of (Coulson & Coulson, 2022) coffee shops usually have between 150 and 500 customers, depending on how big they are, how popular they are, and what products they offer.

### 2.7 Average Net Profit per Month

*Table 2.7 Frequency and Percentage of Coffee Shops as to the Average Net Profit per Month*

| Average Net Profit /month | Frequency | Percentage |
|---|---|---|
| 20,000-40,000 | 4 | 40% |
| 41,000-60,000 | 4 | 40% |
| 61,000-80,000 | 0 | 0 |
| 81,000-100,000 | 0 | 0 |
| 101,000 and Above | 2 | 20% |
| **Total** | **10** | **100%** |

Table 2.7 shows the average net profit per month of the coffee shops. It can be observed that out of ten (10) respondents answered that there are four (4) with an average of 40% of the respondents each that said they have a net profit range from 20,000-40,000 and 41,000-60,000. While there are two (2) with an average of 20% of respondents answered their net profit is 101,000 and above. Hence, the 61,000-80,000 and 81,000-100,000 has no respondent, and the percentage is 0.

This implies that industry profitability is at a reasonable level. Furthermore, 20% of coffee shops record average net earnings of more than ₱ 100,000 each month, demonstrating the notable financial success of certain companies. All things considered, the evidence points to a hopeful picture of coffee shop profitability and the industry's potential for long-term expansion. (Martinez, 2023) said that the profit margin for a coffee shop business usually falls within the range of 3% to 5%, although some establishments may operate with minimal to no profit (0%), while others can achieve higher margins, reaching up to 15%. In addition, a small to medium-sized coffee business in the Philippines can generally generate daily earnings ranging from Php 10,000 to Php 30,000. However, this projection assumes that the coffee shop is located in a sought-after area with a steady flow of customers, offering an appealing menu, and maintaining efficient operations. The actual daily revenue of a coffee business may vary, potentially exceeding or falling short of this estimate (Community, 2023).

### 2.8 Average Monthly Operating Cost

*Table 2.8 Frequency and Percentage of Coffee Shops as to the Average Monthly Operating Cost*

| Average Monthly Operating Cost | Frequency | Percentage |
|---|---|---|
| 20,000 | 3 | 30% |
| 50,000 | 3 | 30% |
| 80,000 | 2 | 20% |
| 100,000 | 1 | 10% |
| 150,000 and Above | 1 | 10% |
| **Total** | **10** | **100%** |

Table 2.8 shows the average monthly operating cost of the coffee shops. It can be observed that out of ten (10) respondents answered that there are three (3) with an average of 30% of the respondents each answered that their monthly operating costs are 20,000 and 50,000. While there are two (2) respondents with an average of 20% answered that their monthly operating cost is 80,000. Additionally, there is one (1) for each respondent with an average of 10% that answered their monthly operating cost are 100,000 and 150,000 and above.

The average monthly operating costs of coffee shops show a positive diversity in Table 2.8, indicating the industry's potential for sustainability and financial efficiency. With 30% of establishments reporting costs of ₱20,000 and another 30% reporting costs of ₱50,000, there's flexibility across different cost structures. Moreover, the presence of establishments with higher costs suggests scalability and growth opportunities. Overall, the data suggests effective financial management and long-term viability among coffee shop businesses. As per (Martinez, 2023) in the early years of operating a coffee shop, monthly expenses are expected to amount to 75-85% of monthly sales. During this period, owners may need to inject additional funds to cover losses incurred from labor, food costs, or marketing. Despite potentially having a superior cold brew process, establishing robust financial strategies is essential for ensuring the long-term success of the coffee shop.

### 2.9 Marketing Strategies

*Table 2.9 Interpretation of the Likert scale questions conformance to the Marketing Strategies*

| Traditional Marketing Programs | Weighted Mean | Verbal Interpretation |
|---|---|---|
| Using Flyers is an effective marketing strategy for our coffee shop. | 3.0 | Effective |
| Implementing Signage is effective for our | 3.8 | Very Effective |

| | | |
|---|---|---|
| coffee shop's brand awareness. | | |
| Word of mouth advertising is an effective method for our coffee shop's reputation growth. | 3.7 | Very Effective |
| Customer referral is effective for increasing our coffee shop's customer base. | 4.0 | Very Effective |
| **Social Media Marketing** | | |
| Marketing on Facebook is effective for our coffee shop's customer engagement. | 3.7 | Very Effective |
| Using Twitter is effective for our coffee shop's real-time communication. | 1.3 | Not Effective |
| Posting on Instagram is effective for visually showcasing our coffee shop. | 2.9 | Effective |
| Creating content on TikTok is effective for engaging with a younger audience. | 2.5 | Effective |

As shown in Table 2.9 most of the questions about conformance to marketing strategies are effective for a coffee shop business. It can be seen from the table above that most of the services offered by the coffee shop were marked as Very effective with a weighted mean ranging from 3.0 to 3.8.

The statements of conformance to the traditional marketing programs “Customer referral is effective for increasing our coffee shop's customer base” gained a weighted mean of 4.0 which means that the respondents answered that customer referral is very effective for increasing a coffee shop’s customer base. Lastly, the “Using Flyers is an effective marketing strategy for our coffee shop” gained a weighted mean of 3.0 which means that respondents answered that the usage of flyers is somewhat effective for marketing strategy.

The question of conformance to the social media marketing “Marketing on Facebook is effective for our coffee shop's customer engagement” obtained a weighted mean of 3.7 which means that respondents answered that marketing on Facebook is very effective for the coffee shop’s customer engagement.

Lastly, the “Using Twitter is effective for our coffee shop's real-time communication” with a weighted mean of 1.3 which falls under the category of “not effective”.

This implies that coffee shops can benefit from traditional and social media marketing techniques, as demonstrated by Table 24's interpretation of Likert scale questions. The impact of traditional tactics on brand awareness and client acquisition is demonstrated by their high rating, which includes flyers, signage, word-of-mouth promotion, and customer referrals. In a similar vein, social media sites like Facebook and Instagram are seen to be useful for attracting customers and providing a visual representation of the coffee shop. Although certain platforms, such as Twitter and TikTok, have received lower ratings, the industry's overall favorable ratings demonstrate its adaptability and ingenuity in using a variety of marketing channels to propel corporate growth and establish effective consumer connections. According to Capper (2019), customer Referrals stand out as one of the most impactful advertising methods. When patrons have a positive experience at a cafe, they often recommend it to their acquaintances. Offering a complimentary cup of coffee as an incentive for referrals can be an effective way to encourage this behavior. While, as per Tampon (2023) companies have the option to utilize Facebook Advertising as a strategy to promote discount offers and seasonal campaigns, aiming to reach their desired audience. Additionally, businesses based in the Philippines can leverage Facebook Ads to acquire customers for as little as Php10.00 by initiating communication through their Facebook page.

**2.10 Legal Requirements**

*Table 2.10 Interpretation of Likert scale questions of Coffee Shops as to the compliance of Legal Requirements*

| Legal Requirements | Weighted Mean | Verbal Interpretation |
|---|---|---|
| DTI or SEC Registration is necessary for operating our coffee shop legally. | 3.8 | Absolutely Necessary |
| Obtaining a business permit is necessary for our coffee shop to function within local regulations. | 4.0 | Absolutely Necessary |
| BIR Registration is necessary for fulfilling our tax obligations. | 4.0 | Absolutely Necessary |
| Health Department Inspection is necessary for ensuring food safety in our coffee shop. | 3.8 | Absolutely Necessary |
| Food Handling Certification is necessary for maintaining proper food service standards. | 3.6 | Absolutely Necessary |
| Fire Safety Certification is necessary for ensuring our coffee shop's compliance with fire regulations. | 3.7 | Absolutely Necessary |
| Acquiring a Barangay Permit is necessary for meeting community-level business operation standards. | 2.1 | Somewhat Necessary |

As shown in table 2.10 most of the questions about compliance of legal requirements for a coffee shop business. It can be seen from the table above that most of the legal requirements by the coffee shop were marked as absolutely necessary with a weighted mean ranging from 3.6 to 4.0.

The compliance of legal requirements “Obtaining a business permit is necessary for our coffee shop to function within local regulations and BIR Registration is necessary for fulfilling our tax obligations” obtained a weighted mean of 4.0 which means that some of the respondents answered that obtaining business permit and BIR registration falls under the category of “absolutely necessary”.

Lastly, the “Acquiring a Barangay Permit is necessary for meeting community-level business operation standards” gained a weighted mean of 2.1 which means that acquiring a barangay permit falls under the category of “somewhat necessary”.

Coffee shops have a positive dedication to following relevant regulations and standards, as indicated by Table 2.10's interpretation of Likert scale questions about legal requirements. Important prerequisites like tax registrations, company permissions, and certificates for food safety are considered vital, indicating a strong compliance culture in the sector. Overall, there is a good understanding of how important it is to operate within the confines of the law to ensure safety and well-being, even though some community-level permits receive a somewhat lower rating. This dedication builds consumer trust, cultivates a great reputation, and supports coffee shop businesses' long-term success. As per Tampon (2023), establishments such as coffee shops must obtain a BIR Clearance before obtaining additional permissions. Depending on the nature of their firm, applicants must fill out one of the BIR forms to receive this clearance, which is provided by the Bureau of Internal Revenue. As per (Tampon, 2023), establishments such as coffee shops must obtain a BIR Clearance before obtaining additional permissions. Depending on the nature of their firm, applicants must fill out one of the BIR forms to receive this clearance, which is provided by the Bureau of Internal Revenue. Furthermore, a Mayor's Permit, also referred to as a business permit, is required for coffee shop businesses, according to (Tampon, 2023). The coffee business is guaranteed to operate safely within the city's regulations thanks to this authorization. Coffee shop owners are only eligible to apply for this permit once they have registered their company with the SEC and DTI and received all required certifications.

**2.11 Return on Investment (ROI)**

*Table 2.11 Frequency and Percentage of Coffee Shops as to the Expected Return on Investment (ROI)*

| Return on Investment (ROI) | Frequency | Percentage |
|---|---|---|
| 6 months – 1 year | 4 | 40% |
| 1 year - 2 years | 4 | 40% |
| 2 years - 3 years | 2 | 20% |
| 4 years and Above | 0 | 0 |
| **Total** | **10** | **100%** |

Table 2.11 shows the Return on Investment of Coffee Shops. It can be observed that out of ten (10) respondents, there are four (4) respondents each with an average of 40% that answered their expected Return on Investment is from 6 months to 1 year and 1 year to 2 years. While there are two (2) respondents with an average of 20% that answered 2 years to 3 years. Hence, the 4 years and above has no respondents, and the percentage is 0.

In terms of return on investment (ROI), Table 2.11 shows that coffee shop operations have a bright future. According to the research, 40% of coffee shops reach a return on investment in less than six months to a year, and another 40% do so in less than two years. This implies that a sizable percentage of coffee shop enterprises see a prompt and advantageous return on investment. Furthermore, 20% of projects see a return on investment in less than two to three years, suggesting room for long-term expansion and industry sustainability. All things considered, the data points to a favorable financial environment and promotes further investment in the coffee shop industry.

In the study of Barlow & Barlow (2023) coffee shops' original investment, ongoing costs, revenue, and rate of expansion all affect how long it takes them to break even and return on their investment. A coffee shop typically needs one to three years to reach a break-even threshold, at which point it begins to turn a profit.

**3. Implication of "Profiling of Cafe Business in Talavera, Nueva Ecija: A Basis for Development of Standardized Checklist of Minimum Requirement for Starting up a Coffee Shop Business" based on the findings of the study.**

The implications of this study extend beyond the coffee shop sector, offering valuable lessons for the wider business landscape. The significant presence of young, educated females as coffee shop owners presents insightful implications for the broader business landscape. This demographic trend not only highlights the entrepreneurial spirit among young women but also suggests a shift in traditional business ownership dynamics. The involvement of these individuals in the coffee shop industry serves as a case study for the potential empowerment and economic engagement of women in other sectors.

Moreover, the balance struck between tradition and innovation in the coffee shop industry serves as a blueprint for businesses across sectors. It illustrates the importance of preserving core industry practices while also embracing technological advancements and innovative methods to stay competitive and relevant. This balance is crucial in meeting evolving customer expectations and enhancing operational efficiency.

The critical role of customer experience, highlighted through investments in amenities and services that prioritize comfort and convenience, speaks to a universal business truth. It suggests that enhancing customer experience is a key differentiator in crowded marketplaces, regardless of the industry. Businesses that invest in understanding and improving the customer journey can foster loyalty, enhance satisfaction, and drive growth.

Additionally, the study's insights into adaptive marketing strategies, blending traditional and digital channels, reflect a broader necessity for businesses to employ flexible and comprehensive marketing approaches. This adaptability ensures broader reach and engagement, leveraging the strengths of various platforms to build brand awareness and customer connection.

The financial and legal insights derived from the study emphasize the foundational importance of sound financial management and adherence to regulatory requirements. These aspects are critical for sustaining operations, mitigating risks, and fostering long-term business growth. It highlights the need for businesses to prioritize financial acuity and legal compliance as non-negotiable elements of their strategic planning.

Lastly, the varied timelines for return on investment underscore the importance of strategic patience and long-term planning in business. It suggests that success often requires a sustained effort and the foresight to invest in growth strategies that may take time to yield dividends. This perspective encourages businesses to focus on building a sustainable model that can weather market fluctuations and evolve.

The findings from the coffee shop industry study offer a mirror to the broader business world, emphasizing the importance of demographic insights, the integration of tradition with innovation, customer experience prioritization, adaptive marketing strategies, financial diligence, and strategic long-term planning. These lessons are invaluable for businesses aiming to navigate the complexities of today's market dynamics successfully.

## 4. Proposed Manual of Operation

### "The Coffee Shop Owner's Handbook: A Guide to Building Your Dream Café"

### Introduction

This handbook is an invaluable resource for aspiring coffee shop owners. It offers comprehensive guidance on every aspect of running a successful café, presented in an accessible and engaging manner.

Beginning with the foundational steps of defining your café's unique identity and value proposition, the handbook walks you through the practicalities of daily operations. From selecting an ideal location, legal compliance to sourcing high-quality beans, from mastering the art of coffee-making to providing exceptional customer service, each chapter is filled with practical tips and advice to help you succeed.

Moreover, the handbook goes beyond business fundamentals to explore the importance of creating a welcoming and environmentally conscious café environment. It emphasizes the value of community engagement, sustainable practices, and ethical sourcing in building a thriving and socially responsible business.

With its easy-to-follow format and relatable examples, this handbook serves as a trusted companion for anyone embarking on the journey of coffee shop ownership. Whether you're a seasoned entrepreneur or a first-time business owner, let this handbook be your guide to turning your coffee dreams into reality.

**I. Business Planning**

**a) Business model and Strategy**

The coffee business is always evolving, much like any other business. Managers and owners of businesses cannot respond recklessly to trends. They require a long-term strategy for growth, a vision for expansion, and the capacity to change course when faced with difficulties. Our coffee business manual operation gives Coffeepreneurs the tools they need to run profitable coffee shops. Trends change, but these strategies for growth will help you manage the coffee business of the future:

**1. Grow Revenue With a Hybrid Model**

Every day, there is increasing competition in the coffee shop industry. To stay ahead, you need to be innovative and generate more income. Now here is the formula to increased revenue:

**Revenue growth = increased Number of transactions + increased Dollar amount per transaction**

What is meant by that? In other words, it implies that in order for a business to be successful, more customers must be making purchases and spending more money overall. This implies that you cannot count on selling ₱200 worth of coffee as your main transaction unless you have an endless list of clients.

The hybrid model is useful in this situation. You should consider selling items other than coffee at your coffee shop. Successful coffee shops have been known to combine a variety of different sources of income, such as selling flowers, pastries, and event hosting.

On the other hand, other companies are going the other way and expanding their offerings to include coffee. This manual can help Students or any young entrepreneurs who are already managing small businesses but have no experience with coffee to launch a coffee shop within their establishment. It's a clever move to makes their clients happy. Every hour of the working day can bring in more money if you provide more for everyone.

**2. Manage Costs of Goods Sold and Labor**

If costs aren't controlled, a coffee shop's net profit could suffer even if sales are increasing. The cost of labor and the cost of goods sold (COGS) are also two of the most crucial expenses to monitor.

First, let's consider COGS, which has three subcategories:

a) **Menu Pricing:** Anyone should never guess the price of a menu item; instead, it should be determined by factoring in the cost of production. The cost of ingredients, delivery, waste, and theft are all included in an item's COGS.

b) **Cost of goods available:** These are the expenses you are aware of: the products, materials, delivery charges, etc. It's the estimated cost of delivering supplies and ingredients to your door before they are sold and before theft and waste are deducted from weekly inventory counts.

c) **Waste:** This takes into account any spoiled, discarded, or even stole ingredient. It hurts to have to account for waste as a store owner. However, weekly expense tracking is necessary for a successful firm. This is a simple process that can stealthily consume a significant amount of profit yet is frequently missed.

On the other hand, the amount of money you pay employees in the form of wages, payroll taxes, and benefits is known as the cost of labor. A successful coffee business controls pay rates, the number of workers present at all times, and the amount of hours worked by employees.

Monitoring sales data every hour of the day to compare to labor coverage could be useful. Are there too many workers working overtime? Or are you having trouble making sales due of a staffing shortage? In either case, tracking this data over time can result in labor costs that are well-managed.

**3. Have a Strategy to Scale**

Getting ready for scale is the third of five clever business plans for 2022 for your coffee shop. You should anticipate growth for your coffee business if profitability is rising. But a company doesn't want to expand in an unexpected, uncontrolled, and wild manner like roots do. Rather, a company ought to develop like a garden—fed, tended, and trimmed.

One way to get started is by creating a growth plan for your coffee shop. Aiming to open one store every twelve to eighteen months is fair. The fourth store is the turning moment. By then, with steady sales and plenty of data, you will have enough demand to buy supplies in bulk at a reduced cost and roast your own coffee with little risk associated with the infrastructure investment.

But maintaining a distinctive identity is crucial as the store expands. Brands are not created by themselves; rather, they are ingrained in consumers by baristas and coffee shop operators. And superior merchandise and graphics are essential for a successful coffee shop brand. There are numerous methods to create a brand that will extend to every new coffee shop you open, from an original company concept to expertly crafted drinks to an eye-catching logo.

**4. Stay a Step Ahead of Inflation**

Data indicates that coffee businesses are impacted by increased costs brought on by inflation. Additionally, the new costs of labor, equipment, supplies, real estate, and other items intimidate a lot of small firms. Coffeepreneurs can learn from this manual on how to always be one or two steps ahead of inflation:

1. **Multiple streams of revenue.** To review this, go to the aforementioned smart business strategy #1.
2. **Effective Operations.** Managers of coffee shops are aware of a few strategies that help them maintain efficiency and speed. These include staff care, planned inventory, weekly cleanings, and cost control (see smart business approach #2).
3. **Drive Thrus. Inflation isn't a trend that's exciting—quite the contrary—but mobile dining is!** Additionally, drive-through coffee shops are speedier, more flexible, and more convenient than before. They can also be added to an already-existing firm.

**Over-inflation is Innovation.** Consider confronting an economic crisis head-on with innovative ideas and smart tactics rather than digging in to ride it out.

**5. Learn From Other Coffee Shops' Successes**

Coffee businesses can learn from the successful coffee shops that have come before them. For instance, Galindo's Coffee Co., owned by coffee entrepreneurs Sophie and Zak Galindo, is a hybrid enterprise located inside a beauty and barbershop. With excess space at their location, the pair decided to fulfill a lifelong ambition of theirs: making and selling coffee. After beginning to sell coffee to their current clientele, the rest is history. These days, people go from all over the Houston region to Galindo's for their great coffee—and maybe for a facial and haircut.

Another successful coffee shop entrepreneur is David Bednarek, a coffeepreneur and proprietor of Dwell House Coffee and Tap. He has used a varied menu, internet ordering, and other revenue streams to manage a profitable company. Dwell House operates a drive-thru and online store in addition to selling coffee, beer, and wine from its quaint setting. And he has a high-end company, just like Galindo. Customers at Salt and Waves Salon can sip adult beverages or artisan coffee while getting their hair done.

**b) Market Analysis and Target Demographics**

A **target market** is a part of the broader consumer market that a corporation has chosen to concentrate on. Businesses primarily target a particular market because they hope to sell their goods or services to that demographic.

In this manual, we will talk about the standard coffee target market, along with the types of people that are most likely to drink coffee regularly. We will also discuss some of the various ways that individuals enjoy drinking coffee.

Although coffee drinkers come from diverse backgrounds, they share some characteristics. Gaining more knowledge about the average coffee user will assist you in promoting your beverage to them.

**Who drinks Coffee?**

People that consume coffee are usually older than eighteen and between the ages of twenty-four and fifty-four. With 38% of them holding a college degree or above, they are highly educated. Furthermore, almost 60% of them have a full-time job. When it comes to coffee drinkers, there are some regional variations.

When we consider factors like gender, economic level, and whether someone lives in an urban or rural region, we find additional gaps in coffee consumption.

Variations also exist in the ways that individuals choose to drink coffee. While some like to drink it plain, others like to add sugar, cream, or milk. Others prefer to sip their coffee cold, either brewed cold or iced.

**Gender**

Men and women are equally likely to drink coffee when it comes to gender. It is more common for men to consume it on a regular basis, but women tend to drink it less frequently.

Men typically like dark roasts, while women typically want flavored coffees and milder roasts. It is equally common for men and women to add sugar, cream, or milk to their coffee (Navarro, 2022).

Income

There is a correlation between income and coffee intake. This is probably because those with greater incomes have more money that is available to them for purchases like coffee. But even people with lesser incomes are probably still habitual coffee drinkers. This is probably because a cup of coffee only costs a few pesos, making it reasonably priced.

When people believe that coffee is of a higher quality, they are generally more inclined to spend a higher price for it. For this reason, high-end coffee shops like Starbucks are so well-liked.

While Instant coffee and less expensive brands, are typically preferred by those with lower incomes.

**Urban vs Rural**

When comparing coffee consumption in urban and rural settings, a few differences can be seen. The likelihood of drinking coffee is higher among urban residents than among rural ones. This is probably because it's easier for people to satisfy their caffeine addiction in cities because there are more cafés and coffee shops there.

Living in a rural region increases the likelihood of drinking instant coffee, whereas living in a city increases the likelihood of drinking freshly made coffee. Coffee that is popular in rural regions is typically more affordable and has a stronger flavor. This is probably due to the fact that people who live in rural areas are more prone to value flavor over money (Navarro, 2022).

**How Much Coffee Do People Drink?**

Everyone's consumption of coffee differs significantly. While some people may drink many glasses daily, others may only consume one. Two cups of coffee are typically drunk by the average person.

People also differ widely in how frequently they drink coffee. While some may have multiple cups during the day, others may only drink it occasionally. Age is another factor that influences coffee intake, with younger individuals typically consuming more of it than older people (Navarro, 2022).

**The Coffee Shop Customer**

The target demographic for customers who purchase coffee online and those who visit coffee shops differs in a few ways. The most common age group among coffee shop customers is 25–34, followed by 18–24. Men are the most common gender among customers of coffee shops, followed by women. People seeking a social setting are typically drawn to coffee shops. Also, the likelihood of nearby residents visiting them is larger.

Coffee shops also typically attract a diverse customer in terms of income. This is because people who buy coffee in coffee shops are typically wealthier than people who buy it online. Compared to individuals who purchase coffee online, coffee shop customers are more likely to have some college experience. It is important to assess and contrast various coffee profiles of customers when creating or refining a target market strategy (Navarro, 2022).

**Consumer Habits**

Customer habits are changing. For example, a lot of customers are increasingly asking for coffee that comes from ethical sources. This indicates that the coffee is roasted sustainably and that the beans come from farmers who receive a fair wage.

When selling coffee to the average consumer, keep this in mind. Customers might be prepared to spend a little bit more for coffee that is roasted and obtained responsibly. The popularity of alternative milk options like oat milk and almond milk, as well as the rise of cold brew coffee, are more examples of changing consumer habits.

**Financial Projections and Budgeting**

In the Philippines, starting a profitable coffee shop requires careful financial planning. A common initial investment estimated between 500,000 to 1 million pesos, which cover necessary expenses such as inventory, equipment, permits, and rent. Continuous financial planning should take into account such as monthly costs for things like rent, utilities, salaries, supplies, marketing, maintenance, and insurance. Estimates of revenue are dependent on a number of variables, including average expenditure, daily consumer visitation, pricing policies, and variations in seasonal demand. Through careful consideration of these factors, entrepreneurs can establish a strong basis for their coffee shop business.

To elaborate the expense covered for this investment here we prepare a standardized checklist for all the tools and equipment will be needed to operate a coffee shop: (see Appendix A)

**II. Legal and Regulatory Compliance**

Operating a coffee shop in the Philippines entails compliance with various legal and regulatory requirements to ensure smooth and lawful operations. Here's an overview of key areas to consider:

1. **Business Registration:** Before opening your coffee shop, register your business with the appropriate government agencies. This typically includes securing a business permit from the local government unit where your café will be located. Additionally, you may need to register your business with the Department of Trade and Industry (DTI) or the Securities and Exchange Commission (SEC) if it's a corporation or partnership.
   - **Process:** Register your business name with the Department of Trade and Industry (DTI) or Securities and Exchange Commission (SEC) if it's a corporation or partnership. Then, secure a Barangay Clearance and Mayor's Permit from the local government unit (LGU) where your coffee shop will be located.
   - **Requirements:**

- DTI/SEC registration certificate
- Barangay Clearance application form
- Mayor's Permit application form
- Valid IDs of business owner/s

➢ **Timeline:** DTI/SEC registration: 1-3 days; Barangay Clearance: same day; Mayor's Permit: 1-2 weeks

➢ **Cost:** DTI/SEC registration: PHP 200 - PHP 3,000 (depending on business structure); Barangay Clearance: PHP 100 - PHP 500; Mayor's Permit: varies by LGU (typically PHP 1,000 - PHP 10,000+)

2. **Mayor's Permit:** The Mayor's Permit is an essential legal document issued by the local government unit (LGU) to authorize the operation of a business within its jurisdiction. It serves as proof that the business has complied with all local ordinances and regulations, including zoning requirements, health and sanitation standards, and fire safety protocols. Obtaining a Mayor's Permit is a fundamental step for entrepreneurs to establish and operate their businesses lawfully, ensuring accountability and adherence to municipal regulations.

➢ **Process:**

**1.** Submit a duly accomplished application form along with required documents to the Business Permits and Licensing Office (BPLO) of the local government unit (LGU) where your coffee shop is located.

**2.** The BPLO will assess your application, conduct inspections if necessary, and issue the Mayor's Permit upon approval.

➢ **Requirements:**

- Completed application form
- Barangay Clearance
- DTI/SEC registration certificate
- Fire Safety Inspection Certificate
- Sanitary Permit from the local health department

➢ **Timeline:** 1-2 weeks

➢ **Cost:** Varies by LGU (typically PHP 1,000 - PHP 10,000+)

**3. Health and Sanitation Standards:** Ensure compliance with health and sanitation regulations set by the Department of Health (DOH) and local health departments. This includes maintaining cleanliness in food preparation areas, proper waste disposal, and adherence to food safety protocols to prevent foodborne illnesses.

➢ **Process**:

**1.** Apply for a Health and Sanitation Permit from the local health department or municipal/city health office.

**2.** Submit required documents and undergo inspections to ensure compliance with health and sanitation standards.

**3.** Upon approval, the health department will issue the Health and Sanitation Permit.

➢ **Requirements:**

- Completed application form
- Floor plan of the coffee shop
- Fire Safety Inspection Certificate
- Sanitary Permit from the Bureau of Fire Protection (BFP)

➢ **Timeline:** 1-2 weeks

➢ **Cost:** Varies by LGU (typically PHP 500 - PHP 5,000+)

**4. Labor Laws:** Familiarize yourself with labor laws and regulations governing employment in the Philippines. This includes minimum wage requirements, employee benefits such as social security and health insurance, and compliance with labor standards on working hours, breaks, and overtime pay.

➢ **Process:** Register your coffee shop with the Social Security System (SSS), Philippine Health Insurance Corporation (PhilHealth), and Home Development Mutual Fund (Pag-IBIG Fund) for employee benefits.

➢ **Requirements:**

- Accomplished registration forms
- Business permits and IDs

- **Timeline:** 1-2 weeks
- **Cost:** No registration fee, but mandatory contributions based on employee salaries apply.

**5. Taxation:** Understand your tax obligations as a business owner, including income tax, value-added tax (VAT), and local taxes. Register your coffee shop with the Bureau of Internal Revenue (BIR) and file the necessary tax returns and payments on time.

- **Process:** Register your coffee shop with the Bureau of Internal Revenue (BIR) for tax purposes.
- **Requirements:**
  - Completed BIR registration forms
  - Business permits and IDs
- **Timeline:** 1-2 weeks
- **Cost:** No registration fee, but taxes are based on income and sales.

**6. Permits and Licenses:** Secure additional permits and licenses specific to the coffee industry, such as a permit for the use of music or entertainment, if applicable. If you plan to serve alcoholic beverages, obtain a liquor license from the local government unit and comply with regulations set by the Alcohol Beverage Control Board (ABCB).

- **Process:**
  1. **If serving alcoholic beverages:** Apply for a liquor license from the LGU and comply with ABCB regulations.
  2. **If hosting live music or entertainment: Obtain permits from the LGU and comply with copyright laws.**
- **Timeline:** Varies by LGU and specific activity.
- **Cost:** Varies depending on the type of permit or license.

**7. Intellectual Property:** Protect your brand and intellectual property rights by registering trademarks for your coffee shop name, logo, and any unique products or services you offer. This helps prevent others from using similar names or designs that could confuse customers.

- **Process:** Register trademarks for your coffee shop name, logo, and unique products/services with the Intellectual Property Office of the Philippines (IPOPHL).
- **Timeline:** 6-12 months
- **Cost:** PHP 3,000 - PHP 10,000+ per trademark application.

**8. Zoning and Building Codes:** Ensure that your coffee shop complies with zoning regulations and building codes set by the local government. Obtain the necessary permits for construction or renovation work, and ensure that your café meets safety standards for fire prevention and emergency exits.

- **Process:** Obtain permits from the LGU for construction or renovation work, ensuring compliance with zoning and building codes.
- **Timeline:** 1-3 months
- **Cost:** Varies depending on the scope of construction/renovation and LGU fees.

By proactively addressing these legal and regulatory considerations, you can establish a compliant and successful coffee shop business in the Philippines while minimizing the risk of legal issues or penalties. But still consider consulting with legal and business advisors for personalized guidance tailored to your specific circumstances.

## III. LOCATION SELECTION AND SETUP:

This section, will discuss the importance of finding the right spot and arranging things just so in a coffee shop. From picking a location where people actually go to making sure the tables and chairs are set up nicely, every detail matters. Furthermore, this will explore what makes a good location, like being easy to get to and fitting in with the neighborhood, and how to create a cozy, welcoming vibe inside.

**1.) Foot Traffic:** Look for areas with high foot traffic, such as busy commercial districts, shopping centers, or university campuses. A steady flow of pedestrians increases the visibility of your coffee shop and attracts potential customers.

**2.) Proximity to Complementary Businesses:** Consider locating near complementary businesses like offices, schools, bookstores, or gyms. These establishments can generate additional traffic and provide potential customers who are likely to patronize your coffee shop.

**3.) Demographics:** Understand the demographics of the area you're considering. Look for neighborhoods with a target market that aligns with your offerings. For example, if you plan to offer specialty coffee, consider areas with a young, affluent, and trend-conscious population.

**4.) Competition Analysis:** Research existing coffee shops in the area to assess the level of competition. While some competition can indicate a healthy market, too many established coffee shops might make it challenging to carve out a niche. Look for opportunities to differentiate your offerings or fill gaps in the market.

**5.) Parking and Accessibility:** Evaluate the availability of parking spaces for customers, as well as the accessibility of public transportation options. A convenient location with ample parking or easy access to public transit can attract more customers.

**6.) Rent Costs and Lease Terms:** Consider your budget constraints and carefully evaluate the rent costs in potential locations. Negotiate favorable lease terms that allow for flexibility and growth while minimizing overhead expenses.

**7.) Ambiance and Atmosphere:** Pay attention to the ambiance and atmosphere of the neighborhood. Choose a location that aligns with the aesthetic and vibe you want to create for your coffee shop. Factors like street noise, nearby attractions, and outdoor seating opportunities can impact the overall experience for customers.

**8.) Future Development Plans:** Research any upcoming development plans or changes in the area that could affect foot traffic or property values. Being aware of future developments can help you anticipate changes in the market and adapt your business strategy accordingly.

## IV. MENU DEVELOPMENT

**Product offerings, Pricing strategy, Costing and Ingredients**

**Specialty Drinks:**

1. **Espresso**

**Ingredients & Cost:**

- Coffee beans: ₱15 - ₱20
- Water and energy costs: ₱5 - ₱10
- Disposable cup - ₱5 - ₱10
- Total cost: ₱25 - ₱40

**Procedures:**

Step 1. Prepare the espresso machine: Make sure it's turned on and heated up.

Step 2. Grind the coffee beans: Use a grinder to crush the beans into fine grounds.

Step 3. Measure the coffee: Scoop the ground coffee into the portafilter, making sure it's level.

Step 4. Tamp the coffee: Use a tamper to press the coffee grounds down firmly.

Step 5. Brew the espresso: Lock the portafilter into the machine and start the brewing process.

Step 6. Pour the espresso: Once the espresso is brewed, pour it into a cup.

**Suggested Price:** ₱80 - ₱100

2. **Cappuccino:**

**Ingredients & Cost:**

- Coffee beans: ₱20 - ₱25
- Milk: ₱10 - ₱15
- Water and energy costs: ₱5 - ₱10
- Disposable cup - ₱5 - ₱10
- Total cost: ₱40 - ₱60

**Procedures:**

Step 1. Prepare the espresso machine: Make sure it’s turned on and heated up.

Step 2. Grind the coffee beans: Use a grinder to crush the beans into fine grounds.

Step 3. Measure and tamp: Scoop the coffee grounds into the portafilter and tamp them down firmly.

Step 4. Brew the espresso: Lock the portafilter into the machine and start the brewing process.

Step 5. Steam the milk: Pour cold milk into a steaming pitcher. Submerge the steam wand in the milk and turn it on. Move the pitcher in a circular motion to froth the milk until it doubles in volume.

Step 6. Pour the espresso: Once the espresso is ready, pour it into a cup.

Step 7. Add the milk: Hold back the foam with a spoon and pour the steamed milk into the cup, aiming for a 1:1:1 ratio of espresso, steamed milk, and foam.

Step 8. Finish with foam: Spoon the remaining foam on top of the cappuccino.

**Suggested Price:** ₱120 - ₱150

**3. Latte:**

**Ingredients & Cost:**

- Coffee beans: ₱15 - ₱25
- Milk: ₱10 - ₱15
- Water and energy costs: ₱5 - ₱10
- Disposable cup - ₱5 - ₱10
- Total cost: ₱35 - ₱60

**Procedures:**

Step 1. Prepare the espresso machine: Make sure it's turned on and heated up.

Step 2. Grind the coffee beans: Use a grinder to crush the beans into fine grounds.

Step 3. Measure and tamp: Scoop the coffee grounds into the portafilter and tamp them down firmly.

Step 4. Brew the espresso: Lock the portafilter into the machine and start the brewing process.

Step 5. Steam the milk: Pour cold milk into a steaming pitcher. Submerge the steam wand in the milk and turn it on. Froth the milk until it's silky and has doubled in volume.

Step 6. Pour the espresso: Once the espresso is ready, pour it into a cup.

Step 7. Add the steamed milk: Hold back the foam with a spoon and pour the steamed milk into the cup, leaving room at the top.

Step 8. Top with foam: Spoon a dollop of foam on top of the latte.

**Suggested Price:** ₱120 - ₱150

4. **Americano:**

**Ingredients & Cost:**

- Coffee beans: ₱10 - ₱20

- Water and energy costs: ₱5 - ₱10
- Disposable cup - ₱5 - ₱10
- Total cost: ₱20 - ₱40

**Procedures:**

Step 1. Prepare the espresso machine: Make sure it's turned on and heated up.

Step 2. Grind the coffee beans: Use a grinder to crush the beans into fine grounds.

Step 3. Measure the coffee: Scoop the ground coffee into the portafilter, making sure it's level.

Step 4. Tamp the coffee: Use a tamper to press the coffee grounds down firmly.

Step 5. Brew the espresso: Lock the portafilter into the machine and start the brewing process.

Step 6. Pour the espresso: Once the espresso is brewed, pour it into a cup.

Step 7. Add hot water: Pour hot water into the cup with the espresso, adjusting the ratio to your preference. Typically, an Americano has a 1:1 or 2:1 ratio of water to espresso.

Optional: Add sugar, milk, or cream according to the customer taste.

**Suggested Price:** ₱90 - ₱110

**5. Mocha:**

**Ingredients & Cost:**

- Coffee beans: ₱20 - ₱30
- Milk - ₱5 - ₱10
- Chocolate syrup or Cocoa powder - ₱10 - ₱20
- Whipped cream - ₱5 - ₱10
- Water and energy costs: ₱5 - ₱10
- Disposable cup - ₱5 - ₱10
- Total cost: ₱50 - ₱80

**Procedures:**

Step 1. Prepare the espresso machine: Make sure it's turned on and heated up.

Step 2. Grind the coffee beans: Use a grinder to crush the beans into fine grounds.

Step 3. Measure the coffee: Scoop the ground coffee into the portafilter, making sure it's level.

Step 4. Tamp the coffee: Use a tamper to press the coffee grounds down firmly.

Step 5. Brew the espresso: Lock the portafilter into the machine and start the brewing process.

Step 6. Steam the milk: Froth and steam the milk until creamy.

Step 7. Mix the ingredients: Pour the brewed espresso into a cup, then add chocolate syrup or cocoa powder.

Step 8. Add milk: Pour steamed milk into the cup over the espresso and chocolate mixture.

Step 9. Top with whipped cream: Optional but recommended for added richness and flavor.

**Suggested Price:** ₱130 - ₱160

**6. Macchiato:**

**Ingredients & Cost:**

- Coffee beans: ₱20 - ₱30
- Milk - ₱5 - ₱10
- Water and energy costs: ₱5 - ₱10
- Disposable cup - ₱5 - ₱10
- Total cost: ₱35 - ₱60

**Procedures:**

Step 1. Prepare the espresso machine: Make sure it's turned on and heated up.

Step 2. Grind the coffee beans: Use a grinder to crush the beans into fine grounds.

Step 3. Measure the coffee: Scoop the ground coffee into the portafilter, making sure it's level.

Step 4. Tamp the coffee: Use a tamper to press the coffee grounds down firmly.

Step 5. Brew the espresso: Lock the portafilter into the machine and start the brewing process.

Step 6. Pour the espresso: Once the espresso is brewed, pour it into a cup.

Step 7. Extract the espresso: Pull a single shot of espresso.

Step 8. Steam the milk: Froth a small amount of milk until it has a velvety texture.

Step 9. Add milk to espresso: Pour a dollop of steamed milk into the espresso, leaving a small mark or "stain" on the surface.

**Suggested Price:** ₱100 - ₱120

7. **Flat White:**

**Ingredients & Cost:**

- Coffee beans: ₱20 - ₱30
- Milk - ₱5 - ₱10
- Water and energy costs: ₱5 - ₱10
- Disposable cup - ₱5 - ₱10
- Total cost: ₱35 - ₱60

**Procedures:**

Step 1. Prepare the espresso machine: Make sure it's turned on and heated up.

Step 2. Grind the coffee beans: Use a grinder to crush the beans into fine grounds.

Step 3. Measure the coffee: Scoop the ground coffee into the portafilter, making sure it's level.

Step 4. Tamp the coffee: Use a tamper to press the coffee grounds down firmly.

Step 5. Brew the espresso: Lock the portafilter into the machine and start the brewing process.

Step 6. Steam the milk: Froth and steam the milk until it has a velvety texture.

Step 7. Pour the milk: Pour the steamed milk into a small pitcher, holding back the foam with a spoon.

Step 8. Pour the espresso: Once the espresso is brewed, pour it into a preheated cup.

Step 8. Add milk to espresso: Pour the steamed milk over the espresso, holding back the foam with a spoon to achieve a velvety texture.

Step 9. Create the microfoam: Spoon a thin layer of milk foam on top of the drink, ensuring a smooth and creamy texture.

**Suggested Price:** ₱120 - ₱150

**8. Cold Brew:**

**Ingredients & Cost:**

- Coffee beans: ₱20 - ₱30
- Water and energy costs: ₱5 - ₱10
- Disposable cup - ₱5 - ₱10
- Total cost: ₱30 - ₱50

**Procedures:**

Step 1. Grind the coffee beans: Coarsely grind the coffee beans to enhance extraction and prevent bitterness.

Step 2. Measure the coffee: Add the ground coffee to a cold brew filter bag or a French press. Use a ratio of approximately 1:4 coffee to water for a concentrated cold brew.

Step 3. Add water: Pour cold, filtered water over the coffee grounds, ensuring that all grounds are saturated.

Step 4. Stir: Gently stir the mixture to ensure even extraction.

Step 5. Brew: Seal the container or cover the French press and let the cold brew steep in the refrigerator for 12-24 hours.

Step 6. Strain: After steeping, remove the filter bag or press down the plunger on the French press to separate the grounds from the liquid.

Step 7. Serve: Pour the cold brew into a cup filled with ice.

**Suggested Price: ₱120 - ₱150**

**9. Iced Coffee:**

**Ingredients & Cost:**

- Coffee beans: ₱20 - ₱30
- Ice: ₱5 - ₱10
- Water and energy costs: ₱5 - ₱10
- Disposable cup - ₱5 - ₱10
- Total cost: ₱35 - ₱55

**Procedures:**

Step 1. Brew the coffee: Prepare a fresh pot of hot coffee using your preferred brewing method, such as drip or French press.

Step 2. Cool the coffee: Allow the brewed coffee to cool to room temperature.

Step 3. Chill the coffee: Transfer the cooled coffee to the refrigerator to chill for at least 1 hour.

Step 4. Fill a cup with ice: Fill a disposable cup with ice cubes.

Step 5. Pour the chilled coffee: Once the coffee is thoroughly chilled, pour it over the ice in the cup.

Step 6. Optional: Add milk, cream, sugar, or flavorings according to customer preference.

Step 7. Stir: Stir the coffee and ice together to combine.

**Suggested Price: ₱100 - ₱120**

10. Frappe:

**Ingredients & Cost:**

- Instant coffee or coffee concentrate: ₱10 - ₱20
- Milk: ₱5 - ₱10
- Sugar or sweetener: ₱5 - ₱10
- Ice: ₱10 - ₱15
- Whipped cream: ₱5 - ₱10
- Optional flavorings (e.g., chocolate syrup, caramel syrup): ₱5 - ₱20
- Water and energy costs: ₱5 - ₱10
- Disposable cup - ₱5 - ₱10
- Total cost: ₱50 - ₱105

**Procedures:**

Step 1. Prepare the coffee base: In a blender, combine instant coffee or coffee concentrate with milk and sugar or sweetener to taste.

Step 2. Add ice: Add a generous amount of ice cubes to the blender.

Step 3. Blend: Blend the mixture until smooth and frothy.

Step 4. Pour into a cup: Pour the blended frappe into a disposable cup.

Step 5. Top with whipped cream: Add a dollop of whipped cream on top of the frappe.

Step 6. Optional: Drizzle with chocolate syrup, caramel syrup, or any other desired flavorings.

**Suggested Price: ₱150 - ₱200**

**Non-Caffeine Drinks:**

- The preparation of non-caffeine drinks varies widely depending on the specific beverage. For herbal teas, steep the tea in hot water for the recommended time. For fruit juices and smoothies, blend together the desired fruits with ice or other ingredients.

**1. Herbal Teas:**

**Ingredients & Cost:**

- Herbal tea bags or loose leaf herbal tea: ₱10 - ₱30
- Honey or sweetener (optional): ₱2 - ₱5
- Sugar or sweetener: ₱5 - ₱10
- Lemon slices (optional): ₱2 - ₱5
- Water and energy costs: ₱5 - ₱10

 

- Disposable cup - ₱5 - ₱10
- Total cost: ₱29 - ₱70

**Procedures:**

Step 1. Boil water: Heat water to the appropriate temperature based on the type of herbal tea being used.

Step 2. Steep the tea: Place the herbal tea bag or loose leaf herbal tea in a cup and pour the hot water over it. Let it steep for the recommended time (typically 5-10 minutes).

Step 3. Add sweetener (optional): If desired, add honey or sweetener to taste.

Step 4. Add lemon (optional): Optionally, add a slice of lemon for flavor.

Suggested Price: ₱70 - ₱90

2. **Fruit Juice:**

**Ingredients & Cost:**

- Fresh fruits (e.g., oranges, apples, pineapples): ₱20 - ₱40
- Ice: ₱5 - ₱10
- Sugar or sweetener (optional): ₱2 - ₱5
- Water and energy costs: ₱5 - ₱10
- Disposable cup - ₱5 - ₱10
- Total cost: ₱37 - ₱75

**Procedures:**

Step 1. Prepare the fruits: Wash and peel the fruits as needed.

Step 2. Juice the fruits: Use a juicer or blender to extract the juice from the fruits. Strain the juice if necessary to remove any pulp.

Step 3. Sweeten (optional): If desired, add sugar or sweetener to the juice and stir until dissolved.

Step 4. Chill: Place the fruit juice in the refrigerator to chill for a refreshing taste.

Step 5. Fill a cup with ice: Fill a disposable cup with ice cubes.

Step 6. Pour the fruit juice: Once chilled, pour the fruit juice over the ice in the cup.

**Suggested Price: ₱80 - ₱100**

3. **Smoothies:**

**Ingredients & Cost:**

- Frozen mixed berries: ₱20 - ₱30
- Banana: ₱5 - ₱10
- Yogurt: ₱10 - ₱15
- Honey or agave syrup: ₱5 - ₱10
- Almond milk: ₱10 - ₱15
- Ice cubes: ₱5 - ₱10
- Water and energy costs: ₱5 - ₱10
- Disposable cup - ₱5 - ₱10
- Total cost: ₱65 - ₱110

**Procedures:**

Step 1. Prepare the blender: Ensure it's clean and ready for use.

Step 2. Add ingredients: Put frozen mixed berries, banana, yogurt, honey or agave syrup, almond milk, and ice cubes into the blender.

Step 3. Blend: Blend the ingredients until smooth and creamy. Add more almond milk if necessary to reach desired consistency.

Step 4. Optional: Add toppings like sliced fruits, granola, or shredded coconut.

Step 5. Serve: Pour the smoothie into a cup or glass.

**Suggested Price: ₱120 - ₱150**

**Pastries and Snacks:**

**1. Croissants:**

Ingredients & Cost:

- All-purpose flour: ₱20 - ₱30
- Butter: ₱10 - ₱20
- Sugar: ₱5 - ₱10
- Salt: ₱2 - ₱5
- Yeast: ₱5 - ₱10
- Milk: ₱5 - ₱10
- Egg: ₱5 - ₱10
- Water and energy costs: ₱5 - ₱10
- Total cost: ₱57 - ₱105

**Procedures:**

Step 1. Prepare the dough:

- Mix flour, sugar, salt, and yeast in a bowl.
- Cut cold butter into small pieces and add to the flour mixture.
- Mix until crumbly.
- Gradually add warm milk and beaten egg, kneading until a smooth dough forms.

Step 2. Shape the croissants:

- Roll out the dough into a rectangle on a floured surface.
- Cut the dough into triangles.
- Roll each triangle from the wide end to the tip, forming a crescent shape.

Step 3. Proofing and baking:

- Place the croissants on a baking sheet lined with parchment paper.
- Let them proof in a warm place until doubled in size.
- Preheat the oven to 375°F (190°C).
- Brush the croissants with egg wash.
- Bake for 15-20 minutes, or until golden brown.

**Suggested Price: ₱120 - ₱150**

**2. Muffins:**

Ingredients & Cost:

- All-purpose flour: ₱10 - ₱20
- Butter - ₱2 - ₱5
- Sugar: ₱5 - ₱10
- Baking powder: ₱3 - ₱5
- Salt: ₱2 - ₱5
- Milk: ₱5 - ₱10
- Vegetable oil: ₱5 - ₱10
- Egg: ₱5 - ₱10
- Optional add-ins (chocolate chips, blueberries, etc.): ₱10 - ₱20
- Water and energy costs: ₱5 - ₱10
- Total cost: ₱52 - ₱105

**Procedures:**

Step 1. Preheat the oven to 375°F (190°C) and prepare muffin tin with liners or grease.

Step 2. In a mixing bowl, whisk together flour, sugar, baking powder, and salt.

Step 3. In another bowl, mix milk, vegetable oil, and egg until well combined.

Step 4. Pour the wet ingredients into the dry ingredients and stir until just combined. Do not overmix.

Step 5. Fold in any optional add-ins, such as chocolate chips or blueberries.

Step 6. Spoon the batter into the muffin cups, filling each about 2/3 full.

Step 7. Bake for 18-20 minutes, or until a toothpick inserted into the center comes out clean.

Step 8. Allow muffins to cool in the tin for 5 minutes before transferring to a wire rack to cool completely.

**Suggested Price: ₱120 - ₱150**

**3. Cookies:**

Ingredients & Cost:

- All-purpose flour: ₱5 - ₱10
- Butter - ₱10 - ₱15
- Sugar: ₱5 - ₱10
- Brown sugar: ₱5 - ₱10
- Egg: ₱5 - ₱10
- Vanilla extract: ₱2 - ₱5
- Baking soda: ₱2 - ₱5
- Salt: ₱1 - ₱3
- Chocolate chips or nuts (optional): ₱10 - ₱20
- Water and energy costs: ₱5 - ₱10
- Total cost: ₱50 - ₱98

**Procedures:**

Step 1. Preheat the oven to 350°F (175°C) and line a baking sheet with parchment paper.

Step 2. In a mixing bowl, cream together softened butter, sugar, and brown sugar until light and fluffy.

Step 3. Beat in the egg and vanilla extract until well combined.

Step 4. In a separate bowl, whisk together flour, baking soda, and salt.

Step 5. Gradually add the dry ingredients to the wet ingredients, mixing until just combined.

Step 6. Fold in chocolate chips or nuts, if using.

Step 7. Drop spoonfuls of dough onto the prepared baking sheet, leaving space between each cookie.

Step 8. Bake for 8-10 minutes, or until the edges are golden brown.

Step 9. Allow the cookies to cool on the baking sheet for a few minutes before transferring to a wire rack to cool completely.

**Suggested Price: ₱90 - ₱130**

**4. Brownies:**

Ingredients & Cost:

- All-purpose flour: ₱5 - ₱10
- Butter - ₱10 - ₱15
- Sugar: ₱5 - ₱10
- Cocoa powder: ₱10 - ₱15
- Eggs: ₱5 - ₱10
- Vanilla extract: ₱2 - ₱5
- Baking powder: ₱2 - ₱5
- Salt: ₱1 - ₱3
- Chocolate chips (optional): ₱10 - ₱20
- Water and energy costs: ₱5 - ₱10
- Total cost: ₱55 - ₱103

**Procedures:**

Step 1. Preheat the oven to 350°F (175°C) and grease a baking pan.

Step 2. In a saucepan, melt the butter over low heat.

Step 3. Remove from heat and stir in sugar, eggs, and vanilla extract until well combined.

Step 4. In a separate bowl, sift together flour, cocoa powder, baking powder, and salt.

Step 5. Gradually add the dry ingredients to the wet ingredients, mixing until just combined.

Step 6. Fold in chocolate chips, if using.

Step 7. Pour the batter into the prepared baking pan and spread evenly.

Step 8. Bake for 20-25 minutes, or until a toothpick inserted into the center comes out with a few moist crumbs.

Step 9. Allow the brownies to cool in the pan before cutting into squares.

**Suggested Price: ₱90 - ₱130**

**5. Sandwiches:**

Ingredients & Cost:

- Bread slices: ₱5 - ₱10
- Protein (grilled chicken, tuna, turkey, etc.): ₱30 - ₱50
- Cheese slices: ₱10 - ₱15
- Vegetables (lettuce, tomato, cucumber, etc.): ₱10 - ₱20

- Condiments (mayonnaise, mustard, etc.): ₱20 - ₱30
- Water and energy costs: ₱5 - ₱10
- Total cost: ₱80 - ₱135

**Procedures:**

Step 1. Prepare the ingredients:

- Lay out the bread slices.
- Place the protein (e.g., grilled chicken, tuna, turkey) on one slice of bread.
- Add cheese slices on top of the protein.
- Layer with vegetables such as lettuce, tomato, and cucumber.
- Spread condiments on the other slice of bread.

Step 2. Assemble the sandwich:

- Place the condiment-covered slice of bread on top of the protein, cheese, and veggies to form a sandwich.

Step 3. Optional: Cut the sandwich in half for easier handling.

**Suggested Price: ₱130 - ₱180**

**6. Nachos:**

Ingredients & Cost:

- Tortilla chips: ₱20 - ₱30
- Cheese (shredded): ₱10 - ₱20
- Black beans: ₱5 - ₱10
- Salsa: ₱5 - ₱10
- Sour cream: ₱10 - ₱15
- Guacamole: ₱10 - ₱15
- Jalapenos (optional): ₱5 - ₱10
- Water and energy costs: ₱5 - ₱10
- Total cost: ₱70 - ₱120

**Procedures:**

Step 1. Preheat the oven to 350°F (175°C).

Step 2. Spread a layer of tortilla chips on a baking sheet.

Step 3. Sprinkle shredded cheese evenly over the tortilla chips.

Step 4. Add black beans on top of the cheese.

Step 5. Bake in the preheated oven for 5-7 minutes, or until the cheese is melted and bubbly.

Step 6. Remove from the oven and drizzle salsa over the nachos.

Step 7. Add dollops of sour cream and guacamole on top.

**Suggested Price: ₱120 - ₱150**

**7. Wraps:**

Ingredients & Cost:

- Tortilla wraps: ₱10 - ₱20
- Protein (grilled chicken, turkey, tofu, etc.): ₱15 - ₱30

- Vegetables (lettuce, tomato, cucumber, etc.): ₱5 - ₱10
- Cheese (optional): ₱5 - ₱10
- Sauce or dressing: ₱5 - ₱10
- Water and energy costs: ₱5 - ₱10
- Total cost: ₱45 - ₱90

**Procedures:**

Step 1. Lay out a tortilla wrap on a clean surface.

Step 2. Place the protein (e.g., grilled chicken, turkey, tofu) in the center of the wrap.

Step 3. Add vegetables such as lettuce, tomato, and cucumber on top of the protein.

Step 4. If desired, sprinkle cheese on top of the vegetables.

Step 5. Drizzle sauce or dressing over the ingredients.

Step 6. Fold the sides of the tortilla inward, then roll it up tightly from the bottom to form a wrap.

Step 7. Optional: Heat the wrap in a skillet or microwave for a warm option.

**Suggested Price: ₱90 - ₱130**

**8. Fries:**

Ingredients & Cost:

- Ready-made frozen fries: ₱20 - ₱30
- Cooking oil (optional for frying): ₱10 - ₱20
- Salt: ₱3 - ₱5
- Ketchup: ₱5 - ₱10
- Mayonnaise: ₱5 - ₱10
- Garlic powder: ₱2 - ₱5
- Paprika: ₱2 - ₱5
- Water and energy, gas costs: ₱10 - ₱20
- Total cost: ₱57 - ₱105

**Procedures:**

Step 1. Preheat the oven according to the instructions on the package of the frozen fries.

Step 2. Arrange the frozen fries in a single layer on a baking sheet.

Step 3. Bake the fries in the preheated oven for the recommended time or until they are golden brown and crispy.

Step 4. If desired, you can also fry the frozen fries in hot oil for a crispier texture.

Step 5. Heat the oil in a deep fryer or large pot to 350°F (175°C) and fry the fries until golden brown and crispy.

Step 6. Once cooked, remove the fries from the oven or oil and drain any excess oil on paper towels.

Step 7. Sprinkle salt over the fries while they are still hot.

Step 8. In a small bowl, combine equal parts of ketchup and mayonnaise for the dipping sauce.

Step 9. Add a pinch of garlic powder and paprika to the mixture for extra flavor.

Step 10. Stir until all ingredients are well combined.

**Suggested Price: ₱90 - ₱150**

**9. Pasta:**

Spaghetti

Ingredients & Cost:

- Spaghetti pasta: ₱20 - ₱30
- Olive oil: ₱5 - ₱10
- Garlic cloves: ₱2 - ₱5
- Tomato sauce: ₱10 - ₱20
- Salt and pepper: ₱1 - ₱3
- Grated cheese (optional): ₱5 - ₱10
- Water and energy, gas costs: ₱20 - ₱30
- Total cost: ₱63 - ₱108

**Procedures:**

Step 1. Bring a large pot of salted water to a boil.

Step 2. Add the spaghetti pasta to the boiling water and cook according to package instructions.

Step 3. While the pasta is cooking, heat olive oil in a large skillet over medium heat.

Step 4. Add minced garlic to the skillet and sauté until fragrant.

Step 5. Pour in the tomato sauce and season with salt and pepper to taste.

Step 5. Simmer the sauce for a few minutes until it thickens slightly.

Step 6. Once the spaghetti is cooked, drain it and add it to the skillet with the tomato sauce.

Step 7. Toss the spaghetti with the sauce until well coated.

Step 8. Optionally topped with grated cheese.

**Suggested Price: ₱150 - ₱200**

**Carbonara**

Ingredients & Cost:

- Spaghetti pasta: ₱20 - ₱30
- Bacon or pancetta: ₱15 - ₱25
- Eggs: ₱5 - ₱10
- Parmesan cheese: ₱10 - ₱20
- Olive oil: ₱5 - ₱10
- Garlic cloves: ₱2 - ₱5
- Salt and pepper: ₱1 - ₱3
- Water and energy, gas costs: ₱20 - ₱30
- Total cost: ₱78 - ₱133

**Procedures:**

Step 1. Bring a large pot of salted water to a boil.

Step 2. Cook the spaghetti pasta in the boiling water according to package instructions.

Step 3. While the pasta is cooking, heat olive oil in a large skillet over medium heat.

Step 4. Add minced garlic to the skillet and sauté until fragrant.

Step 5. Add chopped bacon or pancetta to the skillet and cook until crispy.

Step 6. In a separate bowl, whisk together eggs, grated Parmesan cheese, salt, and pepper.

Step 7. Once the spaghetti is cooked, drain it and add it to the skillet with the bacon and garlic.

Step 8. Turn off the heat and quickly pour the egg and cheese mixture over the hot pasta, tossing continuously to coat the pasta evenly.

Step 9. The heat from the pasta will cook the eggs, creating a creamy sauce.

Step 10. Optionally garnished with additional grated Parmesan cheese and freshly cracked black pepper.

**Suggested Price: ₱170 - ₱220**

10. Waffle:

Ingredients & Cost:

- All-purpose flour: ₱10 - ₱15
- Baking powder: ₱5 - ₱10
- Salt: ₱3 - ₱5
- Sugar: ₱5 - ₱10
- Eggs: ₱10 - ₱20
- Milk: ₱5 - ₱10
- Butter: ₱5 - ₱10
- Vanilla extract (optional): ₱2 - ₱5
- Water and energy, gas costs: ₱20 - ₱30
- Total cost: ₱65 - ₱115

**Procedures:**

Step 1. Preheat your waffle iron according to the manufacturer's instructions.

Step 2. In a mixing bowl, whisk together the flour, baking powder, salt, and sugar.

Step 3. In another bowl, beat the eggs and then stir in the milk, melted butter, and vanilla extract (if using).

Step 4. Gradually add the wet ingredients to the dry ingredients, stirring until just combined. Do not overmix; some lumps are okay.

Step 5. Lightly grease the waffle iron with non-stick cooking spray or melted butter.

Step 6. Pour enough batter onto the center of the preheated waffle iron to cover about two-thirds of the surface area.

Step 7. Close the lid and cook the waffle according to the manufacturer's instructions, usually until golden brown and crispy.

Step 8. Carefully remove the waffle from the iron and serve immediately, or keep warm in a preheated oven until ready to serve.

**Suggested Price: ₱120 - ₱160**

**Breakfast and Lunch Menus:**

**1. Silog Meals:**

Ingredients & Cost:

- Rice: ₱5 - ₱10
- Eggs: ₱10 - ₱20
- Choice of meat (e.g., tocino, tapa, longganisa): ₱20 - ₱30
- Optional toppings (e.g., green onions, tomatoes, cucumber): ₱5 - ₱10
- Water and energy, gas costs: ₱10 - ₱20
- Total cost: ₱50 - ₱90

**Procedures:**

Step 1. Cook the rice according to your preferred method (e.g., rice cooker, stove-top).

Step 2. In a separate pan, cook the choice of meat until fully cooked and caramelized.

Step 3. In another pan, fry the eggs sunny-side up or according to the customer's preference.

Step 4. Once the rice, meat, and eggs are cooked, assemble the silog meal by placing the rice, meat, and eggs on a plate.

Step 5. Optional: Garnish with sliced tomatoes, cucumber, or green onions for added flavor and presentation.

**Suggested Price:** ₱100 - ₱120

**2. Rice Meals:**

Ingredients & Cost:

- Rice: ₱5 - ₱10
- Choice of protein (e.g., chicken, pork, beef, tofu): ₱30 - ₱60
- Vegetables (e.g., carrots, cabbage, bell peppers): ₱10 - ₱20
- Sauce or seasoning: ₱5 - ₱10
- Water and energy, gas costs: ₱20 - ₱30
- Total cost: ₱70 - ₱130

**Procedures:**

Step 1. Cook the rice according to your preferred method (e.g., rice cooker, stove-top).

Step 2. Prepare the protein:

- For chicken, pork, or beef: Season the meat with salt, pepper, and any desired spices. Cook until fully cooked and tender.
- For tofu: Cut the tofu into cubes and pan-fry until golden brown. Set aside.

Step 3. Prepare the vegetables:

- Wash and chop the vegetables into bite-sized pieces.
- Heat a pan with oil and stir-fry the vegetables until tender-crisp.

Step 4. Assemble the rice meal:

- Place a serving of cooked rice on a plate or in a bowl.

- Top with the cooked protein and stir-fried vegetables.
- Drizzle with sauce or sprinkle with seasoning for added flavor.

**Suggested Price: ₱120 - ₱150**

**3. Salads:**

Ingredients & Cost:

- Mixed greens (e.g., lettuce, spinach, arugula): ₱10 - ₱20
- Assorted vegetables (e.g., tomatoes, cucumbers, bell peppers, carrots): ₱10 - ₱20
- Protein (e.g., grilled chicken, tofu, boiled eggs): ₱30 - ₱60
- Dressing (e.g., vinaigrette, ranch, balsamic): ₱10 - ₱20
- Toppings (e.g., croutons, nuts, cheese): ₱10 - ₱30
- Water and energy, gas costs: ₱10 - ₱20
- Total cost: ₱80 - ₱160

Procedures:

Step 1. Prepare the greens:

- Wash and dry the mixed greens thoroughly.
- Tear or chop them into bite-sized pieces if necessary.

Step 2. Prepare the vegetables:

- Wash and chop the assorted vegetables into desired sizes.

Step 3. Prepare the protein:

- Cook the protein (e.g., grill or bake chicken, pan-fry tofu, boil eggs).Slice or cube the protein into manageable pieces.

Step 4. Assemble the salad:

- In a large bowl, combine the mixed greens and assorted vegetables.
- Arrange the protein on top of the greens.
- Sprinkle with desired toppings, such as croutons, nuts, or cheese.

Step 5. Dress the salad:

- Drizzle the desired amount of dressing over the salad.
- Toss the salad gently to ensure even distribution of dressing.

**Suggested Price: ₱140 - ₱190**

**Menu design and presentation**

1. **Front Cover:**
   - Eye-catching coffee-themed design or imagery.
   - Café logo prominently displayed.
   - Clear indication of the menu type (e.g., drinks, pastries, breakfast/lunch).

**Inside Pages:**

**1. Specialty Drinks:**

- List of coffee drinks with appealing descriptions (e.g., "Smooth and velvety latte" or "Rich and indulgent mocha").
  - Organized by category (espresso-based, cold brew, specialty drinks).
  - Prices listed clearly next to each item.

**2. Non-Caffeine Drinks:**

- Herbal teas, fruit juices, smoothies, and specialty mocktails.
- Options for dairy alternatives like almond milk or soy milk.
- Prices listed clearly.

**3. Pastries and Snacks:**

- Assortment of pastries, cookies, muffins, and brownies.
- Savory snacks like sandwiches, nachos, wraps, and fries.
- Prices listed clearly.

**4. Breakfast and Lunch Menus:**

- Silog meals, rice meals, salads, and other hearty options.
- Ingredients and descriptions for each dish.
- Prices listed clearly.

**5. Additional Information:**

- Café location and contact information.
- Operating hours.
- Special offers, loyalty programs, or upcoming events.

**Back Cover:**

- Café branding and contact information.
- Social media handles and website URL.
- Call to action (e.g., "Follow us for updates and promotions!").

**Design Elements:**

- Use of high-quality images of coffee drinks and food items.
- Clean and modern typography for easy readability.
- Cohesive color scheme that reflects the café's branding.
- Consistent layout and formatting throughout the menu.
- Consideration of space and organization to prevent overcrowding and confusion.

**Presentation:**

- Use durable materials such as laminated paper or cardstock for the menu.
- Consider incorporating eco-friendly materials or recyclable options.
- Display menus prominently at the entrance or near the counter for easy access.
- Provide additional copies at tables or seating areas for customers to peruse.
- Regularly update menus to reflect seasonal offerings or new items.

- Train staff to be knowledgeable about the menu and able to make recommendations to customers.

## V. Operations Management

**Staffing Requirements:**

**1. Baristas:**

- Responsible for preparing and serving coffee drinks, maintaining cleanliness and organization behind the counter, and providing excellent customer service.
- Baristas should have knowledge of coffee preparation techniques, espresso machines, and drink recipes.

**2. Kitchen Staff:**

- Responsible for preparing food items such as pastries, sandwiches, and salads.
- Kitchen staff should have experience working in a commercial kitchen, knowledge of food safety regulations, and the ability to work efficiently in a fast-paced environment.

**3. Cashiers/Customer Service Representatives:**

- Responsible for taking orders, processing payments, and providing friendly and efficient service to customers.
- Cashiers should have strong communication skills, basic math skills, and the ability to multitask.

**4. Manager/Supervisor:**

- Responsible for overseeing daily operations, managing staff, inventory control, scheduling, and ensuring overall customer satisfaction.
- Managers should have previous experience in a supervisory or managerial role, strong leadership and organizational skills, and a good understanding of business operations.

**Recruitment Procedures:**

**1. Job Posting:**

- Write a detailed job description for each position, outlining responsibilities, qualifications, and any specific requirements.
- Post job openings on online job boards, social media platforms, and local job fairs**.**
- Consider reaching out to local culinary schools or hospitality programs for potential candidates.

**2. Screening and Interviews:**

- Review resumes and applications to identify qualified candidates.
- Conduct initial phone screenings to assess candidates' qualifications and availability.
- Schedule in-person interviews with promising candidates to evaluate their skills, experience, and fit with the company culture.

**3. Skills Assessment:**

- For positions like baristas and kitchen staff, consider conducting a skills assessment or trial shift to evaluate candidates' ability to perform the job tasks effectively.
- This can include tasks such as making coffee drinks, food preparation, or handling customer transactions.

**4. Background Checks and References:**

- Before making a final hiring decision, conduct background checks and contact references to verify candidates' employment history and qualifications.
- This helps ensure the credibility and reliability of potential hires.

**5. Offer and Onboarding:**

- Extend job offers to selected candidates and negotiate terms such as salary, work schedule, and start date.
- -Provide new hires with an orientation session to familiarize them with coffee shop policies, procedures, and expectations.
- Offer training and ongoing support to help new employees succeed in their roles.

**Training Programs for Employee**

**1. Orientation:** Introduce new employees to the coffee shop environment, including the layout, equipment, and key areas such as the kitchen, counter, and seating area.

- ❖ Provide an overview of the coffee shop's mission, values, and customer service expectations.
- ❖ Review basic policies and procedures, including dress code, punctuality, and communication channels.

**2. Coffee Basics:**

- ❖ Provide an introduction to different coffee varieties, origins, and flavor profiles.
- ❖ Demonstrate the process of coffee bean roasting and grinding.
- ❖ Teach basic coffee brewing methods, including espresso, drip coffee, and French press.
- ❖ Train employees on how to properly use espresso machines, coffee grinders, and other equipment.

**3. Drink Preparation:**

- ❖ Walk employees through the recipes and preparation techniques for each specialty drink on the menu, including espresso-based drinks, cold brew, and specialty drinks.
- ❖ Emphasize the importance of consistency in drink preparation, including shot extraction time, milk steaming temperature, and drink presentation.
- ❖ Provide hands-on practice sessions for employees to master drink preparation techniques under supervision.

**4. Customer Service:**

- ❖ Train employees on effective communication skills, including greeting customers, taking orders, and handling customer inquiries and feedback.
- ❖ Teach employees how to provide personalized recommendations based on customer preferences and menu offerings.
- ❖ Emphasize the importance of maintaining a positive attitude, even during busy or challenging situations.

**5. Food Preparation:**

- ❖ Review the recipes and preparation techniques for all food items on the menu, including pastries, sandwiches, salads, and sides.
- ❖ Train employees on food safety and sanitation practices, including proper hand-washing, food storage, and cleaning procedures.
- ❖ Provide hands-on practice sessions for food preparation and assembly, ensuring employees understand portion sizes, presentation standards, and allergen considerations.

**6. Cash Handling and POS Systems:**

- ❖ Teach employees how to operate the point-of-sale (POS) system, including processing orders, handling cash and card transactions, and generating receipts.
- ❖ Review cash handling procedures, including counting cash, making change, and balancing cash registers at the end of each shift.
- ❖ Emphasize the importance of accuracy and honesty when handling financial transactions.

**7. Continuous Learning and Development:**

- ❖ Encourage employees to continue learning and improving their skills through ongoing training opportunities, workshops, and resources.
- ❖ Provide regular feedback and coaching to help employees identify areas for growth and development.
- ❖ Foster a supportive and collaborative work environment where employees feel empowered to share ideas and contribute to the success of the coffee shop.

**Inventory management and supply chain logistics.**

**1. Establish Inventory Procedures:**

- ➢ **Set Par Levels:** Determine the optimal quantity of each item to keep in stock to meet demand without excess inventory.

- **Categorize Items:** Group inventory items into categories such as coffee beans, dairy products, food items, disposable supplies, and cleaning supplies.
- **Implement First-In, First-Out (FIFO) Method:** Ensure that older inventory is used first to minimize waste and maintain freshness.
- **Track Inventory Levels:** Regularly monitor inventory levels to identify low stock items and potential shortages.

**2. Create Supplier Relationships:**

- **Research Suppliers:** Identify reliable suppliers for coffee beans, dairy products, food items, and other supplies needed for your coffee shop.
- **Negotiate Contracts:** Negotiate contracts with suppliers to secure favorable pricing, terms, and delivery schedules.
- **Diversify Suppliers:** Have backup suppliers in case of emergencies or disruptions with primary suppliers.
- **Communicate Expectations**: Clearly communicate your inventory needs, quality standards, and delivery requirements to suppliers.

**3. Implement Inventory Management Software:**

- **Choose the Right Software:** Select inventory management software that meets the specific needs of your coffee shop, such as tracking inventory levels, managing purchase orders, and generating reports.
- **Train Staff:** Provide training to employees on how to use the inventory management software effectively to track inventory, place orders, and manage stock levels.
- **Regular Updates:** Keep inventory records up to date by entering new inventory, updating quantities, and reconciling discrepancies regularly.

**4. Monitor and Forecast Demand:**

- **Analyze Sales Data:** Use historical sales data to identify trends and patterns in customer demand for different products.
- **Forecast Demand:** Use sales projections and seasonal trends to forecast future demand for inventory items.
- **Adjust Orders Accordingly:** Adjust inventory orders based on demand forecasts to avoid overstocking or stockouts.

**5. Control Inventory Costs:**

- **Minimize Waste**: Implement strategies to minimize waste, such as portion control, proper storage, and rotating inventory.
- **Optimize Inventory Levels:** Avoid overstocking by ordering only what is needed and maintaining lean inventory levels.
- **Monitor Costs:** Regularly review inventory costs and supplier pricing to identify cost-saving opportunities and negotiate better deals.

**6. Streamline Supply Chain Logistics:**

- **Optimize Delivery Routes:** Coordinate delivery schedules to minimize transportation costs and maximize efficiency.
- **Implement Just-In-Time (JIT) Inventory:** Utilize JIT inventory practices to reduce storage costs and improve inventory turnover.
- **Utilize Technology:** Use technology such as GPS tracking and route optimization software to streamline supply chain logistics and improve delivery accuracy.

**7. Conduct Regular Audits:**

- **Physical Inventory Counts:** Conduct regular physical inventory counts to verify inventory levels and identify any discrepancies.

- **Evaluate Performance:** Analyze inventory turnover rates, stock out occurrences, and inventory holding costs to evaluate the effectiveness of inventory management strategies.
- **Adjust Strategies:** Use audit findings to identify areas for improvement and adjust inventory management strategies as needed.

**Quality Control Measures**

**1. Source High-Quality Ingredients:**

- Procure premium coffee beans from reputable suppliers known for their quality and ethical sourcing practices.
- Ensure freshness by purchasing beans in small batches and storing them properly in airtight containers.
- Source fresh dairy products, such as milk and cream, from trusted suppliers with a reputation for quality.

**2. Train Baristas and Staff:**

- Provide comprehensive training to baristas on coffee brewing techniques, espresso extraction, milk frothing, and drink presentation.
- Educate staff on the importance of quality control in every step of the coffee-making process, from bean selection to final presentation.
- Conduct regular refresher training sessions to reinforce skills and introduce new quality control practices.

**3. Establish Standard Operating Procedures (SOPs):**

- Develop SOPs for all aspects of coffee preparation, including drink recipes, portion sizes, and equipment maintenance.
- Document procedures for cleaning and sanitizing equipment to ensure consistency and food safety compliance.
- Standardize presentation guidelines for drinks and food items to maintain a consistent brand image.

**4. Implement Quality Assurance Checks:**

- Conduct regular quality checks throughout the day to monitor the consistency and taste of coffee drinks.
- Use sensory evaluation techniques to assess the aroma, flavor, and texture of brewed coffee and espresso shots.
- Empower staff to identify and address quality issues proactively, whether it's adjusting grind settings, calibrating espresso machines, or replacing stale ingredients.

**5. Monitor Equipment Performance:**

- Schedule routine maintenance and calibration for coffee equipment, including espresso machines, grinders, and brewing equipment.
- Keep a log of equipment maintenance tasks and repairs to track performance and identify potential issues early.
- Invest in quality equipment and upgrades to ensure optimal performance and consistency in coffee production.

**6. Gather Customer Feedback:**

- Encourage customers to provide feedback on their coffee experience through comment cards, online surveys, or in-person interactions.
- Actively listen to customer feedback and use it to identify areas for improvement in product quality, service, and overall experience.
- Respond promptly to customer complaints or concerns and take corrective action to address any issues raised.

**7. Uphold Food Safety Standards:**

- Follow strict food safety protocols to prevent contamination and ensure the safety of food and beverage products.
- Train staff on proper food handling, storage, and sanitation practices, including handwashing, glove usage, and temperature control.
- Regularly inspect storage areas, refrigeration units, and preparation

surfaces to maintain cleanliness and compliance with health regulations.

**8. Continuously Improve Processes:**

- Foster a culture of continuous improvement by regularly reviewing and analyzing quality control data, customer feedback, and performance metrics.
- Engage staff in problem-solving and brainstorming sessions to identify opportunities for innovation and enhancement in product quality and service delivery.
- Implement changes and updates based on insights gained from quality control measures to drive ongoing improvement in coffee shop operations.

**Customer service standards**

**1. Warm and Welcoming Atmosphere:**

- Greet every customer with a friendly smile and welcoming demeanor as they enter the coffee shop.
- Create a warm and inviting ambiance through comfortable seating, cozy lighting, and background music.
- Train staff to engage in friendly conversation with customers, making them feel valued and appreciated.

**2. Prompt and Efficient Service:**

- Aim to serve customers quickly and efficiently, especially during peak hours.
- Ensure that orders are taken promptly, and drinks and food items are prepared and served in a timely manner.
- Maintain a sense of urgency while balancing attention to detail to provide fast but accurate service.

**3. Product Knowledge and Recommendations:**

- Train staff to have in-depth knowledge of the coffee menu, including different brew methods, flavor profiles, and specialty drinks.
- Empower baristas to make personalized recommendations based on customer preferences and taste preferences.
- Educate staff on the origin and characteristics of coffee beans used in the shop's offerings to enhance the customer experience.

**4. Attention to Detail:**

- Pay attention to the small details that contribute to the overall customer experience, such as cleanliness, presentation, and consistency.
- Ensure that drinks are prepared and served with precision, including proper milk frothing, latte art, and garnishes.
- Monitor the condition of the coffee shop environment, including tables, chairs, and restrooms, to maintain a clean and inviting atmosphere.

**5. Handling Customer Inquiries and Concerns:**

- Train staff to actively listen to customer inquiries and concerns with empathy and understanding.
- Provide prompt and helpful responses to questions about the menu, ingredients, and allergens.
- Empower employees to resolve customer complaints and issues quickly and effectively, offering solutions or refunds as needed to ensure customer satisfaction.

**6. Personalized Service:**

- Foster a culture of personalized service by addressing customers by name whenever possible and remembering their preferences.
- Encourage staff to take note of repeat customers and their usual orders, providing a personalized experience that makes them feel valued and appreciated.
- Offer customization options for drinks and food items to accommodate individual tastes and dietary restrictions.

**7. Follow-Up and Feedback:**

- Solicit feedback from customers through comment cards, online surveys, or in-person conversations to gather insights and suggestions for improvement.

- Follow up with customers after their visit to thank them for their patronage and invite them to return.
- Use feedback to identify areas for improvement and implement changes to enhance the overall customer experience.

**8. Consistent Training and Development:**

- Provide ongoing training and development opportunities for staff to improve their customer service skills, product knowledge, and communication abilities.
- Conduct regular performance evaluations and provide constructive feedback to help employees grow and develop in their roles.
- Lead by example by demonstrating exemplary customer service behavior and reinforcing the importance of customer satisfaction to the entire team.

## VI. MARKETING AND PROMOTION

### LOYALTY PROGRAM

**Understand Your Customers:** Start by understanding your customers' preferences, behaviors, and motivations. Collect data through customer surveys, feedback forms, or purchase history to gain insights into their coffee preferences, visit frequency, and spending habits.

**Define Loyalty Program Objectives:** Establish clear objectives for your loyalty program, such as increasing customer retention, driving repeat business, boosting average transaction value, or rewarding customer referrals. Ensure that your objectives align with your overall business goals.

**Choose a Loyalty Program Structure:** Select a loyalty program structure that resonates with your target audience and encourages desired behaviors. Consider options such as points-based systems, punch cards, tiered rewards, or membership programs. Choose a structure that is easy to understand and offers tangible benefits to customers.

**Offer Rewards and Incentives:**Determine the rewards and incentives you will offer to loyalty program members. Consider rewards such as free coffee drinks, discounts on purchases, exclusive access to new menu items or events, birthday rewards, or personalized offers based on purchase history.

**Promote Your Loyalty Program:** Promote your loyalty program through various marketing channels to attract sign-ups and encourage participation. Use signage in your coffee shop, social media posts, email newsletters, website banners, and in-store announcements to raise awareness and incentivize enrollment.

**Provide a Seamless Enrollment Process:** Make it easy for customers to enroll in your loyalty program by offering multiple enrollment options. Allow customers to sign up in-store, online, or through a mobile app, and streamline the enrollment process to minimize friction and encourage participation.

**Communicate Regularly:** Stay in touch with loyalty program members through regular communication channels such as email newsletters, SMS alerts, or push notifications. Keep members informed about their points balance, upcoming rewards, special promotions, and exclusive offers to keep them engaged and motivated.

**Personalize the Experience:** Personalize the customer experience for loyalty program members based on their preferences, purchase history, and behavior. Use data-driven insights to tailor offers, recommendations, and communications to each member's individual needs and preferences.

**Encourage Social Sharing:** Encourage loyalty program members to share their experiences on social media and refer friends and family to join the program. Offer incentives such as bonus points or rewards for successful referrals to incentivize word-of-mouth marketing and expand your customer base.

**Collect Feedback and Iterate:** Gather feedback from loyalty program members through surveys, polls, or feedback forms to understand their satisfaction levels and identify areas for improvement. Use this feedback to iterate and refine your loyalty program over time to better meet the needs of your customers.

**Create Engaging Customer Experiences:** Host special events, tastings, or workshops exclusively for loyalty program members to create memorable experiences and strengthen their connection to your coffee shop. Offer behind-the-scenes tours, meet-and-greets with the roaster, or coffee brewing classes to provide added value and foster loyalty.

**Track and Measure Results:** Monitor and measure the performance of your loyalty program using key performance indicators (KPIs) such as enrollment rates, redemption rates, customer retention rates, and revenue generated from loyalty program members. Use analytics tools to track results and optimize your strategies based on data-driven insights

**MARKETING STRATEGIES AND CAMPAIGN**

- Define Your Target Audience.
- Set Clear Marketing Objectives
- Develop Your Unique Selling Proposition (USP)
- Create a Marketing Budget
- Choose Marketing Channels
- Implement Content Marketing.
- Leverage Social Media
- Optimize Your Website
- Run Promotions and Offers
- Host Events and Workshops
- Collaborate with Influencers and Partners
- Track and Measure Results
- Iterate and Refine

**BRANDING GUIDELINE**

1. **Brand Identity:** Define your coffee shop's brand identity, including its mission, values, personality, and positioning in the market. Consider factors such as your target audience, unique selling points, and competitive landscape.
2. **Logo:** Design a logo that reflects your coffee shop's brand identity and resonates with your target audience. Ensure that the logo is versatile, scalable, and easily recognizable across different applications and mediums.
3. **Color Palette:** Choose a color palette that aligns with your coffee shop's brand identity and evokes the desired emotions and associations. Select primary and secondary colors that complement each other and reinforce your brand's visual identity.
4. **Typography:** Select a set of fonts that reflect your coffee shop's personality and enhance readability across various communication materials. Choose a primary font for headlines and a complementary font for body text, ensuring consistency in font styles and sizes.
5. **Visual Elements:** Define visual elements such as patterns, textures, or illustrations that can be used to enhance your coffee shop's branding and create visual interest. Ensure that these elements align with your brand identity and are used consistently across all touchpoints.
6. **Photography Style:** Develop a photography style that captures the essence of your coffee shop experience and resonates with your target audience. Consider factors such as lighting, composition, and subject matter to create visually compelling images that showcase your products and atmosphere.
7. **Voice and Tone:** Establish guidelines for the voice and tone of your coffee shop's communication. Define the characteristics of your brand's voice (e.g., friendly, informative, casual) and provide examples of appropriate language and messaging for different contexts.
8. **Brand Messaging:** Develop key messaging pillars that articulate your coffee shop's value proposition, unique selling points, and brand story. Craft compelling taglines, slogans, or mission statements that resonate with your target audience and differentiate your brand from competitors.
9. **Brand Application:** Provide guidelines for how your coffee shop's branding should be applied across various touchpoints, including signage, menus, packaging, uniforms, digital platforms, and marketing materials. Ensure consistency in logo usage, color usage, typography, and visual elements.
10. **Brand Experience:** Define the customer experience you want to create at your coffee shop, from the moment customers walk in the door to the moment they leave. Consider factors such as ambiance, service standards, product quality, and overall atmosphere to ensure a cohesive and memorable brand experience.
11. **Brand Extensions:** Consider opportunities for brand extensions or collaborations that align with your coffee shop's brand identity and values. Explore partnerships with local artisans, events, or community initiatives that reinforce your brand positioning and engage your target audience.
12. **Brand Governance:** Establish protocols for brand governance to ensure that your coffee shop's branding guidelines are followed consistently by all stakeholders, including employees, suppliers, and partners. Monitor compliance and provide on-going training and support to maintain brand integrity.

## VII. FINANCIAL MANAGEMENT

**Chart of Accounts Setup:** Establish a chart of accounts specific to a coffee business, including categories such as coffee sales, merchandise sales, cost of goods sold (COGS), operating expenses, payroll, and taxes. Create sub-accounts within each category to track different types of transactions, such as espresso drinks, brewed coffee, retail merchandise, rent, utilities, and marketing expenses.

**Point of Sale (POS) System:** Implement a POS system designed for coffee businesses to process transactions, track sales, manage inventory, and generate reports. Configure the POS system to capture detailed sales data, including itemized transactions, modifiers (e.g., size, milk type), discounts, and promotions. Integrate the POS system with accounting software to automate data entry and ensure accuracy in financial reporting.

**Daily Sales Reconciliation:** Conduct daily reconciliations to verify that sales recorded in the POS system match the cash and credit card deposits. Compare sales reports generated by the POS system with actual cash and card receipts to identify any discrepancies. Investigate and resolve any discrepancies promptly to ensure that all sales transactions are accurately recorded and accounted for.

**Inventory Management:** Implement inventory management procedures to track the movement of coffee beans, syrups, milk, cups, lids, and other supplies. Use inventory tracking software to monitor stock levels, track purchases and sales, and generate reorder alerts when inventory levels are low. Conduct regular physical inventory counts to reconcile actual inventory levels with recorded quantities in the accounting system.

**Accounts Payable (AP) and Accounts Receivable (AR):** Manage accounts payable by receiving invoices, verifying accuracy, and processing payments to suppliers in a timely manner. Monitor accounts receivable to ensure prompt payment collection from wholesale customers, follow up on overdue invoices, and reconcile customer accounts regularly. Utilize accounting software to track outstanding invoices, aging receivables, and vendor payment terms to optimize cash flow management.

**Payroll Processing:** Process payroll for employees, including baristas, kitchen staff, and managers, accurately and on time. Use payroll software to calculate wages, deductions, and taxes, generate pay stubs, and file payroll taxes with regulatory agencies. Ensure compliance with labor laws, minimum wage requirements, and overtime regulations when processing payroll for employees.

**Financial Reporting:** Generate monthly, quarterly, and annual financial statements, including income statements, balance sheets, and cash flow statements. Analyze financial performance metrics such as gross margin, net profit margin, inventory turnover, and return on investment to assess business profitability and identify areas for improvement. Provide regular financial reports to stakeholders, such as owners, investors, and lenders, to communicate the financial health and performance of the coffee business

**Internal Controls and Auditing:** Establish internal controls to safeguard assets, prevent fraud, and ensure the integrity of financial data. Implement segregation of duties to minimize the risk of errors or fraudulent activities, such as having separate individuals responsible for handling cash, recording transactions, and reconciling accounts. Conduct periodic internal audits to evaluate compliance with accounting policies and procedures, identify control weaknesses, and implement corrective actions as needed.

**Sample Cash Flow Forecast Format:**

**Cash Flow Forecast for [Coffee Shop Name]**

**Month/Quarter: [Insert Month/Quarter]**

| **Item** | **Estimated Amount ($)** | **Notes** |
|---|---|---|
| **Cash Inflows** | | |
| Coffee Sales | | Based on projected sales volume and average transaction value. |
| Food Sales | | Includes revenue from pastries, sandwiches, and other menu items. |
| Merchandise Sales | | Revenue from retail merchandise such as coffee beans, mugs, and accessories. |
| Wholesale Sales | | Revenue from selling coffee beans or products to wholesale customers. |
| Other Income | | Additional income sources such as catering, events, or rental income. |
| **Total Cash Inflows** | | Sum of all cash inflows. |
| | | |

| | | |
|---|---|---|
| **Cash Outflows** | | |
| Cost of Goods Sold (COGS) | | Includes the cost of coffee beans, milk, syrups, food ingredients, etc. |
| Operating Expenses | | Expenses such as rent, utilities, insurance, marketing, and supplies. |
| Payroll Expenses | | Wages, salaries, payroll taxes, and benefits for employees. |
| Equipment Purchases/Upgrades | | Investment in new equipment or upgrades to existing equipment. |
| Marketing and Advertising Expenses | | Expenses related to promoting the coffee shop and attracting customers. |
| Loan Payments | | Principal and interest payments on any outstanding loans. |
| Taxes and Licenses | | Business taxes, permits, and licenses required by local authorities. |
| **Total Cash Outflows** | | Sum of all cash outflows. |
| | | |
| **Net Cash Flow** | | Total cash inflows minus total cash outflows. |
| **Beginning Cash Balance** | | Cash balance at the beginning of the month/quarter. |
| **Ending Cash Balance** | | Beginning cash balance plus net cash flow. |

**Notes:**

- Adjust the estimated amounts based on historical data, market trends, and business projections.
- Be conservative with revenue estimates and factor in seasonality and external factors that may impact sales.
- Monitor actual cash flow against forecasted amounts regularly and adjust the forecast as needed to reflect changes in the business environment.
- Cash flow forecasting helps in identifying potential cash shortages or surpluses, allowing for proactive financial management and decision-making.

This template provides a framework for projecting cash flows in a coffee shop business, helping owners and managers anticipate cash needs, plan expenditures, and ensure sufficient liquidity to support operations and growth.

**Sample Revenue Tracking Format:**

**Revenue Tracking and Expense Management for [Coffee Shop Name]**

**Month/Quarter: [Insert Month/Quarter]**

| **Category** | **Revenue (₱)** | **Expenses (₱)** | **Net Income (₱)** |
|---|---|---|---|
| **Coffee Sales** | | | |
| Espresso | | | |
| Latte | | | |
| Cappuccino | | | |
| Other Specialty Drinks | | | |
| **Total Coffee Sales** | | | |
| | | | |
| **Food Sales** | | | |
| Pastries | | | |
| Sandwiches | | | |
| Other Food Items | | | |

| | | | |
|---|---|---|---|
| **Total Food Sales** | | | |
| | | | |
| **Merchandise Sales** | | | |
| Coffee Beans | | | |
| Mugs | | | |
| Accessories | | | |
| **Total Merchandise Sales** | | | |
| | | | |
| **Wholesale Sales** | | | |
| Bulk Coffee | | | |
| Products | | | |
| **Total Wholesale Sales** | | | |
| | | | |
| **Other Income** | | | |
| Catering | | | |
| Events | | | |
| Rental Income | | | |
| **Total Other Income** | | | |
| | | | |
| **Total Revenue** | | | |
| | | | |
| **Operating Expenses** | | | |
| Rent | | | |
| Utilities | | | |
| Supplies | | | |
| Marketing and Advertising | | | |
| Payroll | | | |
| Equipment Maintenance | | | |
| Other Expenses | | | |
| **Total Operating Expenses** | | | |
| | | | |
| **Net Income (Revenue - Expenses)** | | | |

**Notes:**

- Track revenue and expenses for each category to understand the financial performance of different aspects of the coffee shop business.
- Update the revenue and expense figures based on actual sales and expenditures throughout the month or quarter.
- Monitor net income to assess profitability and identify opportunities for cost savings or revenue growth.
- Use historical data and trends to make informed decisions about budgeting, pricing, and resource allocation.

- Regularly review financial statements and performance metrics to evaluate the financial health of the coffee shop business and make adjustments as needed.

**How to calculate Profitability Analysis and Performance Metrics:**

1. **Gross Profit Margin:**
   - **Formula:** (Total Revenue - Cost of Goods Sold) / Total Revenue * 100%
   - **Interpretation:** Measures the percentage of revenue that exceeds the cost of producing goods (coffee, food, merchandise). A higher gross profit margin indicates better profitability.
2. **Net Profit Margin:**
   - **Formula:** (Net Income / Total Revenue) * 100%
   - **Interpretation:** Measures the percentage of revenue that remains as net profit after deducting all expenses, including COGS, operating expenses, and taxes. A higher net profit margin indicates better overall profitability.
3. **Average Transaction Value (ATV):**
   - **Formula:** Total Sales Revenue / Number of Transactions
   - **Interpretation:** Measures the average amount spent by customers per transaction. Increasing ATV can boost revenue without requiring additional customers.
4. **Customer Lifetime Value (CLV):**
   - **Formula:** Average Transaction Value * Number of Transactions per Customer * Average Customer Lifespan
   - **Interpretation:** Estimates the total revenue generated by a customer over their lifetime of patronage. Focus on increasing CLV through repeat business, loyalty programs, and personalized marketing.
5. **Customer Acquisition Cost (CAC):**
   - **Formula:** Total Marketing and Advertising Expenses / Number of New Customers Acquired
   - **Interpretation:** Measures the cost incurred to acquire a new customer. Aim for a CAC lower than the CLV to ensure profitability from customer acquisition efforts.
6. **Inventory Turnover Ratio:**
   - **Formula:** Cost of Goods Sold / Average Inventory
   - **Interpretation:** Measures how efficiently inventory is managed by indicating how many times inventory is sold and replaced during a specific period. Higher turnover ratios indicate efficient inventory management.
7. **Employee Productivity:**
   - **Formula:** Total Sales Revenue / Total Labor Costs
   - **Interpretation:** Measures the revenue generated per dollar spent on labor. Aim to maximize employee productivity while controlling labor costs to improve profitability.
8. **Table Turnover Rate:**
   - **Formula:** Number of Tables Turned / Number of Seats Available
   - **Interpretation:** Measures how quickly tables are occupied and vacated, indicating the efficiency of table utilization and potential revenue generation.
9. **Profit per Square Foot:**
   - **Formula:** Net Income / Total Square Footage of the Coffee Shop
   - **Interpretation:** Measures the profitability of the coffee shop relative to its size. Higher profit per square foot indicates better utilization of space and resources.
10. **Break-Even Point:**
    - **Formula:** Fixed Costs / (Revenue per Unit - Variable Costs per Unit)
    - **Interpretation:** Calculates the level of sales needed to cover all fixed and variable costs, indicating the minimum sales volume required to achieve profitability.

Regularly tracking and analyzing these performance metrics can help coffee shop owners and managers identify strengths, weaknesses, and opportunities for improvement, ultimately driving profitability and long-term success.

## VIII. Customer Experience

In this section provides a Step-by-step guide to creating an exceptional customer experience in your coffee shop, it focuses on store ambiance and atmosphere, menu presentation and product quality, customer feedback, and strategies for enhancing overall customer satisfaction.

**Create a Welcoming Atmosphere:** Design your coffee shop space to be inviting and comfortable, with cozy seating areas, warm lighting, and appealing decor. Consider factors like music selection and aroma to enhance the ambiance and create a relaxing environment.

**Provide Exceptional Customer Service:** Train your staff to deliver exceptional customer service with a friendly and welcoming attitude. Encourage them to engage with customers, answer questions, and provide recommendations to enhance their experience.

**Offer High-Quality Products:** Source high-quality coffee beans, fresh pastries, and other menu items to ensure a consistently excellent product. Invest in training for baristas to perfect the art of coffee brewing and preparation.

**Personalize the Experience:** Get to know your customers by name and remember their preferences. Offer personalized recommendations based on their tastes and previous orders to make them feel valued and appreciated.

**Streamline Ordering and Payment Processes:** Implement efficient ordering and payment systems to minimize wait times and streamline the customer experience. Consider options like mobile ordering, self-service kiosks, or contactless payments for added convenience.

**Create a Comfortable Workspace:** Cater to remote workers and students by providing amenities like free Wi-Fi, ample power outlets, and comfortable seating conducive to work or study. Consider offering workspace rentals or dedicated co-working areas for added convenience.

**Host Events and Activities:** Organize events such as live music performances, open mic nights, or art exhibitions to create a sense of community and attract customers. Offer workshops or tastings to educate customers about coffee and enhance their appreciation for the craft.

**Offer Loyalty Rewards:** Implement a loyalty program to reward repeat customers and encourage loyalty. Offer incentives such as discounts, free drinks, or exclusive promotions for members to incentivize repeat visits and foster customer retention.

**Solicit and Act on Feedback:** Encourage customers to provide feedback through surveys, suggestion boxes, or online reviews. Use this feedback to identify areas for improvement and make necessary adjustments to enhance the customer experience.

**Engage with Customers on Social Media:** Use social media platforms to engage with customers, share updates about menu offerings or events, and respond to inquiries or feedback. Build a community around your coffee shop and foster connections with your customers online.

**Maintain Cleanliness and Hygiene:** Prioritize cleanliness and hygiene throughout your coffee shop, including dining areas, restrooms, and food preparation areas. Implement regular cleaning schedules and procedures to ensure a safe and sanitary environment for customers and staff.

**Create Memorable Touch points:** Pay attention to small details that can make a big difference in the customer experience, such as personalized greetings, thoughtful packaging, or handwritten thank-you notes. Create memorable moments that leave a lasting impression on your customers.

## IX. EMERGENCY PREPAREDNESS

1. **Emergency Response Procedures:**
    a) **Identify Potential Emergencies:** Conduct a risk assessment to identify potential emergencies such as fires, medical emergencies, natural disasters, and security threats.
    b) **Develop Emergency Response Protocols:** Create detailed procedures outlining how to respond to each type of emergency. Include steps for evacuating customers and staff, contacting emergency services, and mitigating risks.
    c) **Train Staff:** Provide comprehensive training to all staff members on emergency response procedures. Conduct regular drills to ensure everyone knows their roles and responsibilities during an emergency.
    d) **Maintain Emergency Equipment:** Ensure that emergency equipment such as fire extinguishers, first aid kits, and emergency lighting is regularly inspected, maintained, and easily accessible.
    e) **Establish Communication Protocols:** Designate specific individuals or roles responsible for communicating with emergency services, customers, staff, and stakeholders during an emergency.

2. **Crisis Communication Plan:**
    a) **Designate Spokesperson:** Identify a designated spokesperson or team responsible for communicating with the media,

customers, staff, and other stakeholders during a crisis.

b) **Prepare Messaging:** Develop pre-approved messaging templates for different types of crises, including what information to communicate, how to convey empathy and concern, and where to direct inquiries.

c) **Establish Communication Channels:** Determine the primary communication channels for distributing crisis-related information, such as social media, email, website updates, and signage in the coffee shop.

d) **Monitor and Respond:** Monitor news and social media channels for mentions of the crisis and respond promptly to correct misinformation, address concerns, and provide updates as the situation evolves.

e) **Coordinate with Authorities:** Work closely with emergency services, local authorities, and other relevant agencies to coordinate communication efforts and ensure accurate and timely information is shared with the public.

**3. Business Continuity Measures:**

a) **Identify Critical Functions:** Identify the key functions and operations that are critical to the continued operation of the coffee shop, such as coffee brewing, food preparation, and customer service

b) **Develop Continuity Plans:** Develop contingency plans and procedures to ensure that critical functions can continue in the event of a disruption, such as backup power sources, alternative suppliers, and remote work arrangements.

c) **Data Backup and Recovery:** Implement regular data backup procedures to protect essential business data, such as customer records, financial information, and inventory management systems. Develop protocols for restoring data in the event of a loss.

d) **Insurance Coverage:** Review and update insurance policies to ensure adequate coverage for potential risks and liabilities, including property damage, business interruption, and liability claims.

e) **Regular Review and Testing:** Regularly review and update emergency response, crisis communication, and business continuity plans to reflect changes in the business environment, regulations, and lessons learned from past incidents. Conduct regular testing and drills to ensure preparedness and identify areas for improvement.

**CRISIS COMMUNICATION PLAN**

1. **Identify Potential Crisis Scenarios:** Begin by identifying potential crisis scenarios that could impact your coffee shop business. Consider scenarios such as food contamination, health and safety incidents, natural disasters, supply chain disruptions, or negative publicity.
2. **Establish a Crisis Management Team:** Form a crisis management team comprising key stakeholders and decision-makers within your coffee shop business. Assign specific roles and responsibilities to each team member, including a designated spokesperson responsible for communicating with the media and other stakeholders.
3. **Develop Key Messaging:** Develop key messaging and talking points that will guide your communication efforts during a crisis. Ensure that your messaging is clear, concise, and consistent across all communication channels. Address the situation transparently, express empathy and concern, and provide reassurance and guidance to customers and stakeholders.
4. **Identify Communication Channels:** Identify the primary communication channels you will use to disseminate information during a crisis. This may include your website, social media platforms, email newsletters, press releases, signage in your coffee shop, and direct communication with customers and staff.
5. **Establish Notification Procedures:** Establish procedures for notifying customers, staff, suppliers, and other stakeholders in the event of a crisis. Determine who will be responsible for initiating notifications, what information will be communicated, and through which channels.
6. **Coordinate with External Partners:** Establish relationships with external partners, such as local authorities, emergency services, and industry associations, to coordinate communication efforts during a crisis. Keep contact information readily accessible and establish protocols for collaboration and information sharing.
7. **Prepare Holding Statements and FAQs:** Prepare holding statements and frequently asked questions (FAQs) that can be used to respond quickly to media inquiries and customer concerns during a crisis. Anticipate potential questions and provide thoughtful, factual responses that demonstrate

your commitment to transparency and accountability.

8. **Monitor and Respond to Feedback:** Monitor news media, social media platforms, and other channels for mentions of the crisis and customer feedback. Respond promptly and transparently to correct misinformation, address concerns, and provide updates as the situation evolves.
9. **Review and Debrief:** After the crisis has been resolved, conduct a thorough review and debrief with your crisis management team to evaluate the effectiveness of your communication efforts. Identify strengths, weaknesses, and areas for improvement, and incorporate lessons learned into your crisis communication plan for future reference.
10. **Update and Maintain:** Regularly review and update your crisis communication plan to reflect changes in your business, industry regulations, or emerging risks. Ensure that all relevant stakeholders are familiar with the plan and know their roles and responsibilities in the event of a crisis.

**BUSINESS CONTINUITY MEASURES**

1. **Risk Assessment:** Begin by conducting a comprehensive risk assessment to identify potential threats and vulnerabilities that could impact your coffee shop business. Consider risks such as natural disasters, equipment failures, supply chain disruptions, or public health emergencies.
2. **Business Impact Analysis:** Perform a business impact analysis to assess the potential consequences of each identified risk on your coffee shop operations. Determine the potential impact on revenue, customer service, reputation, and other critical business functions.
3. **Develop a Business Continuity Plan (BCP):** Based on the results of your risk assessment and business impact analysis, develop a business continuity plan (BCP) that outlines strategies and procedures for maintaining essential business functions during a crisis or emergency. Include contingency plans for key areas such as:
   a) **Operations:** Identify essential tasks and processes required to keep your coffee shop running, such as coffee brewing, food preparation, and customer service. Develop backup plans and alternative workflows to ensure continuity of operations during disruptions.
   b) **Supply Chain Management:** Evaluate your supply chain and identify critical suppliers, vendors, and partners. Develop strategies for sourcing alternative suppliers, maintaining safety stock levels, or diversifying supply sources to minimize disruptions.
   c) **Communication:** Establish communication protocols for notifying employees, customers, suppliers, and other stakeholders in the event of a crisis or emergency. Ensure that contact information is up-to-date and readily accessible, and establish procedures for disseminating information quickly and efficiently.
   d) **Staffing and Personnel:** Develop plans for staffing and personnel management during a crisis, including protocols for remote work, flexible scheduling, and cross-training to ensure continuity of staffing levels and essential roles.
   e) **Financial Management:** Evaluate your financial resources and develop strategies for managing cash flow, accessing lines of credit or emergency funds, and mitigating financial losses during a crisis.
4. **Training and Awareness:** Train your employees on the business continuity plan and their roles and responsibilities in implementing it. Conduct regular drills and exercises to test the effectiveness of the plan and ensure that staff are prepared to respond effectively in a crisis.
5. **Backup Systems and Redundancies:** Implement backup systems and redundancies for critical infrastructure, equipment, and data. This may include backup power generators, redundant internet connections, cloud-based data storage, and offsite backups of important documents and records.
6. **Regular Review and Update:** Regularly review and update your business continuity plan to reflect changes in your business, industry regulations, or emerging risks. Ensure that the plan remains current and relevant to your coffee shop operations.
7. **Collaborate with External Partners:** Establish relationships with external partners, such as emergency services, local authorities, and industry associations. Coordinate with these partners to share information, resources, and best practices for business continuity planning and response.

## X. SUSTAINABILITY PRACTICES

**1. Environmental Sustainability Initiatives:**

a) **Assess Current Practices:** Conduct an assessment of current practices to identify areas where environmental sustainability can be improved. Consider energy consumption, water usage, waste generation, and overall environmental impact.

b) **Set Goals:** Establish clear and measurable goals for environmental sustainability, such as reducing energy and water usage, minimizing waste, and increasing use of renewable resources.

c) **Implement Energy Efficiency Measures:** Invest in energy-efficient appliances, LED lighting, and heating and cooling systems to reduce energy consumption and lower utility costs.

d) **Promote Water Conservation:** Implement water-saving measures such as installing low-flow faucets and toilets, fixing leaks promptly, and using water-efficient dishwashing and cleaning practices.

e) **Reduce Single-Use Plastics:** Minimize the use of single-use plastics such as disposable cups, lids, and straws. Offer incentives for customers to bring their reusable cups or offer biodegradable or compostable alternatives.

2. **Waste Management and Recycling Programs:**

a) **Develop a Waste Management Plan:** Develop a comprehensive waste management plan that outlines procedures for waste reduction, recycling, composting, and proper disposal of hazardous materials.

b) **Provide Recycling Facilities:** Install recycling bins for customers and staff to separate recyclable materials such as paper, plastic, glass, and aluminum. Ensure that bins are clearly labeled and easily accessible.

c) **Compost Organic Waste:** Implement a composting program to divert organic waste such as coffee grounds, food scraps, and compostable packaging from the landfill. Partner with local composting facilities or community gardens to recycle organic waste.

d) **Reduce Food Waste:** Implement strategies to minimize food waste, such as offering smaller portion sizes, donating surplus food to local charities, and composting food scraps.

e) **Educate Staff and Customers:** Provide training and educational materials to staff and customers about the importance of waste reduction, recycling, and composting. Encourage participation and raise awareness about sustainability initiatives.

**3.Ethical Sourcing Policies:**

a. **Source Responsibly:** Establish ethical sourcing policies that prioritize sourcing coffee beans, food ingredients, and other products from suppliers who adhere to fair labor practices, environmental sustainability standards, and ethical sourcing principles.

b. **Direct Trade Partnerships:** Establish direct trade partnerships with coffee growers and suppliers to ensure fair wages, working conditions, and environmental practices. Build long-term relationships based on transparency and mutual respect.

c. **Certifications:** Seek out certifications such as Fair Trade, Rainforest Alliance, or Organic to verify that products meet ethical and sustainability standards. Display certification logos prominently to communicate your commitment to ethical sourcing to customers.

d. **Transparency:** Provide transparency about the origin of your coffee beans and other products, including information about the farmers, growing practices, and social and environmental impact. Share stories and photos from coffee farms to connect customers with the people behind their coffee.

e. **Continuous Improvement:** Continuously evaluate and improve your ethical sourcing practices by seeking feedback from suppliers, monitoring industry developments, and staying informed about emerging sustainability trends and best practices.

**WASTE MANAGEMENT AND RECYCLING PROGRAMS.**

1. **Conduct a Waste Audit:** Begin by conducting a thorough waste audit to understand the types and quantities of waste generated in your coffee shop. Identify the main sources of waste, including coffee grounds, disposable cups, packaging, and food scraps.
2. **Set Clear Recycling Goals:** Based on the findings of your waste audit, set clear recycling goals for your coffee shop. Determine the percentage of waste you aim to divert from the landfill through recycling and composting initiatives.\
3. **Educate Staff:** Educate your staff about the importance of waste management and recycling. Train them on proper waste sorting techniques, including separating recyclables, compostables,

and non-recyclable materials. Provide ongoing training and reinforcement to ensure compliance.

4. **Source Sustainable Packaging:** Choose sustainable packaging options for your coffee shop products, such as compostable cups, lids, straws, and utensils made from renewable materials like paper, PLA (corn-based plastic), or bamboo. Minimize the use of single-use plastics whenever possible.
5. **Implement Recycling Stations:** Set up designated recycling stations throughout your coffee shop for customers and staff to easily sort and dispose of recyclable materials. Clearly label bins for different types of waste, including paper, plastic, glass, and aluminium.
6. **Compost Organic Waste:** Implement a composting program to divert organic waste, such as coffee grounds, food scraps, and compostable packaging, from the landfill. Partner with local composting facilities or community gardens to collect and compost organic waste.
7. **Engage Customers:** Encourage customers to participate in your recycling and composting efforts by providing educational materials, signage, and incentives. Offer discounts or rewards to customers who bring their reusable cups or containers.
8. **Monitor and Measure Progress:** Regularly monitor and measure your coffee shop's waste generation and recycling rates to track progress toward your recycling goals. Use this data to identify areas for improvement and adjust your waste management strategies as needed.
9. **Collaborate with Suppliers:** Work with your suppliers to minimize packaging waste and explore opportunities for closed-loop recycling or take-back programs. Choose suppliers who share your commitment to sustainability and offer eco-friendly packaging options.
10. **Celebrate Successes and Share Results:** Celebrate milestones and successes in your waste management and recycling efforts with your staff and customers. Share progress updates and results on your website, social media channels, and in-store signage to demonstrate your commitment to sustainability.
11. **Continuous Improvement:** Continuously evaluate and improve your waste management and recycling program based on feedback from staff, customers, and stakeholders. Stay informed about new technologies, best practices, and industry trends in waste reduction and recycling.

## XI. CONCLUSIONS

1. The Sop 1's conclusion provides insight into the state of the Philippine coffee shop market today. According to the study results, young adult female entrepreneurs are common, and a significant number of them operate as independent entrepreneurs or self-employed people while earning moderate monthly wages.

Moreover, most of the respondents have bachelor's degrees, indicating a highly educated and skilled workforce based on their educational backgrounds. These business owners also gained one to three years of industry experience on average, which gives them the expertise needed to successfully manage the coffee shop industry. In addition, the popularity of forming partnerships highlights the importance of collaboration and teamwork to the development and success of the coffee shop industry. This study essentially highlights the strength and potential of the coffee shop industry in the Philippines, which is supported by a dynamic, competent, and cooperative workforce.

2. For Sop 2's conclusion, this research shows a good look at how to manage coffee shops properly. Help everyone to learn about how long they usually operate, what equipment they need, and how to make a profit. Coffee shops are the best places for people to start their businesses and be part of the coffee industry. This kind of business can typically stand for a few years and needs things like tables, restrooms, and equipment like jiggers and bar spoons to make sure customers are satisfied. It is also best for both big and small investments. With just a few staff members, they can still give each customer special attention and can easily adapt to changes. When in terms of finances, this industry tends to do well, return the investment, and make a profit within a couple of years. They also use social media and other marketing techniques to get more customers. And they make sure to follow all the rules and regulations to ensure the safety and satisfaction of everyone. Overall, the research shows that coffee shops are thriving businesses that care about their customers and follow legal standards.

3. To conclude Sop 3, this research study focuses on highlighting how young and educated women are changing the coffee shop industry, by contributing to the dynamics of business ownership and giving women financial power. This shows the balance between tradition and innovation in the coffee shop industry to fulfill the changing expectations of the customers. It shows the importance of the coffee industry to put the needs of their customers first, engaging flexible marketing strategies, and support regulatory compliance and financial stability to succeed over the long run. This study also provides helpful suggestions, such as encouraging long-term planning and strategic patience,

emphasizing financial management, encouraging creative thinking, putting the needs of the client first, marketing agility, and having strategic foresight.

## XII. RECOMMENDATIONS

1. Coffee shop owners/managers may implement a comprehensive training program or engage in other activities aimed at developing employees' skills and enhancing their knowledge. By doing so, employees gain valuable advantages that further improve their working capabilities.

2. To successfully launch a coffee shop business, it is crucial to carefully select a strategic location that caters to your target market and ensures easy accessibility for customers to navigate your establishment.

3. For coffee shop owners in the municipality of Talavera, Nueva Ecija, it is essential to establish an organization. This initiative fosters healthy competition among coffee shop businesses, leading to sustained growth and meaningful contributions to the municipality's economy.

4. Make it a regular practice to actively engage on various social media platforms, leveraging collaborative efforts with trending food vloggers and content creators. By consistently sharing compelling content, the owner can effectively amplify their coffee shop's online presence, attract a wider audience, and foster meaningful connections with customers in the digital space.

5. Strictly follow the provided standardized checklist of the researchers and don't be afraid to innovate products that can challenge the competition of the coffee shops at its highest potential that can continuously provide satisfaction for the locals of Talavera, Nueva Ecija.

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# Classifying Emotional Engagement in Online Learning Via Deep Learning Architecture

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***Abstract***— *The world has seen a phenomenal rise in online learning over the past decade, with universities shifting courses to online modes, MOOCs(Massive Open Online Course) emerging and laptop and tab-based initiatives being extensively promoted. However, educators face significant challenges in analyzing learning environments due to issues like lack of in-person cues, small video size, etc. To address these challenges, it is crucial to analyze the engagement levels of online classes. Out of the various subcategories of engagement, emotional engagement is one that is overlooked, but integral to analysis and deterministic in its approach. In response, we developed a deep learning architecture to analyze emotional engagement in online classes. Our method utilizes a ResNet50-based algorithm, refined through experimentation with various techniques such as transfer learning, optimizers, and pre-trained weights. The model adds a unique layer to the analysis of different algorithms used for engagement detection in academia while also achieving stellar rates of 81.34% validation accuracy and 81.04% training accuracy. Unlike other models, our approach employs high-quality image data for training, ensuring more reliable results. Moreover, we constructed a novel framework for applying emotional engagement to real-world scenarios, thus bridging the pre-existing gap between implementation and academia. The integration of this technology into online learning has immense potential, and can bring with it a shift in the quality of education. By fostering a safe and healthy learning space for every student, we can significantly enhance the effectiveness of online education systems.*

***Keywords***— ***deep learning, emotional engagement, engagement, framework, online learning, ResNet-50***

## I. INTRODUCTION

Education stands as a fundamental pillar of modern- day society and one of the most influential developments in this field is online learning. Over the past decade, online learning has rapidly gained popularity and usage (Mukhopadhyay et al., 2020), with the COVID 19 pandemic greatly catalyzing its implementation into society (Gupta & Kumar, 2022). For instance, many universities and institutes have shifted onto virtual platforms. MOOCs (Massive Open Online Course) have emerged, dramatically changing the education landscape, with over 150,000 being available in 2023 (Pickard et al., 2023). Multiple laptop and tab-based initiatives have been promoted by schools and governments globally (Clarke & Svanaes, 2014; Fuhrman, 2014). While online learning is advantageous due to how ubiquitously and flexibly it can be used along with the increased course variety it provides, it still lacks in many aspects, including teacher- student interaction and practical education provision (Das & Paris, 2022).

One key challenge with online classes is analyzing learning environments. This is due to multiple reasons, including the absence of non-verbal and in-person cues, the miniscule size of videos which makes it impractical to assess students' reactions and teach simultaneously, the necessity of muting student microphones which hinders interactive feedback, etc. Therefore, teachers tend to teach without a complete understanding of whether or not students are concentrating on and comprehending the material, as has been proved in multiple studies

(Sobieszczuk-Nowicka et al., 2018; Mashoedah et al., 2018). It is also difficult for educators to understand the class dynamics and environment in online modes. As a result, students' emotional well-being can't be catered to. In turn, since students' participation is highly impacted by the direct attention and support they obtain from teachers, students are prompted to leave the class or disengage from lessons (Azlan et al., 2020).

To initiate change, it is necessary to systematically analyze online classes. The principal approach for analyzing learning environments is to monitor student engagement levels. Engagement can be defined as "the interaction between the time, effort and other relevant resources invested by both students and their institutions to optimize the student experience while also enhancing the learning outcomes and development of students as well as the performance of the institution" (Trowler, 2010). There are multiple types or sub-categories of engagement within the educational setting. Researchers agree that cognitive, emotional and behavioral engagement are the most deterministic. Cognitive engagement refers to the willingness and effort to grasp more difficult concepts and try challenging puzzles, behavioral engagement refers to concentration and attention on the material, and emotional engagement refers to the presence of positive emotion such as interest and enthusiasm in regards to the material being taught (Hasnine et al., 2023).

This paper has limited its scope to emotional engagement due to its comprehensiveness and significance, along with the elusiveness of its quantifiability in pre-existing frameworks. According to Patrick et al, the premise is simple: "the more emotionally involved students are with their environment while studying a subject, the more engaged they are, and the more support students get with managing their emotional states, the more they can pay attention in classes" (Patrick et al., 2007). In other words, student engagement is directly proportional to their achievement (Skinner et al., 1998). Hence, it is crucial for achieving learning goals and receiving quality education.

Many methods are used to gauge emotional engagement. Traditionally, educators rely on quizzes and questionnaires at the end of sessions, but this is prone to demand characteristics and is susceptible to the student's angle of analysis (McCambridge et al., 2012). It also requires a lot of effort from both the students and the educators. Hence, automation has been brought into the limelight, significantly shifting the potential scope of emotional engagement analysis. Our research delves into the field of automated analysis through the usage of deep learning.

Deep Learning (DL) is a subset of machine learning that utilizes multi-layered neural networks called deep neural networks to imitate the intricate decision-making capability of the human brain. These deep neural networks are trained on vast amounts of data to enable them to identify phenomena, observe patterns in information, and make predictions and decisions. They only need to be trained once, however, after which they can efficiently be used for purposes ranging from medical diagnosis to voice-enabled machinery (Goodfellow et al., 2016). Many deep learning algorithms are used to create neural networks. This paper focuses on ResNet-50, which was developed by Microsoft researchers in 2015. It was designed to enable better performance through its residual connections. Interestingly, its name was derived from its characteristic feature of having 50 layers in its network.

One particular machine learning technique that we will use in the study is transfer learning. Regarding theoretical context, transfer learning can be defined as a method where a model trained on one task is used as the starting point for a model on a second task. By using the learned features from the first task, the model can work more efficiently and quickly even with a small amount of data (Ali et al., 2023).

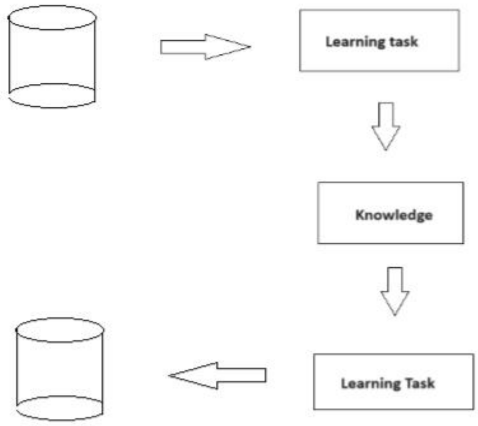


*Fig. I The process of transfer learning*

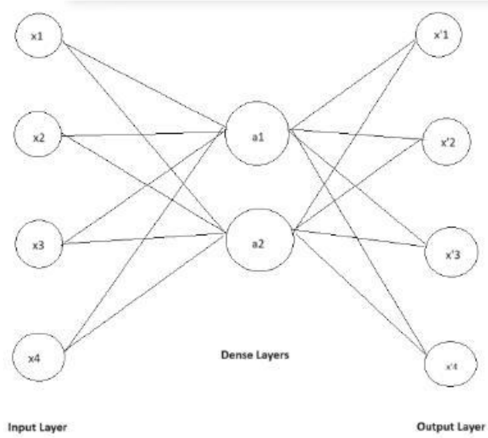


*Fig. II Deep learning architecture*

The key contributions of this paper are:

- This paper proposes a model that has been trained to detect the emotional engagement levels of students in real-time with a stellar accuracy of 81.34% val. accuracy and 81.01% test accuracy
- This paper adds on to the plethora of research done in this field by methodologically experimenting with 4+ datasets, 3+ algorithms, and a wide range of machine learning techniques to determine which is more lightweight and yields better results, along with the learning rate and epoch number at which it does so
- The model uses high quality data, a feature of datasets that is rarely seen in research in this field
- This paper also aims to provide a modified framework that prioritizes privacy by analyzing student videos on their own devices and provides visual, easy to navigate, graphical summaries to educators. It will also enable a student support system to assist students with dire emotional states

In terms of potential limitations in our research, a prevalent issue is the scarcity of available high-quality data, which reduces the accuracy of models and their ability to learn relevant features. Moreover, there may be biases due to deep learning models mirroring the innate biases of the training data. For example, cultural accessories such as bindis and headscarves may not be properly identified by the model and hence may create discrepancies. The model may also have difficulty interpreting mixed emotions, since it is trained on artificially emotive images.

## II. METHOD

This research was carried out on Google Collab software with T4 GPU, using the highly-acclaimed python libraries of Keras and Tensorflow. The dataset was uploaded to Google Drive, where file paths were used to reference the images and train the model on them. Initially, the employed system underwent training with the FER-2013 dataset, which contains 30,000+ images of people of different cultures and ages. However, due to low image quality and lack of color, the Facial Expressions Training Data was chosen instead. This dataset is a high-quality, coloured dataset consisting of 29,000+ (96 by 96 pixels) images. It was taken from Kaggle, a public dataset publishing platform.

To pre-process the data, multiple steps were taken. The labeled data was first sorted into its respective emotion class folders, and split into validation, training and testing data by a 10-80-10 split. Training and validation data was shuffled to ensure random selection.

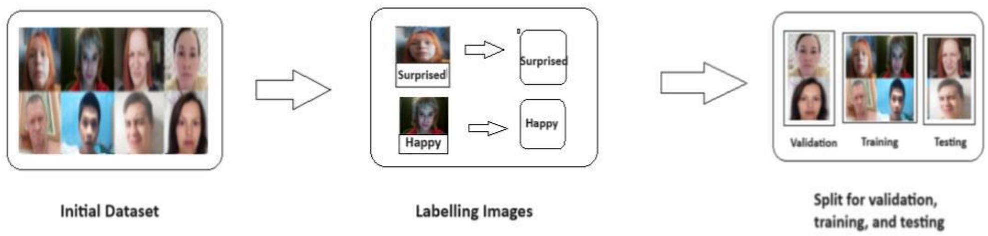


*Fig. III Process of data cleaning*

The employed CNN (Convolutional Neural Network) architecture was integral to this study. We experimented with MobileNet, ResNet-50 and EfficientNet, evaluating which would be better for the chosen objective. While all of them converged as epochs increased, ResNet-50 had the best overall performance since it gave higher accuracies even at smaller epochs. Additionally, transfer learning proved to be a crucial technique to increase the speed and accuracy of the model. We used pre-trained a ResNet50 model from Keras Applications.

To construct the architecture, we removed the fully connected layers at the top of the pre-trained models to enable customization of layers. 8 output classes were added, namely 'Happy', 'Sad', 'Contempt', 'Surprised', 'Neutral', 'Fear', and 'Anger'.

In terms of the layers in the models, the functional transfer learning layers were followed by alternating flatten and dense layers. These dense layers were composed of 2048 neurons. For activation, ReLu was used to prevent gradients from saturating and hence solve the issue of vanishing gradients. In the final layer, Softmax was used, which helped training converge at a faster rate.

Moreover, the model weights pre-trained on the standard ImageNet dataset were used. These weights were locked into the models to ensure learned representations are not lost. After the convolutional layers, global average pooling was used to reduce the amount of computation required while retaining important features. In terms of optimizers, we initially implemented Adam, which is a standard method to help the model converge faster. However, upon analysis, we deemed SGD (Stochastic Gradient Descent) to be better suited due to how well it converged to more optimal solutions.

In this study, loss calculation was done through sparse categorical cross entropy. In comparison to other methods, it saves time in memory as well as computation. The key metric we used to measure the success of the model was training accuracy, which estimates the potential of a model.

```
Layer (type)                Output Shape              Param #
=================================================================
resnet50 (Functional)       (None, 2048)              23587712

flatten (Flatten)           (None, 2048)              0

dense (Dense)               (None, 1024)              2098176

flatten_1 (Flatten)         (None, 1024)              0

dense_1 (Dense)             (None, 1024)              1049600

flatten_2 (Flatten)         (None, 1024)              0

dense_2 (Dense)             (None, 1024)              1049600

dense_3 (Dense)             (None, 8)                 8200

=================================================================
Total params: 27793288 (106.02 MB)
Trainable params: 4205576 (16.04 MB)
Non-trainable params: 23587712 (89.98 MB)
```

*Fig. IV Model structure summary*

## III. RESULTS

### i) Model

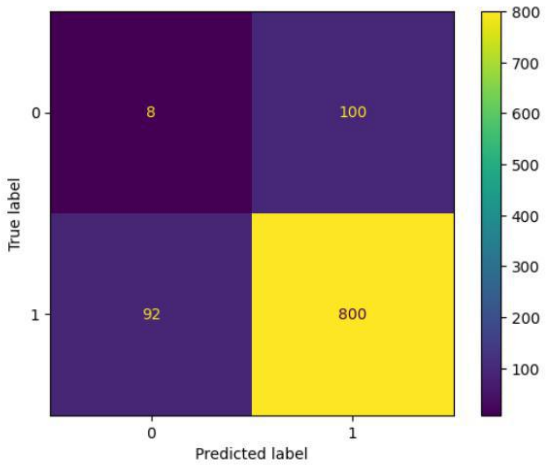


*Fig. V: Confusion matrix*

In summary, the confusion matrix indicates that the model has a high accuracy (80.8%) and performs well in terms of precision (88.9%) and recall (89.7%) for class 1. However, it has a relatively high false positive rate (92.6%) and a low false negative rate (10.3%).

The final model is an 8-layer sequential classification model, composed of a pre-trained layer along with alternating dense and flattening layers. The usage of high-quality data and experimentation with parameters has resulted in lightweight yet high performance structuring. In essence, this model analyses student expressions to accurately classify their emotional engagement states.

### ii) Framework

This framework is designed to be an extension app in online learning platforms such as Zoom. Currently, the market does not host any such platforms, with the closest alternative being Engagement Hub, an extension on Zoom Marketplace that allows users to automatically transcribe and analyze meeting recordings. This lack of implementation may be a result of how restricted engagement analysis via deep learning architecture is to academia.

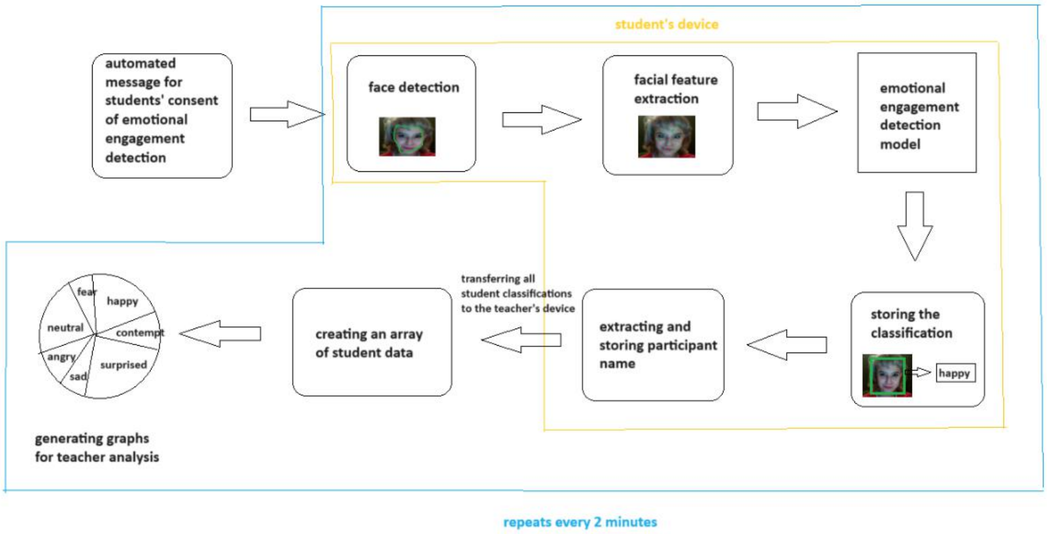


*Fig. VI Process of emotional engagement analysis*

Following are the steps of the devised framework-

- At the start of any session, an automated message will be displayed on all student devices to notify them that they are being recorded and analyzed. This will be similar to the pre-existing feature on zoom that notifies participants when screen recording is turned on by a user. Through this feature, the privacy rights of students will be protected.
- The cycle of emotional engagement analysis will repeat in a set interval of time, for example, every 2 minutes. On each student's device, their camera will be connected to the framework and a screenshot will be taken.
- Through a basic AI (Artificial Intelligence) algorithm, the student's face will be detected. Then, facial features of the image will be extracted by mapping of facial points. For both face detection and feature extraction, the OpenCV library will be used, which provides ready-to-use methods with advanced capabilities.
- The extracted image will then be run through an emotional engagement detection model, where it will be pre-processed and then analyzed. Through methods like transfer learning, optimization, pooling layers, etc. the model is fine tuned to accurately predict the emotion of the student.
- The student's name is then extracted from their name label. The name and its associated emotion classification is encrypted and sent to the teacher's device.
- At the teacher's device, all data is decrypted and entered into an array. This process will run in the backend, where it can't be accessed by the teacher.
- The emotion classification data of the array will then be used to generate a pie-graph. This will be an easy to read, understandable format for educators to quickly access and analyze. The graph will be available during screen sharing and be readily movable across the educator's page. This will ensure ease and efficiency.

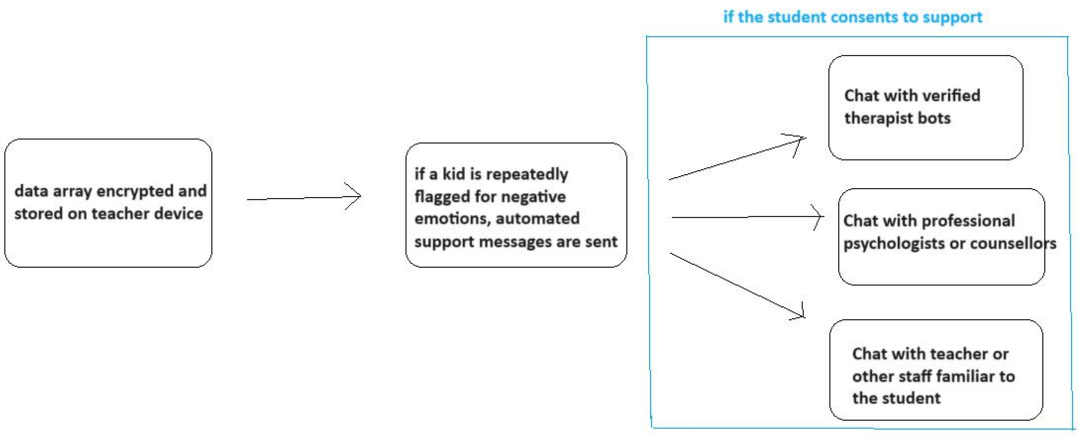


*Fig. VII Process of student support*

Following are the steps for student support in the devised framework-

- For long-term courses that engage with students for more than 3 sessions, educators can turn on settings to enable student support. Data arrays from each session will be automatically stored on the teacher's device. This data will be encrypted to prevent privacy invasion. It will be loaded back onto the streaming platform architecture in the backend when the next session starts.
- The data arrays in the backend will be analyzed and if a student is flagged to have shown negative emotions such as 'sad', 'angry', 'contempt', 'fear', etc. repeatedly (i.e. more than 7 times in an average session of 30 minutes), their device will be contacted. An automated support message will be sent asking for their consent to take further action. Moreover, if all students show negative emotions consistently, this will be an indication to the educator to make their sessions more engaging.
- If the student gives consent, they will be prompted to take one or more of 3 actions-
    - They can contact their teacher or other trusted staff, with whom they can then share their concerns. This method would be best suited for issues with the learning style or course load.
    - They can contact professional therapists or psychologists. We will suggest trained experts they can reach out to. This method is suited for personal issues, such as mental health disorders, financial issues, health-related challenges, etc.
    - We can also collaborate with high-quality therapist AI bots. This would work best for students who have minor problems, and aren't willing to spend a lot or aren't comfortable with professional therapy

## IV. DISCUSSION

For the purpose of this study, we developed a ResNet50-based classification model, with the aim of analyzing different architectures, datasets, parameters, etc. to develop the most accurate and efficient version. This was accompanied with constructing a framework which detailed the real-time process of image extraction, feature detection, emotion classification and data storage. The student support system is unique from pre-existing research through its ability to actually utilize the data emotion classification data to assist students that are struggling.

This study's results are promising, both in terms of model analysis and framework development. The high training accuracy reflects that the model architecture and hyperparameters are well-suited to the task. The ResNet50 model is particularly noteworthy due to its performance and lightweight characteristics. Additionally, the features in the dataset are highly predictive of the target variable. While the research objectives were met, it's essential to consider the limitations as well. Due to the lack of available data, the potential of this model was stunted to some extent. With resources like more computational power, it could have had better performance. As predicted, the model also may have difficulties in real- world scenarios, where lighting, angles, accessories, etc may distort faces in images and lead to inaccurate predictions. The training data may also be artificial in its expression of specific emotions, leading to disparity with real-life analysis scenarios since students don't portray singular emotions in real life but rather have mixed emotions that the model may get confused with.

The framework is well developed through its cumulation of the ideations of notable researchers and creative addition of more unique features. It is also realistic in terms of implementation and ethically sound. While it prompts the shifting of academia into practical usage, limitations such as the lack of resources meant that this study was unable to fully implement the framework. Moreover, the immediate concern of users not willing to share their data or permit to be recorded persists and can only be resolved with a change in ideology towards sharing data.

In response to these limitations, a strategic procedure is necessary for future developments. Most importantly, gathering sufficient resources is required, since only with more data and computational power can the model be made to classify all variations of emotive images. Data can furthermore be augmented to increase both the amount of data and the symmetry of the amount per class of emotions. This will also reduce any chances of overfitting. Researchers that aim to create an optimal solution should also specifically use datasets that have extracted data from online learning sessions to guarantee the training data is similar in characteristics to real world emotive data in online classes. In terms of future steps with this research, this model exhibits noteworthy scalability. We can make the analysis mechanism more multifaceted, with inclusion of behavioral engagement analysis and chat analysis, hence improving not only the accuracy of the model but also the reliability of its analysis.

## V. CONCLUSION

This study presents a ResNet50-based model for real-time emotion classification of students, achieving validation and test accuracies of 81.34% and 81.01%, respectively. The research evaluates various architectures, datasets, parameters, and machine learning techniques to optimize performance. It uniquely employs high-quality data and considers privacy by processing videos on student devices, offering visual summaries for educators and support for emotionally distressed students.

Limitations include limited data and computational power, potential inaccuracies in diverse real-world conditions, and reluctance from users to share data. Enhancing performance requires more data, improved computational resources, and augmenting datasets to balance emotional classes and prevent overfitting. The model has significant scalability potential. Future enhancements could include analyzing behavioral engagement and chat interactions, which would increase both the accuracy and reliability of the model's emotional engagement analysis.

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# Factors affecting Job Satisfaction with Moderating Role of Organizational Training

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***Abstract*****—** *The main objective of this research is to determine both the direct and the indirect elements influencing satisfaction with job among employees in Khyber Pakhtunkhwa, Pakistan. The research study specifically aims to investigate the different impacts of economic concerns on employees in the elementary and secondary education department's job satisfaction. The study based on Primary Source of data and an adapted Questionnaire and survey technique was used to collect the data for further analysis and 274 Primary School Teachers were participated in this study. SPSS version 25 was used for Analysis. In order to create a collection of items that represent the idea of employees' job satisfaction, the first step involved reviewing the available research on the factors that influence job satisfaction. To address every facet of job satisfaction, an extensive list of items was developed. In order to generate more items, a focus group and a comprehensive questionnaire were also utilized. Overall, the results of several analyses, including multiple regression and correlation analysis, demonstrate that all the economic factors have a positive and significant influence on job satisfaction. Additionally, these elements may contribute significantly to an employee's job satisfaction. Furthermore, the most significant and effective moderating variable for this association is organizational training. Which play a crucial role in this study. To increase employee job satisfaction, organizations should develop a suitable financial compensation policy that includes either direct or indirect financial compensation. This study is crucial for HR practitioners, business owners, and educational institutions in the area because it explains the factors that determine job satisfaction, which is a crucial topic that has not received much attention in Pakistani research.*

***Keywords*****— *Job satisfaction, Determinants, Pay & Promotions, Supervision, relationship with co-worker, Performance appraisal, organization training, job satisfaction, Khyber Pakhtunkhwa.***

## I. INTRODUCTION

### 1. Background of the Study

Scholars from both the West and Asia have been interested in job satisfaction for a number of years. More research has been done on it in Western regions than any other institutional variable because of the effects it has on individuals and organizations as well (Abdulla et al., 2011). Research and theory suggest job satisfaction as a key variable (Spector, 1997). It has been discovered that employee relations, absenteeism, and turnover are all highly impacted by job satisfaction (Al Ajmi, 2001). While increased absenteeism and turnover are common among employees those who are not satisfied from their job (Metle, 2003). People who are satisfied with their jobs are less likely to skip work or hide from it, and they are also more likely to manage daily challenges effectively (Zeffane et al., 2008).

To describe job satisfaction, certain scholars have explored. According to (Spector, 1997) The degree in which individuals are satisfied or unsatisfied with their work is known as job satisfaction. (Ozturk and Hancer, 2011) explore that It is usually seen as the level to which the desires of a worker of a job match with the work's characteristics. Consequently, the degree of satisfaction or dissatisfaction will rely on the gap among expectations and reality as well as the deviation's direction—that is, whether it is valued or disvalued. (Locke, 1976). In addition, (Metle, 2003) reported that it might be considered people's general feelings regarding their jobs. While the relationship between job satisfaction among individual and organizational, and work-related demographics and external factors has been extensively studied in Western literature, the same cannot be said for the Asian Context.

In the underdeveloped world, the subject has mainly received little research attention. It is not possible to immediately apply research findings from Western countries to organizations in Asia or developing nations. A large amount of research indicates cross-cultural differences in the factors that influence and are affected by work satisfaction (Spector, 2008). The developing Countries has not only produced very few published studies on job satisfaction, but there has also been little study conducted in the region on this subject (Al Ajmi, 2001). Given the assumption that workers in developing nations do not view their jobs as sources of satisfaction and instead experience various forms of deficiency and withdrawal behavior, including absenteeism and high turnover, it is crucial for academics and practitioners to know the level of employee satisfaction in emerging markets (Metle, 1997). For a long time, it has been believed that addressing satisfaction with work should come before developing any internal incentive programs. To increase employee productivity and the sector's profitability, it is critical to understand the elements influencing the job satisfaction of a large number of working people in the various services sectors (Hayfaa A. Tlaiss, 2012). But it is very crucial for HR practitioners to identify those (internal as well as external) factors/elements that affect the employees job satisfaction. Further research on these elements is very important. Because satisfied, goal oriented, trained and committed employees are the key components of any organization.

(Narendra Singh Chaudhary; Preeti Bhaskar,. 2016) Organizations must provide opportunities for employees to upgrade in order to gain a competitive edge and produce the best results. The best way to do this is by setting up programs for training and development, which boost workers' performance, motivation, and their overall job satisfaction in addition to improving their skill sets. Employee training have impact on job satisfaction, but salary and Pay also have a strong impact on the job satisfaction. According to (Al Ajmi, 2001) trained/Higher degree holders were shown to be satisfied with their jobs as well as with their current pay scales than were managers with only a high school education. Job satisfaction has been found to be influenced by a wide range of organizational elements, such as incentives, job security and salaries/payment levels. In addition, work-related variables are an effective indicator of job satisfaction (Abdulla et al., 2011).

According to (Reilly et al. 1993), managerial staff members are more engaged in the preparation and execution of organizational changes, have greater advancement opportunities, and are satisfied in their jobs. According to (Schermerhorn et al., 2005) display a wide range of employee emotions regarding the various dimensions of job satisfaction, including the type of work itself, compensation, prospects for advancement, and coworker satisfaction.

(Ellickson ; Logsdon, 2001) stated that supervision is also an element that effect the employee job satisfaction. According to (Lambert et al., 2001) Salary stage, climate management, advancement chances, honesty of appraisal processes, and satisfaction with coworkers are among the significant predictors of job satisfaction.

**Research Gap**

(Adigun and Stephenson, 1992; Huang and Van de Vliert, 2004; Jassem Abdulla et al, 2010) stated that the Workers in Western economies tend to be more satisfied with their jobs due to internal employment features that are associated with the nature of their work than workers in developing nations. Furthermore, studies have revealed that workers in non-Western nations are more satisfied with their jobs due to outer employment elements like compensation and working conditions than workers in industrialized Western nations. According to his research, environmental variables have a stronger correlation with job satisfaction than demographic ones and further indicate that a combination of extrinsic and internal elements may contribute to job satisfaction. It is hoped that further public and commercial entities would test these findings.

(Hayfaa A. Tlaiss, 2012) the aims of his study to fill gap about the employee demographic factors influencing the work satisfaction of women executives in Lebanon. 113 women managers in the banking sector in Lebanon participated in a study to investigate the link between job satisfaction and individual demographic such as (education, age, gender, marital status) and organizational demographic such as (job level, years of experience and size of the organization). He did not find sufficient result among these variables and suggest that further study should be conducted in another country with more factors like work related/ external factors.

This study will fill the theoretical gap through studying Direct and In-Direct Compensation / environmental / external factors such as (Salary, Promotion, Supervision, relationship with co-worker, job stress and performance appraisal) in Pakistani Context. Furthermore, this study will fill the conceptual gap through adding Organizational Training as a moderating variable in factors affecting on job satisfaction relationship. Empirical evidence will be collected from government schools from Peshawar district and Peshawar is the capital of Khyber Pakhtunkhwa Province. In addition, the objective of this study to investigate the factors affecting job satisfaction with moderating role of Organizational Training.

### 1.2 Problem Statement

According to (Shishupal et al. 1999) a company needs a clear training manual and policy. It has been discovered that executive development programs help managers become more productive, efficient, and effective. So therefore if HR practitioner want to modernization of schooling and other activities carried out by educational institutions, such as developing creative methods of instruction, transferring technology, conducting research, providing community services, creating civilized societies, and creating nations, are all made possible by satisfied faculty members.

Moreover, the Elementary & Secondary Education Department is the largest department in the province terms of employees, it has about 50 thousand employees at the provincial level and the highest number of employees is in Peshawar district, which has about 05 thousand male's employees and about 03 thousand are female employees. As the department is big and vast, its problems are also more. (According to Techers Recruitment Policy, 2018) Before 2018, trained and experienced teachers used to be hired/recruited, but nowadays, according to the new policy untrained and unprofessional employees are being recruited/hired. Which is a hindrance to the development of the organization and the organization is not developing properly so these employees need timely training.

(District Account Office report/Payroll, 2022; District education office report, 2022; District Election Commission data, 2022; Education Monitoring Authority report, 2022) And with it more problems like low pay compared to other organization, slow promotion system, lack of proper work supervision, lack of relationship with other employees working within the organization, extra work load in form of different kind of election duties, polio duty, lack of performance appraisal system. All these factors are also hindrance to the development of the organization.

Therefore, the main objective of this study to investigates the effect of Salary, Promotion, Supervision, relationship with co-worker, job stress and performance appraisal on employee job satisfaction and organization training play a moderating role in this study.

### 1.3 Research Questions

The study will be based on following research questions.

1. Does Salary and Promotion effect the employee job satisfaction?
2. Does Supervision and relationship with co-worker effect the employee job satisfaction?
3. Does performance appraisal effect the employee job satisfaction?
4. Does any impact of Organizational Training on this relationship?

### 1.4 Research Objective

The following are the research objective of this study.

1. To evaluate the factors that affect employee job satisfaction like Salary, Promotion, Supervision, relationship with co-worker, job stress and performance appraisal.
2. To examine the moderating impact of organizational training on this relationship.

### 1.5 Significance of the Study

Employees, managers, and the organization as a whole can all benefit greatly from job satisfaction in hundreds of ways. Employee retention as well as job satisfaction are closely related. Employee satisfaction lowers turnover costs and decreases the need for ongoing hiring and training since satisfied staff members are less willing to quit. Positive morale at work has a connection with job satisfaction. Positive mindsets develop improved teamwork and favorable workplace conditions when employees are satisfied with their jobs. Workers who are satisfied in their roles are able to feel confident to express their opinions and participate in creative solutions to problems. Employee satisfaction increases the probability that they will provide good customer service. When workers feel satisfied in their positions, they are more willing to do more extra mile to satisfy clients, which boosts client loyalty and happiness.

The success of an organization also depends on the job satisfaction of managers, since satisfied managers have a beneficial effect on multiple facets of the workplace. they are more likely to be capable leaders. They are able to motivate their teams more effectively, which improves performance as a whole. Effective communication between managers and their staff is more likely happens when they are satisfied. clear communication is crucial to set clear expectations, give positive feedback, and promote an enjoyable workplace atmosphere. Managers' ability to make decisions can be positively impacted by their level of job satisfaction. Managers are able to make planned, strategic decisions that are beneficial for the team and for the company as a whole when they are comfortable and satisfied in their positions. Positive work cultures are the consequence of satisfied management. Managers that are satisfied with their jobs are more capable to resolve issues at work and come up with positive solutions.

In summary, Pleasant and productive work environments are largely dependent on high levels of job satisfaction. It is beneficial for managers as well as for workers, and it also helps the company as a whole succeed and perform well.

## II. LITERATURE REVIEW

According to Parvin & Kabir (2011), A worker's attitude towards their work, depending on the various aspects of the job, is known as job satisfaction. which refers to a person's attitude towards their work. It's a complicated idea that depends on a number of variables related to the nature of the work itself. According to (Puspita Rinny et al, (2020) A person's attitude towards their work, which is influenced by both internal and external factors such as the work environment, outcomes, and job itself, is known as job satisfaction. Because it is based on human perceptions and feelings, the meaning of satisfaction with work is difficult to understand. When an employee believes the benefits of their work equal the expenses and labor they have personally incurred and their salary is still sufficient to support them throughout their lives, they are said to be satisfied with their jobs.

Puspita Rinny et al, (2020) states that a promotion is a change in rank and responsibilities from a particular position to another. Moving to a position of greater responsibility typically entails receiving more money, though this isn't always the case. According to Puspita Rinny et al, (2020), technically a promotion is a change in status and pay that occurs when one goes up within the organizational structure. Employees are primarily interested in job promotions because they highlight many parts of the job in addition to the nature of the position as described in the job description. This aligns with the idea that Puspita Rinny et al, (2020) states that promotion is the move from one position to another which has a higher status and responsibility.

Fletcher (2001) defines "Activities through which organizations try to evaluate individuals to improve their competence, enhance performance, and distribute rewards" is the definition of performance appraisal in a broader sense. Simply said, performance appraisals can be summed up as an efficient procedure that assesses employee performance while also providing a means for supervisors to advance their careers and enhance organizational performance. According to Atiomo (2000) agree that Performance appraisals are always considered in terms of one particular goal: compensation. This goal encompasses the identification of training needs, enhancement of current employee performance, improvement of motivation and communication, and assistance in determining compensation to raise employee job satisfaction levels.

Formal evaluations of employee performance are one of the most crucial aspects of human resource management. They are usually conducted annually or semiannually and have been thoroughly investigated (Murphy & Cleveland, 1995). Performance appraisals can be used for many different purposes, including professional advancement, salary increases, promotions, and thorough and insightful criticism. They usually include both an assessment and a developmental component (Boswell & Boudreau, 2002). The term "developmental use" refers to the experiences and abilities that workers should gain and which are determined by performance reviews (e.g., learning and growth needs). Additionally, appraisals for performance are a good way to identify an employee's strengths and shortcomings, or areas where they may grow, as well as to assist set goals and raise employee performance. It is possible to identify particularly bad performers and provide them with comments on how to get better over time.

According to Margulies & Murphy (2004) was explained that in addition to serving as a tool for employee development and coaching, the researcher highlights the importance of identifying specific behaviors or job performance that can be stopped or built. It also provides an accurate evaluation of an employee's readiness for promotion and, finally, serves as the foundation for merit pay awards for workers based on their performance.

According to Armstrong, M. (2001) As "the organized development of the expertise, abilities, and mindsets needed by a person to carry out properly an activity or job," training is commonly known. According to (Wesley & Skip, 1999) Improved self-esteem, lower employee turnover, improved quality and service regularity, higher guest satisfaction, lower company expenses, the use of new technology, a better ability to meet target market needs, an improved attitude, increased teamwork, higher job satisfaction, and a greater commitment from the organization have all been linked to training. Organizations must provide their employees with the tools to upgrade them if they want to gain a competitive edge and produce the best results. The best way to do this is by setting up training and development programs, which boost employees' performance, motivation, and sense of job satisfaction in addition to improving their skill sets. Employee training is still a major factor in promoting satisfaction with work (Batool, A., and Batool, B., 2012). Employers that offer training and development opportunities to their staff report high employee satisfaction and little staff turnover (Wagner 2000). The program for staff training and development offers numerous advantages to employees (Jehanzeb and Bashir, 2012). The majority of workers want their pay to rise and understand the value of training programs (Dillich, 2000).

According to (Locke, 1976; Al-Saadi, 1996) For workers in emerging nations or those with low salaries in developed countries, income might signify security. A large percentage of employees in wealthy Western countries view salary as a source of respect. Companies compensate their employees for the labor they accomplish. Although the majority of people mistakenly believe that pay and compensation are synonymous, compensation actually entails much more than the financial benefits that a company offers. According to Milkovitch et al (2008), All monetary gains as well as material services and advantages that employees receive as a condition of their employment are collectively referred to as compensation. Dessler (2011) stated that Any payment made to employees as a result of their employment is referred to as employee compensation. For employees, compensation is the most crucial factor. What an employee receives as payment for their labor includes pay, benefits, paid time off, bonuses, and incentives. According to Mondy & Martocchio (2016) The sum of all awards made to workers as payment for their labour is known as compensation. There are two categories of compensation: non-financial compensation and financial compensation. Both direct and indirect financial rewards are the two types of financial compensation. The payment made to an employee in the form of a salary, wages, commission, or bonus is known as direct financial compensation. All forms of remuneration that aren't reflected in cash payments are referred to as indirect financial compensation. Employee benefits are another name for this kind of indirect financial compensation. Indirect financial compensation encompasses benefits including social security, worker's compensation, unemployment insurance, paid time off, medical insurance, life insurance, pension plans, disability insurance, employee options for stock schemes, staff services, and premium payments. Non-monetary rewards can take many different forms, such as recognition and gratitude, difficult work, advancement, job growth, independence, personal growth, flexibility in one's career path, comfort in one's role, and many more (Al Fajar & Heru, 2013; Kaswan, 2017).

Bernard (2005) stated that the capacity of superiors to shape subordinates' work habits in order to accomplish particular tasks or behaviors is known as supervision. It's an art to persuade people to accomplish organizational objectives. Bernard went on to say that the standard of supervision reveals how successful superiors are in shaping subordinates' work habits and completion rates. According to (Leonard & Trusty, 2016) A person who takes supervisory responsibilities and has solid work knowledge is necessary to hold a position with supervisory tasks. As it entails a managerial ability that needs to be owned and utilized to evaluate performance efficiency, the person must be able to control the work. (Rowe et al., 2012) The following metrics can be used to gauge supervision effectiveness:1. Facilitate. It is the responsibility of a supervisor to assist and mentor their subordinates. 2) Instruction. A supervisor needs to be able to transfer both general and technical abilities to their subordinates. Teaching strategies include keeping an eye on subordinates' development, making sure they stay "on track," providing helpful guidance to enhance performance, and acknowledging their accomplishments and strengths. 3) The management and administrative component. A competent manager can enhance employees' experiences and efficiently supervise daily tasks. 4) supervision. Serving as the entry point for the sector and advancing its future are two task-oriented aspects of this forward-oriented function. As a result, supervisors serve as gatekeepers, upholding the profession's quality standards. (Borders, L. D., & Brown, L. L. 2005) stated that as a control mechanism, supervision's job is to correct people's and groups' actions to make sure that their work is in line with plans. (Reichelt, S., & Skjerve, J. 2002) claimed that staff productivity is directly impacted by supervision. Supervisors assign duties and specify who is responsible for completing them; they then demand quality and punctuality from assignees, or workers. Moreover, Bouheni, F. B. (2013) Furthermore, supervision provides the proper guidance to supervised personnel so that those who exercise initiative and take on responsibility can progress independently. The goal of supervision is to provide people the knowledge, attitudes, and abilities they need to be productive members of their community, their immediate organization, and their nation. Nickson, A. (2008) Through improved productivity and effectiveness as well as the development of the organization's strategic vision, supervision plays a critical role in boosting production. A group can be activated, guided, improved, refreshed, encouraged, and watched over through supervision in the hopes of gaining their cooperation so that the supervisors can successfully carry out their supervision duties. (Esia-Donkoh, K., & Ofosu-Dwamena, E. (2014), According to their research, people who are under supervision are more productive in terms of gaining experience, skills, and knowledge. Additionally, they agreed that monitoring enhances employee productivity within the company by assisting in identifying their needs. In accordance with earlier research, (Bouheni, F. B. (2013) conducted research on how supervision affects banking performance and discovered that it significantly affects staff performance. Apenteng, J.O. (2012) The Ga South

Municipal Education Directorate's study on the impact of supervision on employee performance came to the conclusion that counselling sessions should take into account the findings of the appraisals since employees expect to be directed when they perform below expectations. It suggested that supervisor's priorities staff satisfaction with work in order to boost performance.

According to (Gupta, 2003) This study's theoretical approach relies on the Expectancy Theory, which emphasizes the relationship between behavior and incentives. In this study the reward is compensation while the behavior is job satisfaction. According to the theory, Motivation is the product of valence, instrumentality and expectancy. Compensation systems differ according to their impact on these motivational components and pay systems differ most in their impact on instrumentality. There is a belief that behavior and compensation are related. The degree to which an employee's job satisfaction is correlated with the rewarding outcomes they receive—such as compensation, variety in their work, attention provided by their supervisor, an excellent chance of promotion, close collaboration with colleagues, the ability to make decisions, and influence over their work pace—is directly connected to the degree to which an employee reports being satisfied with their job.

### 2.1 Vroom's expectancy theory 1964

Vroom's theory builds on the concept that people frequently favor some objectives or results above others. therefore, expect to feel satisfied in the event that such a desired result develops. The word "valence" describes this emotion for particular results. Having the desired result is desirable if it has a good valence. If the result is negative, it is preferable not to have it. As a result of the value they have in themselves or due to the fact they are predicted to produce subsequent outcomes that will either satisfy or disappoint us, outcomes can also gain meaning. Therefore, while one individual may find the growth of profits per sight to be inherently fulfilling, another may regard it as a necessary way of achieving the goal of purchasing a sports vehicle.

The focus of expectation theory is on the expectations that workers bring to the workplace, as well as the circumstances and means that allows these expectations are met. "suitable degrees of efforts, resulting in output, can only be expanded if employees' expectations are fulfilled," is the basic hypothesis. rather than maintaining a fixed range of expectations shared by all employees, it raises the potential of various expectations. Reward perceptions range from expectations fulfilled to those not fulfilled. Expectancy theory asks managers to show staff members that going above and beyond will result in rewards that match their efforts. The compensation package and a range of other external or direct advantages must be considered in the relationship between effort and reward. Because employees are largely driven by money, reward programs must therefore establish a positive relationship between the amount of money received and the amount of effort put out.

### 2.2 Conceptual Framework of the Study

The research comprising on the following concept as shown in Figure No.1

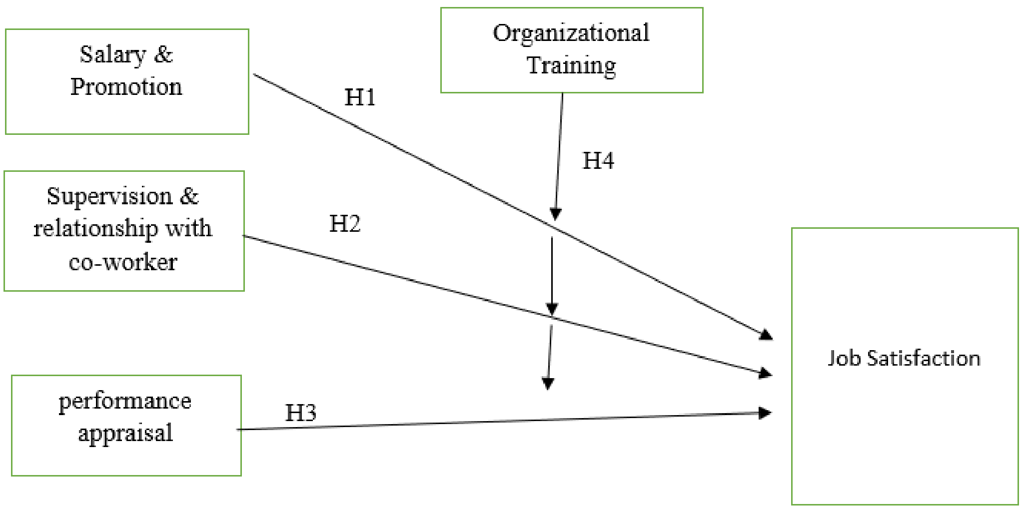


*Fig.1: Source: Burhanudin, B., & Tambun, R. 2021*

### 2.3 Hypotheses of the Study

H1: There is a Significant impact of Salaries & Promotions on employees Job Satisfaction.

H2: There is a Positive impact of Supervision & relationship with co-worker employee's job

Satisfaction.

H3: Performance Appraisal has a significant impact on employee's job satisfaction.

H4: Organizational Training has a positive and significant impact on employee's job satisfaction.

## III. RESEARCH METHODOLOGY

### 3.1 Research Design

Since the current study's objectives are dictated by the earlier theory, a deductive method will be employed, and positivism will serve as the philosophical foundation. In addition, it attempts to address irrelevant research questions to the subject at hand. a major data source that was used to compile and gather the information (Khawar, S., & Sarwar, A. 2021).

#### 3.1.1 Research Philosophy & Approach

Because positivism holds that reality exists outside of social actors, the study will be grounded in this research philosophy. And this study will use a deduction-based approach to theory. Yin (1994) claims that the deductive method provides a variety of mathematical and statistical methods that produce generalizable results.

#### 3.1.4 Research Method

The study will be based on mono method for data collection and analysis purposes. An adapted questionnaire will be distributed and survey method will be used to collect the data and for analysis purpose.

#### 3.1.5 Time Horizon

The research will be conducted through a cross-sectional approach because of financial and scheduling limitations. Cross-sectional designs have occasionally been used by empirical researchers to describe a population. The main characteristic of cross-sectional designs is the fact that all aspects of the data observed are only recorded once (Cummings, C. L. (2018).

### 3.2 Population of the Study

The population of the study will be primary school teachers working in government primary schools in district Peshawar. There are total 974 primary school teachers in district Peshawar who are working in different grades (e.g PST BPS-12, SPST BPS-14, Head Teacher BPS-15) involved in this study and performing their duties in different primary schools of district Peshawar.

### 3.3 Sample Size and Sample Technique

The study will be based on simple random sampling technique and sample size will be based on Krejcie and Morgan formula as shown in appendix. According Krejcie and Morgan table, the sample size will be 274.

### 3.4 Variables of the Study

Job satisfaction act as a dependent variable in this study.

(Salary, Promotion, Supervision, relationship with co-worker and performance appraisal) are acting as an independent variable in this study

Organizational Training act as a moderating variable in this study.

### 3.5 Data Collection Tools

A 49-items an adapted questionnaire will be used for collection of data and for further analysis. In which 32-items will be related to (Salary, Promotion, Supervision, relationship with co-worker and performance appraisal) all these are act as an independent variable. Which is adapted from Jassem Abdulla et al, 2010. Secondly, 07-items will be related to Subjective factors and overall job satisfaction factors. Which is adapted from (Greenhaus et al.'s 1990; Scarpello;Campbell 1983). While remaining 10 items will be related to organizational training and organizational training act as a moderating variable in this study. Which is adapted from (Sobia Shaheen, 2020). All 49-items will be measured through 05 point Likert scale starting from Strongly Disagree (01), Disagree (02), Neutral (03), Agree (04), Strongly Agree (05). Furthermore, Survey method will be used for data collection and for further analysis.

### 3.6 Data Analysis Techniques

SPSS version 25 will be used for analysis purpose. Descriptive analysis will be used to find the frequency, percentage, mean and standard deviation of the sample Size. Secondly, reliability analysis will be used to find the internal consistency of the items. Thirdly, Pearson Correlation analysis will be used to find the relationship among all variables. Fourthly, Multiple Regression analysis will be used to find the effect of both (independent variables and moderating variable) on dependent variable.

## IV. ANALYSIS & DISCUSSION

*Table for Summary of Reliability Test*

| S. No | Variables | Cronbach's Alpha | N of Items | Remarks |
|---|---|---|---|---|
| 1 | Salaries & Promotion | .827 | 16 | V. Good |
| 2 | Supervision | .794 | 7 | Good |
| 3 | relationship with co-worker | .849 | 6 | V. Good |
| 4 | performance appraisal | .783 | 3 | Good |
| 5 | organizational training | .910 | 10 | Excellent |
| 6 | overall job satisfaction | .912 | 7 | Excellent |

**Interpretation**

The outcomes of a test of reliability on a number of variables pertaining to the work environment and job satisfaction are shown in the table. The inner consistency or accuracy of the scales is evaluated using Cronbach's Alpha. Higher inner consistency among the elements that make up each variable is generally indicated by higher Cronbach's Alpha scores. According to the findings, every variable has an internal consistency of good to exceptional, with Cronbach's Alpha values all over 0.7. In particular, Cronbach's Alpha values for "Overall Job Satisfaction," "Performance Appraisal," "Supervision," "Salaries & Promotion," and "Relationship with Coworker" range from 0.783 to 0.849, indicating strong consistency. Furthermore, both "Overall Job Satisfaction" and "Organizational Training" exhibit outstanding reliability, with Cronbach's Alpha scores of 0.912 and 0.910, respectively. These results show that the study's variables have a high degree of internal consistency, which improves the validity of the metrics used to evaluate different facets of the working environment and job satisfaction.

*Table for Summary of Correlation Analysis*

| | | Salaries & Promotion | Supervision | relationship with co-worker | performance appraisal | organizational training | overall job satisfaction |
|---|---|---|---|---|---|---|---|
| Salaries & Promotion | Pearson Correlation | 1 | .297** | .379** | .542** | .423** | .523** |
| | Sig. (2-tailed) | | .000 | .000 | .000 | .000 | .000 |
| | N | 274 | 274 | 274 | 274 | 274 | 274 |
| Supervision | Pearson Correlation | .297** | 1 | .362** | .276** | .397** | .518** |
| | Sig. (2-tailed) | .000 | | .000 | .000 | .000 | .000 |
| | N | 274 | 274 | 274 | 274 | 274 | 274 |
| relationship with co-worker | Pearson Correlation | .379** | .362** | 1 | .472** | .502** | .571** |
| | Sig. (2-tailed) | .000 | .000 | | .000 | .000 | .000 |
| | N | 274 | 274 | 274 | 274 | 274 | 274 |
| job stress | Pearson Correlation | .357** | .258** | .501** | .425** | .411** | .630** |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | .000 | .000 |
| | N | 274 | 274 | 274 | 274 | 274 | 274 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| performance appraisal | Pearson Correlation | .542** | .276** | .472** | 1 | .329** | .617** |
| | Sig. (2-tailed) | .000 | .000 | .000 | | .000 | .000 |
| | N | 274 | 274 | 274 | 274 | 274 | 274 |
| organizational training | Pearson Correlation | .523** | .518** | .571** | .617** | 1 | .442** |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | | .000 |
| | N | 274 | 274 | 274 | 274 | 274 | 274 |
| overall job satisfaction | Pearson Correlation | .523** | .518** | .571** | .617** | .442** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | .000 | |
| | N | 274 | 274 | 274 | 274 | 274 | 274 |

The correlation table shows the connections between a number of factors related to job satisfaction. The Pearson correlation value between each of the variables is displayed in each cell, along with the degree and progress of the association between them. Notably, this analysis uses organizational training as a moderating variable.

After analyzing the correlations, we find that there are multiple valuable positive relationships ($p < 0.01$) between the dependent variable, which is overall job satisfaction, and the independent variables, namely salaries & promotions, supervision, coworker relationships and performance appraisals, moderated by organizational training.

The data indicates that there is a positive correlation between salaries and promotion and as a whole job satisfaction ($r = 0.523$). This suggests that staff members who view better salaries and opportunities for advancement usually express a greater degree of satisfaction with their jobs, particularly when organizational training is taken into account. Similarly, there is a positive association ($r = 0.518$) between supervision and total job satisfaction, suggesting that good supervision raises job happiness, especially when combined with organizational training. Additionally, favorable associations between overall job happiness and coworker relationships and performance reviews are observed; these relationships are all influenced by organizational training.

According to these results, there is a moderating effect of organizational training on the favorable associations between different aspects of the job and total job satisfaction. In order to maximize the effects of elements like pay and advancement, supervision, relationships with coworkers and performance reviews on employees' total job satisfaction, it highlights the significance of making organizational training investments.

**4.7.1 Regression**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .970[a] | .950 | .952 | .2210 |

The regression analysis was done through spss software version 25, regression model summary, R and R Square and Standard Error shows in above summary table. The value of R Square is 0.950 that clearly presented that explain 95% value of R Square this mean that performance appraisals, coworker relationships, salary and promotion, and supervision has a 95 % impact on employee Job Satisaction.

Int_1: T x JS

Test(s) of highest order unconditional interaction(s):

| | R2-chng | F | df1 | df2 | p |
|---|---|---|---|---|---|
| X*W | .0185 | 7.3216 | 1.0000 | 273.0000 | **.0051** |

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Mod variable: T (W)

Conditional effects of the focal predictor at values of the moderator(s):

| T | Effect | se | t | p | LLCI | ULCI |
|---|---|---|---|---|---|---|
| **4.2278** | **.1792** | .0531 | 2.1046 | .0283 | .2635 | .0149 |
| **5.3322** | **.2302** | .0554 | 3.1635 | .0015 | .3390 | .0814 |
| **5.6556** | **.2835** | .0630 | 3.6293 | .0004 | .4072 | .1198 |

ANALYSIS NOTES AND ERRORS

Level of confidence for all confidence intervals in output: 95.0000

W values in conditional tables are the 16th, 50th, and 84th percentiles.

The conditional effects table shows that the effect of the independent variable (X) on the Dependent variable increases with the value of the moderating variable (from 4.2278 to 5.6556), with statistically significant effects at each level (p <.05). The association appears to strengthen with increasing values of the moderator, as indicated by the effect sizes (.1792,.2302,.2835) and their related confidence intervals. This indicates the significance of taking the moderating variable into consideration when attempting to explain the primary relationship. This interaction raises the possibility that moderator actions or change could increase the independent variable's influence on the result.

## V. CONCLUSION & FUTURE RESEARCH DIRECTION

### Conclusion

According to the study's findings Employee job satisfaction is impacted by performance appraisals, organizational training, coworker relationships, salary and promotion, and supervision. Research by Abdulla, J., Djebarni, R., and Mellahi, K. (2011), Puspita Rinny et al. (2020), Batool, A., and Batool, B. (2012), and others that found that organizational training, performance appraisals, relationships with coworkers, salaries and promotions, and supervision all had an impact on job satisfaction. Luthans (2011) claims that financial compensation, in the form of pay or wages and benefits, is a significant determinant of employee work satisfaction. Financial reward in this study includes direct as well as indirect financial compensation. the basics salaries, bonuses, incentives, and allowances make up direct financial compensation. Indirect financial compensation comprises pension plans, health coverage, employment insurance, holidays, and amenities like comfortable accommodations and safe parking spots.

One of the things that motivates employees is pay. According to this study, teachers who receive fair compensation will feel confident, inspired, and have great views about their work, all of which will lead to job satisfaction. Also sharing this is (Bennel, 2007). The results suggest that one key factor contributing to teachers' job dissatisfaction is their inadequate pay. The study's conclusion is based on the data, which shows that teachers' pay does not correspond with their duties. The base compensation that teachers receive was found to have a moderate impact on their job satisfaction, along with the pay structure, uniformity of policies, administration, and rapid salary payment by the account office. Paying employees, a decent salary is crucial for businesses and employees alike.

Furthermore, Results suggest that job satisfaction is directly influenced by Performance appraisals, a relationship that hasn't been thoroughly examined yet. The favorable impact appears to be supported by appraisals of financial results. There is evidence to suggest that an appraisal system may result in positive recognition from staff members, which may therefore have an encouraging effect on job satisfaction.

Additionally, the results of this study showed a positive significant correlation between supervision received and job satisfaction for professionals. Study results indicated that the supervision were present the professionals. This positive relationship should contribute to personal and professional development of professionals. Professionals should benefit from this favorable interaction in both their personal and professional development.

Supervisors have been characterized as goal-driven, logical thinkers, and results-oriented.

Moreover, the relationship with coworkers and whole job satisfaction are significantly positively correlated, according to the correlation analysis. This suggests that workers who get along better with their coworkers typically express greater job satisfaction. The significance of creating constructive interactions in the workplace to improve overall job satisfaction is highlighted by the correlation's strength. The importance of a cooperative and encouraging work environment in promoting employee satisfaction and well-being is pointed out in this conclusion.

The results of this study show a significant relationship between job satisfaction and training. The faculty members who participate in training programs believe they can improve their skills and areas of competence, according to the results. They also benefit from receiving appreciation from upper management and their peers. In addition to financial advantages like pay increases, promotions, and bonuses, it also opens doors for greater chances and professional advancement. They provide financial support in the form of paid leave, reimbursement for fees, and allowances to encourage them to take part in these programs. Thus, we can say that in the education sector, training programs result in job satisfaction.

Financial remuneration serves as both the primary source of revenue and a guarantee of financial security for employees. Their success or standing within the company and in society is reflected in their financial pay. Pay is another indicator of an individual's value or self-worth. Companies can use financial remuneration as a powerful instrument to help them accomplish their strategic objectives. Employee attitudes and conduct are significantly influenced by compensation. Although financial compensation represents a substantial expense for the business, transparency must be very high. The amount of money paid is typically based on a number of factors, including years of service, position, and degree of education. As such, these aspects must be taken into account when establishing financial compensation. Because sufficient financial rewards will affect job satisfaction.

**Managerial Implications**

The findings of these research suggest that in order for Elementary & Secondary Education Khyber Pakhtunkhwa to accomplish the desired outcomes, job satisfaction is necessary. The study identifies a number of crucial managerial implications for improving job satisfaction among employees. Initially, managers need to focus on developing their supervisory abilities and offering their people regular feedback, assistance, and clear direction. Secondly, establishing strong links with colleagues is important since favorable interactions with others considerably enhance workplace satisfaction. To improve these bonds, managers should promote team-building exercises and develop a cooperative workplace culture. Third, with a focus on staff development, performance appraisals need to be fair, open, and helpful. According to the study, training also functions as a moderating variable, strengthening the effect of the previously indicated elements on job satisfaction. Consequently, spending money on extensive training programs is essential since it enhances worker abilities and improves the benefits of supervision, connections with coworkers, and performance appraisals on entire job satisfaction. Managers can encourage a more positive and dedicated workforce by addressing these issues, which will ultimately lead to organizational success.

Furthermore, an employee needs encouragement from a variety of sources that contribute to productivity creation in order to be able to deliver performance that meets expectations and raise their level of job satisfaction. Offering competitive pay allows staff members to feel appreciated for their efforts and gives them the chance to learn more about their legal rights.

Promotion to a new position offers workers the chance to grow professionally and to use their knowledge, expertise, and abilities to fulfil responsibilities. After completing their initial training, workers will feel satisfied with their jobs, which is directly linked to improved performance. Additionally, make a strong and positive bond with the Teachers Union and examine basic salary and allowances for teachers according to changes in the economic condition of the country.

**Limitation & Future Research Direction**

The limitations of this study is, our results are not as broadly applicable as they may be because we only looked at one public sector organization located in Khyber Pakhtunkhwa. While our findings may have direct effects for other public organizations across Pakistan, more research encompassing both public and private sector organizations is necessary to confirm that economic factors are the primary determinant of work satisfaction in Pakistani organizations. The second drawback of the research was This study used the cross-sectional approach, because of time constraints, the sample size was minimal.

The present study includes the following research directions.

- The company must implement job satisfaction schemes, one of which may involve conducting individual interviews to measure employee satisfaction levels and determine what factors contribute to them.

- expressing respect to teachers by achieving job satisfaction in areas such as safety, policy, method, and rules development, as well as the development of positive relationships between teachers and supervisors.
- Because the study's independent variables have a significant impact on the satisfied educational staff members are with their jobs, it is expected that the findings of this research will serve as a guide for future researchers who will expand on the findings by examining additional variables, such as staff engagement, work discipline, competence, or variables not covered by this study. It is helpful to understand how significantly these factors influence job satisfaction.
- A larger sample size would be used in this study's revision to better understand the findings and generalize the study's significance.

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**Appendix**

Abbreviation of Questionnaire

Strongly Disagree= (SD)=1

Disagree =(D)=2

Neutral = (N) = 3

Agree = (A) = 4

Strongly Agree = (SA) = 5

**Training Questionnaire**

| S.NO | Training items | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1 | I think my training has helped or will be given the opportunity to develop to my full potential in my Organization. | 1 | 2 | 3 | 4 | 5 |
| 2 | I Believe the training will help me do my current job better. | 1 | 2 | 3 | 4 | 5 |
| 3 | The Employees in this organization are penalized for not using what they have learned in training. | 1 | 2 | 3 | 4 | 5 |
| 4 | I use what I learn in training, it will help me get higher performance ratings. | 1 | 2 | 3 | 4 | 5 |
| 5 | I have time in my schedule to change the way I do things to fit my new learning. | 1 | 2 | 3 | 4 | 5 |
| 6 | The more training I apply on my job, the better I do my job. | 1 | 2 | 3 | 4 | 5 |
| 7 | Training usually helps me increase my efficiency | 1 | 2 | 3 | 4 | 5 |
| 8 | The trainer`s used lots of examples that showed me how I could use my learning on the job. | 1 | 2 | 3 | 4 | 5 |
| 9 | My officer let me know I am doing a good job when I will use my training. | 1 | 2 | 3 | 4 | 5 |
| 10 | After training, I get feedback from people on how well I am replying. | 1 | 2 | 3 | 4 | 5 |

**Source = Sobia Shaheen 2020**

**Salary and Incentives Questionnaire**

| S.NO | Salary and Incentives items | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 11 | My salary is adequate for my living expenses | 1 | 2 | 3 | 4 | 5 |
| 12 | The period between pay rises is reasonable | 1 | 2 | 3 | 4 | 5 |
| 13 | I feel appreciated by the organization when I think about what they pay me. | 1 | 2 | 3 | 4 | 5 |
| 14 | My organization has an appropriate salary scale. | 1 | 2 | 3 | 4 | 5 |
| 15 | All necessary fringe benefits are provided in my organization (e.g. health insurance, travel tickets, accommodation and allowances). | 1 | 2 | 3 | 4 | 5 |
| 16 | The performance recognition system in my organization is as good as in most other organizations | 1 | 2 | 3 | 4 | 5 |
| 17 | There are adequate financial rewards for those who work here. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **18** | Regarding salary, I feel that I am treated fairly compared with colleagues in my organization who have similar qualifications and who have served a similar number of years | **1** | **2** | **3** | **4** | **5** |
| **19** | Regarding fringe benefits, I feel that I am treated fairly compared with colleagues in my organization who have similar qualifications and who have served a similar number of years | **1** | **2** | **3** | **4** | **5** |
| **20** | Regarding recognition and rewards, I feel that I am treated fairly compared with colleagues in my organization who have similar qualifications and who have served a similar number of years. | **1** | **2** | **3** | **4** | **5** |

**Source = Jassem Abdulla et al, 2010**

**Supervision Questionnaire**

| **S.NO** | **Supervision items** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **21** | My supervisor is available when needed | **1** | **2** | **3** | **4** | **5** |
| **22** | My supervisor shows consideration for subordinates' feelings | **1** | **2** | **3** | **4** | **5** |
| **23** | My supervisor gives me the opportunity to participate in important decision-making. | **1** | **2** | **3** | **4** | **5** |
| **24** | Communication between me and my immediate supervisor is good. | **1** | **2** | **3** | **4** | **5** |
| **25** | I receive regular feedback about my performance | **1** | **2** | **3** | **4** | **5** |
| **26** | The feedback I receive from my supervisor is useful | **1** | **2** | **3** | **4** | **5** |
| **27** | The form my supervisor uses accurately evaluates my performance. | **1** | **2** | **3** | **4** | **5** |

**Source = Jassem Abdulla et al, 2010**

**Promotion Opportunities Questionnaire**

| **S.NO** | **Promotion Opportunities items** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **28** | My organization has a clear career path (that is, the defined track a person follows in the pursuit of professional goals) | **1** | **2** | **3** | **4** | **5** |
| **29** | Promotion opportunities are not limited and are fairly adequate in this organization | **1** | **2** | **3** | **4** | **5** |
| **30** | My organization has a clear and fair promotion policy and strategy that takes efficiency, performance and experience into account | **1** | **2** | **3** | **4** | **5** |
| **31** | My organization puts the right person in the right position | **1** | **2** | **3** | **4** | **5** |
| **32** | My organization gives proper attention to staff complaints and grievances | **1** | **2** | **3** | **4** | **5** |
| **33** | Regarding promotion, I feel that I am treated fairly compared with colleagues in my organization who have similar qualifications and who have served a similar number of years | **1** | **2** | **3** | **4** | **5** |

**Source = Jassem Abdulla et al, 2010**

**Relationship with co-workers Questionnaire**

| **S.NO** | **Relationship with co-workers items** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **34** | I receive an assignment with the proper staffing to complete it | **1** | **2** | **3** | **4** | **5** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **35** | I work with a team who operate quite consistently | **1** | **2** | **3** | **4** | **5** |
| **36** | I do not receive incompatible requests from all of my supervisors | **1** | **2** | **3** | **4** | **5** |
| **37** | Honest competition exists between workers in this organization | **1** | **2** | **3** | **4** | **5** |
| **38** | There is no bickering and fighting at work | **1** | **2** | **3** | **4** | **5** |
| **39** | I do not have difficulty in my job because of the competence of the people with whom I work | **1** | **2** | **3** | **4** | **5** |

**Source = Jassem Abdulla et al, 2010**

**Performance Appraisal Questionnaire**

| **S.NO** | **Performance Appraisal items** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **40** | My performance appraisal is conducted on time each year | **1** | **2** | **3** | **4** | **5** |
| **41** | I always receive a copy of my annual performance appraisal | **1** | **2** | **3** | **4** | **5** |
| **42** | Regarding performance appraisal, I feel that I am treated fairly compared with colleagues in my organization who have similar qualifications and who have served a similar number of years | **1** | **2** | **3** | **4** | **5** |

**Source = Jassem Abdulla et al, 2010**

**Subjective factors and overall satisfaction factors Questionnaire**

| **S.NO** | **Subjective factors and overall satisfaction factors items** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **43** | I am satisfied with the success that I have achieved in my career | **1** | **2** | **3** | **4** | **5** |
| **44** | I am satisfied with the progress that I have made toward my overall career goals | **1** | **2** | **3** | **4** | **5** |
| **45** | I am satisfied with the progress that I have made toward meeting my goals for income | **1** | **2** | **3** | **4** | **5** |
| **46** | I am satisfied with the progress that I have made toward meeting my goals for advancement | **1** | **2** | **3** | **4** | **5** |
| **47** | I am satisfied with the progress that I have made toward meeting my goals for the development of new skills | **1** | **2** | **3** | **4** | **5** |
| **48** | How satisfied are you with your job in general | **1** | **2** | **3** | **4** | **5** |
| **49** | All things considered, are you satisfied with your job | **1** | **2** | **3** | **4** | **5** |

**Source = (05) items from Greenhaus et al.'s (1990); (02) items Scarpello and Campbell (1983)**

Sample Size & Selection Table

| *N* | *S* | *N* | *S* | *N* | *S* |
|---|---|---|---|---|---|
| 10 | 10 | 220 | 140 | 1200 | 291 |
| 15 | 14 | 230 | 144 | 1300 | 297 |
| 20 | 19 | 240 | 148 | 1400 | 302 |
| 25 | 24 | 250 | 152 | 1500 | 306 |
| 30 | 28 | 260 | 155 | 1600 | 310 |
| 35 | 32 | 270 | 159 | 1700 | 313 |
| 40 | 36 | 280 | 162 | 1800 | 317 |
| 45 | 40 | 290 | 165 | 1900 | 320 |
| 50 | 44 | 300 | 169 | 2000 | 322 |
| 55 | 48 | 320 | 175 | 2200 | 327 |
| 60 | 52 | 340 | 181 | 2400 | 331 |
| 65 | 56 | 360 | 186 | 2600 | 335 |
| 70 | 59 | 380 | 191 | 2800 | 338 |
| 75 | 63 | 400 | 196 | 3000 | 341 |
| 80 | 66 | 420 | 201 | 3500 | 346 |
| 85 | 70 | 440 | 205 | 4000 | 351 |
| 90 | 73 | 460 | 210 | 4500 | 354 |
| 95 | 76 | 480 | 214 | 5000 | 357 |
| 100 | 80 | 500 | 217 | 6000 | 361 |
| 110 | 86 | 550 | 226 | 7000 | 364 |
| 120 | 92 | 600 | 234 | 8000 | 367 |
| 130 | 97 | 650 | 242 | 9000 | 368 |
| 140 | 103 | 700 | 248 | 10000 | 370 |
| 150 | 108 | 750 | 254 | 15000 | 375 |
| 160 | 113 | 800 | 260 | 20000 | 377 |
| 170 | 118 | 850 | 265 | 30000 | 379 |
| 180 | 123 | 900 | 269 | 40000 | 380 |
| 190 | 127 | 950 | 274 | 50000 | 381 |
| 200 | 132 | 1000 | 278 | 75000 | 382 |
| 210 | 136 | 1100 | 285 | 1000000 | 384 |

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970

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# Leveraging Lending Institutions for Sustainable Growth: Implications for Sales Growth and Profitability in Small and Medium Enterprises

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***Abstract*—*This study is titled, Leveraging Lending Institutions for Sustainable Growth: Implications for Sales Growth and Profitability in Small and Medium Enterprises. This research studies how small and medium enterprises (SMEs) utilize lending institutions to achieve sustainable growth. A descriptive research design was used in this study with a total of 45 respondents who answered the survey questionnaires. The respondents of this study are individuals or representatives from small and medium enterprises (SMEs) who have experience the borrowing process from lending institutions. The research objectives dealt with a description of the demographic profile of the respondents, factors influencing financing decisions, the impact of leveraging lending institutions, challenges and opportunities in leveraging lending institutions for SMEs, and a strategic plan for enhancing SMEs' access to and utilization of financing from lending institutions. The research aims to understand how SMEs' utilization of lending institutions contributes to their long-term sustainability and financial success. The study revealed that the main factor influencing SMEs financing decisions is Access to capital. Likewise, there's a strong consensus among respondents that lending institutions have positively contributed to SME's growth and expansion. Additionally, high interest rates emerge as a notable challenge, with respondents strongly agreeing on its negative impact. Lastly, access to capital emerges as a crucial opportunity, enabling SMEs to obtain the financial resources necessary for their expansion initiatives, thus facilitating market penetration and operational improvements.*

***Keywords*— financial institutions, lending institutions, profitability, sales growth, small and medium enterprise, sustainable growth***

## I. INTRODUCTION

Access to finance is a critical barrier for small and medium enterprises (SMEs) to grow and thrive. While traditional bank lending remains an important source of financing, the limitations of this approach have motivated many countries to consider alternative avenues for SMEs to access growth capital (Beck, Demirguç-Kunt, & Levine, 2005; OECD, 2015). Insights from the literature suggest that developing a diversified financial system and enabling SMEs to leverage various funding sources can be instrumental in facilitating their sustainable growth and profitability (Berger & Udell, 2006; Beck, Demirguç-Kunt, & Singer, 2013).

Small and medium-sized enterprises (SMEs) play a vital role in economic growth and job creation, yet they often face significant challenges in obtaining the necessary financing to expand their operations (Abdulsaleh & Worthington, 2013). This challenge is particularly acute in developing economies, where informality, underdeveloped financial infrastructure, and other structural factors constrain SMEs' access to formal credit channels (Ayyagari, Demirguç-Kunt, & Maksimovic, 2011; Shinozaki, 2014).

Researchers have found that financial and institutional development can help alleviate these growth constraints and increase SMEs' access to external finance, thereby levelling the playing field between firms of different sizes (Beck & Demirguç-Kunt, 2006; Demirguç-Kunt et al., 2015).

While traditional bank lending remains an important source of financing, the limitations of this approach have motivated many countries to consider alternative avenues for SMEs to access growth capital. At the heart of addressing these challenges lies the essential contributions of financial institutions. From traditional banks to microfinance organizations and fintech companies, these entities serve as vital partners in nurturing small business success. By providing access to capital, offering financial advisory services, and mitigating risks, financial institutions play a multifaceted role in empowering small businesses to thrive and prosper (Cull et al., 2006; World Bank, 2022).

This paper seeks to unpack the essential contributions of financial institutions in nurturing small businesses' sustainable growth in sales and profitability. By examining the various ways in which financial institutions support small businesses, we gain insights into the symbiotic relationship between financial institutions and small enterprises and the transformative impact it has on local economies and communities. From facilitating access to finance to fostering innovation and resilience, financial institutions emerge as indispensable allies in the journey of small business growth and prosperity (Beck, Demirguç-Kunt, & Levine, 2005; World Bank, 2022).

Through a comprehensive exploration of the role of financial institutions in nurturing small business success, this paper aims to shed light on the importance of fostering a supportive ecosystem for entrepreneurship and economic development. By highlighting the pivotal role played by financial institutions, we can identify opportunities for collaboration, innovation, and policy intervention to empower small businesses and drive sustainable growth in the global economy (OECD, 2015; Demirguç-Kunt et al., 2015).

## II. METHODOLOGY

The research was conducted in Guimba, Nueva Ecija, focusing on individuals or representatives from small and medium enterprises (SMEs) with experience in borrowing from lending institutions. These include SME owners, managers, and staff. A total of 45 purposively chosen respondents (Subia, 2018) participated by answering a survey questionnaire that will describe the factors that will influence SMEs' decisions to seek financing from lending institutions as well as the challenges and opportunities of leveraging lending institutions on sales growth and profitability. A consent form with confidentiality and other ethical considerations was utilized before data collection. Respondents were selected through purposive sampling from various SMEs in the municipality. Not all SMEs registered in the Guimba Business Unit are financed by lending institutions, hence purposive sampling was utilized to target specific criteria relevant to the research objectives. This method involves selecting samples based on predetermined criteria, making it a commonly used non-random technique. Basic descriptive statistics such as frequency count, percentages, and weighted mean were used (Babbie, 2016).

## III. RESULTS AND DISCUSSION

### 1. Profile of Respondents: Demographic Information

#### 1.1. Demographic Profile

Table 1 represents the demographic profile of respondents in terms of business type or industry, role in SME, and length of operation.

*Table 1. Business Type / Industry*

| Profile | Frequency | Percentage |
|---|---|---|
| Retail Business Industry | 20 | 44.45 |
| Food Industry | 19 | 42.22 |
| Service-based Business Industry | 6 | 13.33 |
| **Total** | **45** | **100.00** |

The findings illustrate a varied landscape of business sectors among respondents. A substantial portion is involved in retail, reflecting a focus on direct consumer goods sales through outlets like grocery stores and hardware supply shops. Furthermore, a significant number are affiliated with the food industry, indicating a diverse array of food production and distribution establishments, such as eateries and bakeries. Additionally, a notable percentage belongs to the service sector, highlighting the significance of consumer services like salons and water refilling stations. This diversity suggests a rich economic environment, with retail and food industries prominently featured, alongside essential consumer services, providing valuable insights into local economic dynamics and consumer preferences.

*Table 2. Role in the SME*

| Profile | Frequency | Percentage |
|---|---|---|
| Owner | 43 | 95.56 |
| Manager | 2 | 4.44 |
| Staff | 0 | 0.00 |
| Others | 0 | 0.00 |
| **Total** | **45** | **100.00** |

The analysis highlights a notable trend among respondents involved in small and medium enterprises (SMEs), emphasizing the prevalence of ownership roles. Specifically, a vast majority of respondents, without quantifying the exact percentage, identified themselves as SME owners, indicating a strong presence of individuals directly engaged in managing and making decisions for their businesses. This suggests that the survey primarily targeted individuals with ownership stakes or entrepreneurial leadership responsibilities within SMEs. In contrast, a smaller proportion of respondents hold managerial positions within these enterprises.

*Table 3. Length of Operations*

| Profile | Frequency | Percentage |
|---|---|---|
| Less than 1 year | 2 | 4.44 |
| 1 – 3 years | 27 | 60.00 |
| 3 – 5 years | 9 | 20.00 |
| More than 5 years | 7 | 15.56 |
| **Total** | **45** | **100.00** |

The data regarding the operational duration of SMEs offers insights into the different stages of the businesses surveyed. Most respondents reported having relatively young businesses, suggesting a vibrant landscape of entrepreneurship. Many participants are in the early stages of building and establishing their ventures. However, there are also more established businesses represented, indicating a subset of enterprises that have likely experienced growth and maturity over time. Additionally, there is a presence of emerging businesses, with a small percentage of respondents indicating operations of less than one year. Overall, the data paints a picture of a diverse range of SMEs at various stages of development and maturity.

## 2. Factors Influencing SMEs Financing Decisions

*Table 4. Factors Influencing SMEs Financing Decisions*

| Parameters | Weighted Mean | Verbal Description |
|---|---|---|
| 1. Access to Capital | 3.69 | Strongly Agree |
| 2. Interest Rates | 3.53 | Strongly Agree |
| 3. Terms and Conditions of Loans | 3.62 | Strongly Agree |
| 4. Reputation and credibility of the lending institution | 3.67 | Strongly Agree |
| 5. Ease of application process | 3.62 | Strongly Agree |
| **Overall Mean** | **3.63** | **Strongly Agree / Significant Factor** |

*Legend: 3.25-4.00 Strongly Agree/Very Significant Factor; 2.50-3.24; Agree/Significant Factor; 1.75-2.49 Disagree/Insignificant Factor; 1.00 -1.74 Strongly Disagree/Very Insignificant Factor*

Table 4 sheds light on the key factors influencing SMEs' strategies for acquiring capital. Access to capital emerges as a crucial consideration, with respondents strongly affirming its significance. This highlights the importance for SMEs to secure adequate funding to support their growth and operational needs. Additionally, interest rates and loan terms are deemed essential, indicating that favorable terms can impact the cost-effectiveness of borrowing and financial sustainability. The reputation and credibility of lending institutions also resonate strongly with respondents, emphasizing the importance of trustworthy partnerships. Furthermore, the ease of the application process is valued, suggesting that simplified procedures are preferred by SMEs. Overall, the study indicates a widespread consensus among respondents regarding the factors shaping SMEs' financing decisions.

### 3. Impact of Leveraging Lending Institutions

*Table 5. Impact of Leveraging Lending Institutions*

| Parameters | Weighted Mean | Verbal Description |
|---|---|---|
| 1. Leveraging lending institutions have positively contributed to our SME's growth and expansion. | 3.42 | Strongly Agree |
| 2. Accessing financing from lending institutions has enabled our SMEs to invest in innovation and technology. | 3.00 | Agree |
| 3. Utilizing loans from lending institutions has helped improve our SME's production capacity and efficiency. | 3.13 | Agree |
| 4. Leveraging lending institutions has facilitated our SME's entry into new markets or expansion of existing operations. | 3.02 | Agree |
| 5. Our SME has experienced increased sales volumes because of leveraging lending institutions. | 3.18 | Agree |
| 6. Leveraging lending institutions has contributed to enhancing our SME's profitability. | 3.22 | Agree |
| **Overall Mean** | **3.16** | **Agree/Significant Factor** |

*Legend: 3.25-4.00 Strongly Agree/Very Significant Factor; 2.50-3.24; Agree/Significant Factor; 1.75-2.49 Disagree/Insignificant Factor; 1.00 -1.74 Strongly Disagree/Very Insignificant Factor*

The findings from Table 5 highlight the significant role of utilizing lending institutions in driving the growth and progress of small and medium enterprises (SMEs). There's a strong consensus among respondents regarding the impactful nature of leveraging these institutions, as indicated by their weighted mean of 3.42. Accessing financing from these entities has been particularly beneficial, empowering SMEs to invest in innovation and technology, thereby enhancing their competitiveness in dynamic markets. Moreover, utilizing loans from lending institutions has proven effective in improving SMEs' production capacity and operational efficiency, facilitating their entry into new markets or expansion of existing operations. SMEs have experienced tangible benefits such as increased sales volumes and enhanced profitability through their collaboration with lending institutions. The overall mean of 3.16 further confirms the widespread recognition among respondents of the positive outcomes stemming from leveraging these institutions.

### 4. Challenges and Opportunities in Leveraging Lending Institution

*Table 6. Challenges in Leveraging Lending Institutions*

| Parameters | Weighted Mean | Verbal Description |
|---|---|---|
| 1. High interest rates pose a significant challenge for our SME in accessing financing from lending institutions with a weighted mean of 3.29 and verbal interpretation strongly agree | 3.29 | Strongly Agree |
| 2. Strict eligibility criteria set by lending institutions make it difficult for our SME to qualify for loans with a weighted mean of 3.13 and verbal interpretation agree | 3.13 | Agree |

| | | |
|---|---|---|
| 3. Lack of understanding of financial products and services offered by lending institutions is a challenge for our SME with a weighted mean of 3.18 and verbal interpretation agree | 3.18 | Agree |
| 4. Regulatory constraints hinder our SME's ability to leverage lending institutions for growth and profitability with a weighted mean of 3.16 and verbal interpretation agree | 3.16 | Agree |
| **Overall Mean** | **3.19** | **Agree/Significant Factor** |

*Legend: 3.25-4.00 Strongly Agree/Very Significant Factor; 2.50-3.24; Agree/Significant Factor; 1.75-2.49 Disagree/Insignificant Factor; 1.00 -1.74 Strongly Disagree/Very Insignificant Factor*

The research findings from Table 6 shed light on the pervasive hurdles faced by small and medium enterprises (SMEs) when dealing with lending institutions, revealing significant barriers that impede their access to financial resources. High interest rates emerge as a notable challenge, with respondents strongly agreeing on its negative impact. This emphasizes how excessive interest rates hinder SMEs' ability to secure affordable financing, thus hindering their growth and financial stability. Additionally, the stringent eligibility criteria set by lending institutions present another formidable challenge, making it harder for SMEs to qualify for loans and limiting their access to essential capital for expansion and operational improvements. Moreover, the lack of comprehension of financial products and services offered by these institutions exacerbates the challenges faced by SMEs. This underscores the importance of initiatives focused on financial literacy and education to empower SMEs in navigating the complexities of engaging with lending institutions effectively. Additionally, regulatory constraints emerge as significant barriers, imposing compliance burdens and limiting the flexibility of SMEs in accessing financing options, thereby constraining their potential for expansion and innovation. The overall findings highlight the widespread recognition among respondents of the multifaceted challenges confronting SMEs in their interactions with lending institutions.

*Table 7. Opportunities in Leveraging Lending Institutions*

| Parameters | Weighted Mean | Verbal Description |
|---|---|---|
| 1. Access to capital for expansion is a significant opportunity that leveraging lending institutions can offer our SMEs. | 3.20 | Agree |
| 2. Competitive interest rates and favorable loan terms present an opportunity for our SME to leverage lending institutions effectively. | 3.18 | Agree |
| 3. Building creditworthiness and reputation through lending institutions can benefit our SMEs in the long term. | 3.20 | Agree |
| **Overall Mean** | **3.19** | **Agree/Significant Factor** |

*Legend: 3.25-4.00 Strongly Agree/Very Significant Factor; 2.50-3.24; Agree/Significant Factor; 1.75-2.49 Disagree/Insignificant Factor; 1.00 -1.74 Strongly Disagree/Very Insignificant Factor*

Table 7 highlights the significant opportunities available to small and medium enterprises (SMEs) through strategic partnerships with lending institutions, offering a pathway for growth and expansion. Access to capital emerges as a crucial opportunity, enabling SMEs to obtain the financial resources necessary for their expansion initiatives, thus facilitating market penetration and operational improvements. Competitive interest rates and favorable loan terms provide another compelling opportunity for SMEs to leverage lending institutions effectively, enhancing their cost-effectiveness and financial sustainability. Moreover, establishing creditworthiness and a positive reputation with lending institutions offers long-term benefits, improving SMEs' credibility and access to future financing opportunities, thereby promoting resilience and stability in the competitive market environment. Additionally, respondents recognize broader societal benefits, emphasizing how lending institutions enable businesses to expand, invest, and consumers to access goods and services otherwise out of reach. The overall findings underscore the collective acknowledgement among respondents of the numerous opportunities presented by strategic engagement with lending institutions.

**Part 5. Proposed Strategic Plan for enhancing SMEs' access to and utilization of financing from lending institutions.**

*Table 8. Proposed Strategic Plan*

| Phase | Objectives | Activities | Timeline | Responsible Parties |
|---|---|---|---|---|
| 1. Assessment | - Evaluate current financial position | - Assess cash flow, creditworthiness, and debt levels | 1 month | Financial team |
| | - Analyze market and competitive landscape | - Research lending options and criteria | | |
| 2. Goal Setting | - Set clear objectives for financing access | - Define target loan amounts and terms | 1 week | Management team |
| | - Establish utilization goals | - Determine how borrowed funds will be used | | |
| 3. Strategy Development | - Develop a comprehensive plan | - Identify strategic initiatives for enhancing access and utilization | 2 months | Strategy team |
| | - Prioritize strategic objectives | - Determine key focus areas for immediate action | | |
| 4. Implementation | - Enhance creditworthiness | - Improve credit scores through timely payments | Ongoing | Financial team |
| | - Diversify funding sources | - Explore alternative financing options | | |
| | - Strengthen financial management | - Implement financial software for better management | | |
| | - Promote sustainability | - Integrate sustainable practices into operations | | |
| 5. Monitoring & Evaluation | - Track progress towards objectives | - Monitor key performance indicators (KPIs) | Ongoing | Management team |
| | - Assess the effectiveness of strategies | - Conduct regular reviews and adjustments | Quarterly | Strategy team |
| 6. Continuous Improvement | - Identify areas for improvement | - Solicit feedback from stakeholders | Ongoing | All teams |
| | - Adapt strategies based on feedback | - Update strategic plan as needed | | |

The table presents a comprehensive strategic plan to improve small and medium enterprises (SMEs) access to and use of financing from lending institutions. It divides the plan into phases, each with specific goals, activities, timelines, and responsible parties. The initial phase involves evaluating the current financial situation and market context to inform strategic decisions. Next, the management team sets clear financing objectives, followed by the strategy team identifying key initiatives and prioritizing objectives. Implementation involves executing strategies like improving creditworthiness and diversifying funding sources, with ongoing support from the financial team. Monitoring and evaluation track progress and effectiveness, with adjustments made quarterly. Lastly, continuous improvement involves all teams identifying areas for enhancement and adapting strategies based on stakeholder feedback. This comprehensive plan aims to empower SMEs in effectively navigating financing complexities, promoting their growth and sustainability.

## IV. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were drawn from the above-mentioned results of the study:

1. The study's examination of respondents' demographic profiles provides a comprehensive understanding of small and medium enterprises (SMEs) involved in the research. It highlights a diverse representation across retail, food, and service sectors, emphasizing the entrepreneurial drive of SME owners and the dynamic lifecycle stages of these businesses. Tailored support mechanisms are essential to address the unique needs of SMEs across various industries, roles, and development stages.
2. Analysis of factors influencing SMEs' decisions to seek financing from lending institutions reveals critical insights into financial strategies. Access to capital, interest rates, loan terms, and the reputation of lending institutions are key considerations. Streamlined financing procedures are crucial for SMEs, reflecting the importance of accessibility and efficiency.
3. The evaluation of leveraging lending institutions' impact on SMEs' sales growth and profitability underscores the importance of strategic financial partnerships. Financing enables SMEs to invest in innovation, expand into new markets, and enhance competitiveness, resulting in increased sales and profitability.
4. Despite challenges such as high interest rates and regulatory constraints, opportunities exist for SMEs to collaborate effectively with lending institutions. Access to capital, competitive interest rates, and establishing creditworthiness are avenues for SMEs to leverage financial partnerships, driving growth and profitability.
5. The proposed strategic plan outlines a comprehensive roadmap for SMEs to enhance their access to and utilization of financing from lending institutions. Through systematic assessment, goal setting, strategy development, implementation, monitoring, and continuous improvement, SMEs can navigate financial complexities effectively. Adaptability to market dynamics ensures the plan's effectiveness, empowering SMEs to overcome challenges and achieve sustainable success.

Based on the findings and conclusions, the following were suggested:

1. SMEs should focus on creating and managing a solid credit profile. Ensuring payments on current loans and trade credit are made on time, responsibly handling debt levels, and promptly dealing with any inaccuracies in credit reports. A favorable credit history boosts trustworthiness with creditors and enhances the ability to secure advantageous financing terms.
2. Leverage government initiatives and support programs designed for SMEs to benefit from subsidized loans, grants for innovation and expansion, and help with navigating regulatory requirements. SMEs need to research and utilize these resources to complement their financing strategies.
3. Create a comprehensive financial strategy that combines immediate operational requirements with future growth goals. This strategy should encompass various economic situations and possible obstacles to ensure the company can adjust and succeed in different market conditions.
4. Interact with advisors who specialize in SME financing and growth strategies, industry experts, or mentors. These experts can offer insightful advice, connections to networks of possible lenders or investors, and direction on financial matters. With their experience, SMEs can minimize obstacles and make the most of their financing strategies.
5. Strong cash flow management procedures to maintain liquidity and financial stability. SME cash inflows and outflows should be routinely monitored, payment terms with suppliers and customers should be optimized, and efficient inventory management should be put in place. SMEs can reduce their dependency on outside funding and strengthen their overall financial resilience by actively managing cash flow.

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# From Employment to Entrepreneurship: Profiling Filipino Overseas Workers in Abu Dhabi, UAE with and without Business Ventures

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***Abstract*— *Overseas Filipino Workers (OFWs) in Abu Dhabi, UAE, are increasingly venturing into entrepreneurship, yet little research explores their entrepreneurial endeavors and the factors influencing their decisions. This study profiles OFWs with and without businesses, examining motivations, challenges, and opportunities. Employing a descriptive quantitative design, data was collected from 100 OFWs via Google Forms. Findings reveal a diverse demographic profile, with a majority being female, married, and holding bachelor's degrees. Most OFWs have moderate incomes, significant family dependents, and extensive work experience abroad. While 32% have initiated businesses, motivations include financial independence and skills utilization. Challenges include competition and capital constraints. Lack of capital and entrepreneurial knowledge hinder entrepreneurial pursuits for others. Nonetheless, OFWs express varied career aspirations, from concurrent entrepreneurship to full-time ventures. Recommendations include tailored entrepreneurship support, investment promotion, training initiatives, and reintegration programs. Understanding OFWs' entrepreneurial landscape is crucial for policymakers and stakeholders to support their economic growth and aspirations effectively.*

***Keywords*— Abu Dhabi, Business Ventures, Employment, Entrepreneurship, Overseas Filipino Worker**

## I. INTRODUCTION

Overseas Filipino Workers (OFWs) have long been recognized for their contributions to the global workforce, particularly in the Middle East. They play a crucial role in the economic development of both their home country and their host nations. While many OFWs are employed in various industries, there is a growing trend of Filipino workers in Abu Dhabi, UAE venturing into entrepreneurship. However, there is limited research on their entrepreneurial endeavors and the factors that influence their decision to venture into business. This study seeks to bridge this gap by profiling Filipino overseas workers who have successfully established their businesses, as well as those who have remained in employment.

By examining the motivations, challenges, and opportunities faced by Filipino overseas workers in Abu Dhabi, UAE this study aims to shed light on the specific circumstances that drive individuals to transition from being employees to becoming entrepreneurs. The findings of this research will not only contribute to the existing literature on entrepreneurship but also inform policymakers and stakeholders about the potential benefits and contributions of Filipino overseas workers in Abu Dhabi in the entrepreneurial landscape.

The relationship between migration, development, and entrepreneurship is widely recognized as an important concept in both developed and developing countries. Some researchers argue that labor export migration can have positive effects and contribute to national development (Cai, 2011). European governments, for example, view the diaspora phenomenon as beneficial for the development of their home countries (Sinatti and Horst, 2015). Policies aimed at facilitating this connection have become crucial for states to attract investments, resources, and skills. In addition, workers are encouraged to start their businesses in the fields they work in because they learn more about the opportunities available in those industries (Shane et al., 2003; Gacheru,2007).

However, there are potential challenges for returning migrants who wish to become entrepreneurs. In the case of Egypt, returnees who have accumulated savings and overseas experiences are more likely to start their businesses. However, they may face the risk of losing their social capital, which includes their connections and networks (Wahba and Zenou, 2009). Filipino and Indonesian migrant workers, encouraged to become entrepreneurs, often face the burden of enterprise failures (Spritzer, 2016). The impact of global crises that lead to the return of migrant workers further exacerbates their challenging situation (Spritzer and Piper, 2014).

To address these issues, it is important to adopt a migrant-centered approach that not only recognizes the contribution of migrants to national incomes but also prioritizes their economic well-being and human development (Sinatti, 2019). In the Philippines, for instance, there is a policy in place to support returning migrants in establishing their micro, small, or medium-sized enterprises. Senator Win Gatchalian has emphasized the need to provide alternative opportunities for returning OFWs by enabling them to start their businesses (Gatchalian, 2020).

## II. METHODOLOGY

This study utilized a descriptive design under quantitative research. According to Nieswiadomy (2008), a descriptive study describes the phenomena or relationship between examined variables. The study also exemplified the relationships between age, civil status, educational attainment, and OFW's monthly family income. The respondents of the study were composed of 100 Overseas Filipino Workers in Abu Dhabi. The sample population was determined using purposive sampling or judgmental sampling. Due to the location of the respondents of the proposed study, the researcher has decided to conduct the survey using Google Forms. The survey questionnaire used in this study was self-made by the researcher to fully answer the research questions posed.

## III. RESULTS AND DISCUSSION

### 1. Socio-Demographic Characteristics of Participants

*Table 1: Socio-Demographic Profile of Respondents, n=100*

| **Description** | ***f*** | **%** |
|---|---|---|
| **Gender** | | |
| Male | 24 | 24% |
| Female | 76 | 76% |
| **Age** | | |
| Under 25 | 1 | 1% |
| 25 - 30 | 12 | 12% |
| 31 - 35 | 20 | 20% |
| 36 - 40 | 27 | 27% |
| Over 40 | 40 | 40% |
| **Marital Status** | | |
| Single | 40 | 40% |
| Married | 55 | 55% |
| Separated/Divorced | 3 | 3% |
| Widow | 2 | 2% |
| **Educational Attainment** | | |
| Elementary | 1 | 1% |
| High School | 8 | 8% |
| Bachelor's degree | 84 | 84% |
| Postgraduate Degree | 7 | 7% |

*Table 1* illustrates the number and socio-demographics of respondents. The sample included 100 OFWs currently based in Abu Dhabi UAE. The presented data provides a snapshot of a specific population's demographic profile, which is crucial for research analysis and understanding the characteristics of the study group. The data encompasses gender, age, marital status, and educational attainment. The age of participants included in the population ranged from 25 and above 40 years, with a mean of 20 years. Almost half of the respondents are aged 40 and above. The vast majority (n = 76, 76%) of participants were female, and most of the participants were married (n = 55, 55%), more than one-fourth were single (n = 40, 40%),3 were separated 3%) and 2 were widow (2%). In terms of educational background, 84% of the participants were bachelor's degree holders (n = 84), Postgraduate degree holders 7% (n = 7), while 8% (n=8) of the respondents have attained high school and 1% (n=%) is elementary.

**2. Family Dependent**

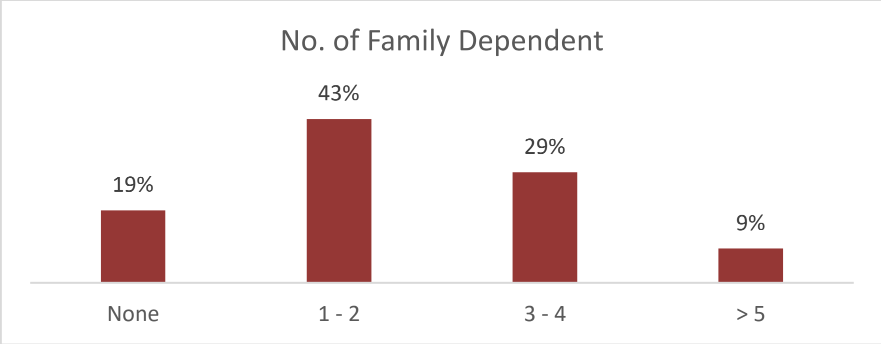


*Fig.1: Family Dependent*

Figure 1 The data above represents the number of family dependents of the respondents. It is segmented into four categories based on the number of dependents. A significant portion of the population, 43%, falls into the "1 - 2" dependent category, indicating that many individuals have one- or two-family dependents. Meanwhile, 29% have "3 - 4" dependents, showing a sizable group with a somewhat larger family. A smaller proportion, 19%, have "None" as their family dependents, while 9% have "More than 5" dependents, suggesting a minority with a larger family size.

**3. No. of Years as an OFW**

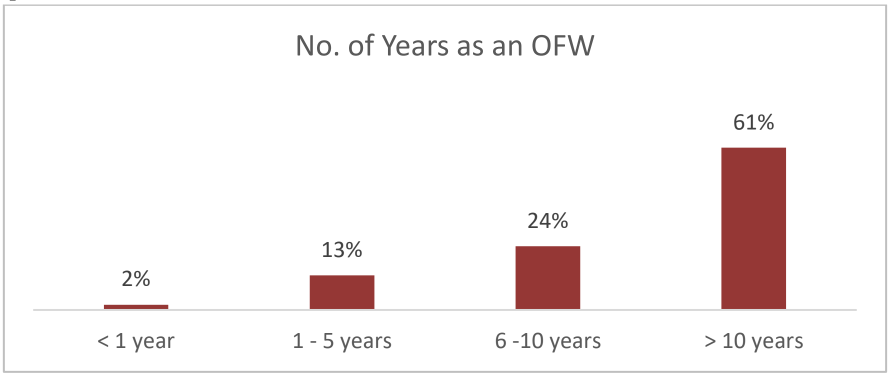


*Fig.2: No. of Years as an OFW*

Figure 2 illustrates the respondents' number of OFWs for "More than 10 years," highlighting a significant portion of long-term overseas workers. "6 - 10 years" accounts for 24%, indicating a substantial mid-term group. Meanwhile, 13% have "1 - 5 years" of experience, and 2% have been OFWs for "< 1 year."

**4. Respondents Monthly Income**

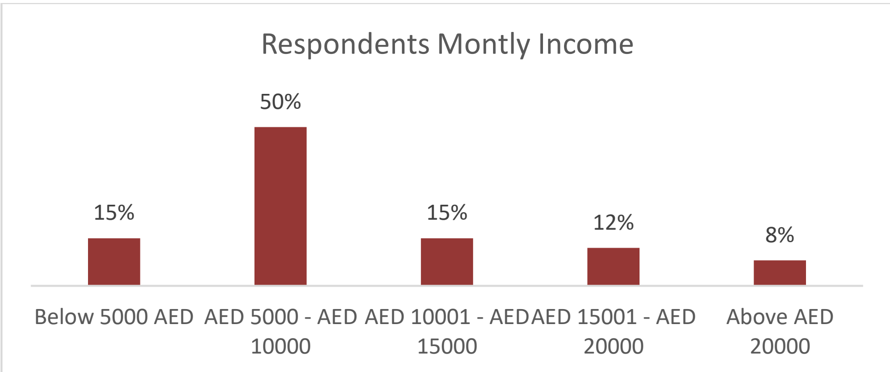


*Fig.3: Respondents Monthly Income*

The data represents the monthly income distribution of the respondents, categorized into five income brackets. The largest segment, comprising 50%, falls within the "AED 5001 – AED 10000 " category, indicating a significant portion with moderate incomes. "Below AED 5000 "accounts for 15%, while "AED 10001 – AED 15000" and "AED 15001 - AED 20000 " each represent 15% and 12%, respectively. A smaller group of 8% falls into the "Above AED 20000" category, signifying a minority with relatively high incomes.

### 5. Started Own Business While Working as an OFW

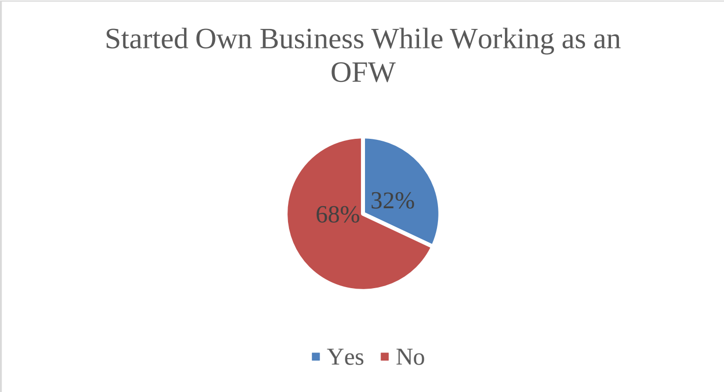


*Fig.4: Started Own Business While Working as an OFW*

Figure 4 shows whether respondents who work as overseas workers (OFWs) have initiated their businesses. It is divided into two categories, "Yes" and "No." Notably, the majority, 68%, have not started their businesses while working as OFWs, which suggests that a significant portion is not involved in entrepreneurial endeavors. In contrast, 32% have ventured into business ownership during their overseas work, indicating a substantial minority who have embraced entrepreneurship while abroad.

### 6. Respondent type of business being ventured

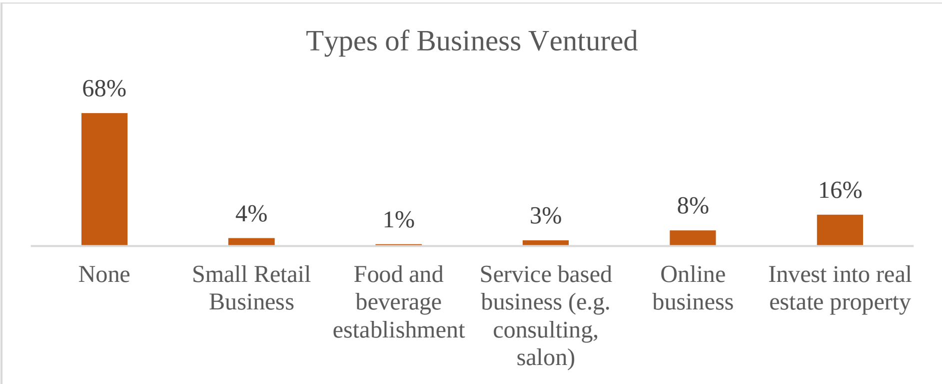


*Fig.5: Respondent type of business being ventured*

Figure 5 offers insights into the types of businesses initiated by overseas workers (OFWs) who have ventured into entrepreneurship. Respondents who answered "Yes" to start their businesses were further asked to specify the type of business they were involved in. Here are the results:

- "Invest into real estate property" constitutes the largest category at 16%, indicating a substantial number of OFWs have chosen to invest in real estate, a common financial strategy for many working abroad.
- "Online business" follows closely at 8%, reflecting a significant segment engaged in e-commerce or digital entrepreneurship, likely benefiting from the accessibility and global reach of the internet.
- "Small Retail Business" and "Service-based Business" make up 4% and 3%, respectively, representing smaller but still noteworthy groups involved in traditional retail, consulting, or salon businesses.
- A minimal of 1% are engaged in "Food and beverage establishments."

### 7. Scale of business being established based on capitalization

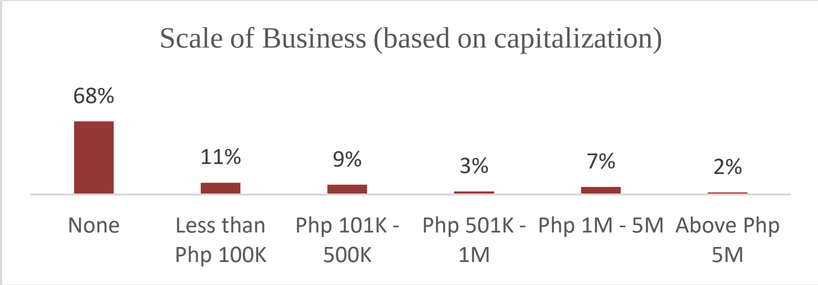


*Fig.6: Scale of business being established based on capitalization*

Figure 6 offers a comprehensive view of the scale of businesses established by overseas workers (OFWs) who have embarked on entrepreneurial endeavors, with the categorization based on their capitalization. Here's the analysis of the findings:

- "Less than Php 100K" is the most common scale, representing 11 respondents (11% of those involved in entrepreneurship). This suggests a substantial portion of OFWs have initiated small-scale businesses with limited initial capital.
- "Php 101K – Pph 500K" closely follows with 9 respondents (9%), indicating that a significant group of OFWs have established businesses with a slightly larger capital base, positioning them in the small to medium-scale category.
- "Php 1M – Php 5M" comes next with 7 respondents (7%), showing that a noteworthy number of OFWs have ventured into medium-scale businesses with more substantial capitalization.
- "Php 501K – Php 1M" and "Above Php 5M" make up smaller segments at 3% and 2%, respectively. This data suggests that a minority of OFWs have embarked on larger entrepreneurial initiatives, potentially involving more significant financial resources.

**8. Factors motivated the OFWs to start their own business**

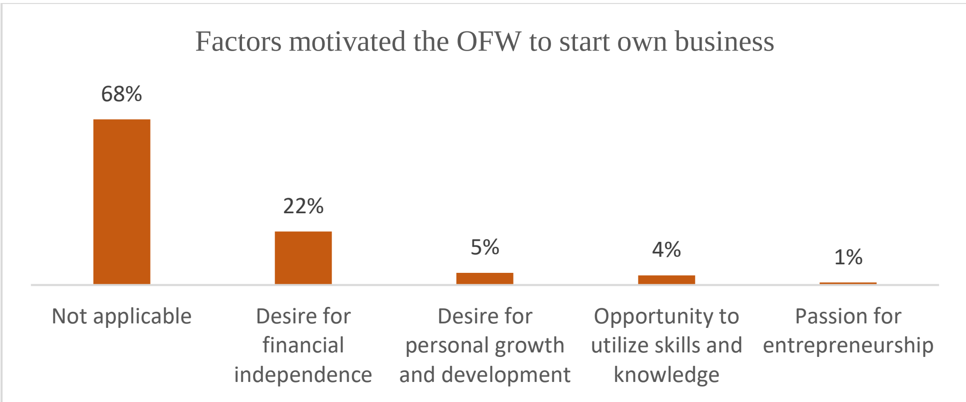


*Fig.7: Factors that motivated the OFWs to start their own business*

Figure 7 shows the motivations of overseas workers (OFWs) who have embarked on entrepreneurial ventures. When asked what prompted them to start their businesses, the responses reveal various motivating factors:

- "Desire for financial independence" emerged as the primary motivator, with 22% of respondents indicating a strong aspiration for economic self-sufficiency. This highlights the importance of financial stability and the desire to break free from financial constraints.
- "Desire for personal growth and development" was cited by 5%, indicating that some OFWs are motivated by a commitment to self-improvement and personal fulfilment, beyond just financial gains.
- "Opportunity to utilize skills and knowledge" was the motivation for 4%, reflecting a group keen on applying their expertise and experience to entrepreneurial endeavors.
- "Passion for entrepreneurship" stood at 1%, underscoring a smaller but significant portion driven by a genuine love for the challenges and rewards of business ownership.

**9. Primary challenges OFWs faced when starting and managing their business**

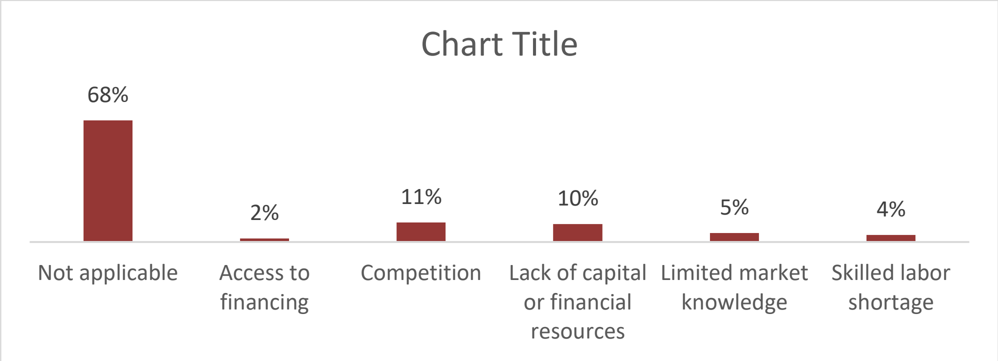


*Fig.8: Primary challenges OFWs faced when starting and managing their business*

Figure 8 provides insights into the primary challenges faced by overseas workers (OFWs) who have initiated and managed their businesses. Respondents were asked to specify the key challenges they encountered in this entrepreneurial journey, and the findings are as follows:

- "Competition" was cited by 11% of respondents, indicating that a significant challenge for OFW entrepreneurs is contending with rivals in their respective markets.
- "Lack of capital or financial resources" closely follows at 10%, underscoring the pervasive challenge of securing adequate funding to start and sustain their businesses.
- "Access to financing" accounts for 2%, pointing to a smaller group struggling with financial support and resources.
- "Limited market knowledge" was a challenge for 5%, indicating that a portion of OFWs faced hurdles related to understanding and navigating their target markets.
- "Skilled labor shortage" represented 4%, reflecting a group dealing with difficulties in recruiting and retaining qualified employees.

**10. Primary reason for not starting own business**

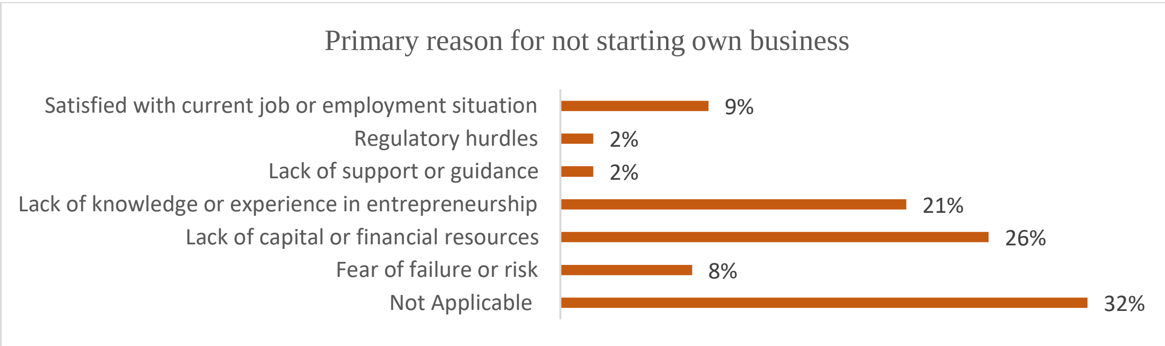


*Fig.9: Primary reason for not starting own business*

Figure 9 presents the primary reasons why some overseas workers (OFWs) have not pursued entrepreneurship, shedding light on the key factors that influence their decision to refrain from starting their businesses. The findings are as follows:

- "Lack of capital or financial resources" is the most prevalent obstacle, with 26 respondents (26%) facing financial constraints that hinder their entrepreneurial aspirations. This highlights the pressing need for capital to initiate business ventures.
- "Lack of knowledge or experience in entrepreneurship" closely follows, cited by 21 respondents (21%). This indicates that a substantial portion recognizes the importance of expertise and experience in the entrepreneurial realm.
- "Satisfied with current job or employment situation" is mentioned by 9 respondents (9%), suggesting that a segment of OFWs prefers the stability and contentment provided by their current employment.
- "Fear of failure or risk" represents 8%, implying that a minority may be apprehensive about the uncertainties and potential risks associated with starting a business.
- "Lack of support or guidance" and "Regulatory hurdles" are reported by a smaller number of

respondents, indicating that these issues are less common but can still deter entrepreneurial pursuits.

**11. How do the respondents envision their future career or professional aspirations?**

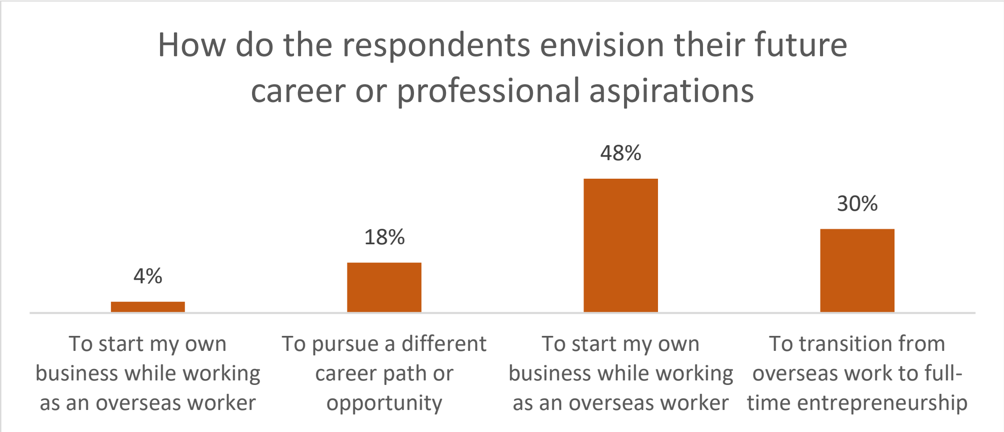


*Fig.10: How do the respondents envision their future career or professional aspirations*

Figure 10 reveals the career and professional aspirations of overseas workers (OFWs), shedding light on their future and ambitions. Respondents were asked to envision their future career paths, and the results are as follows:

- "To start my own business while working as an overseas worker" garnered 48% of responses. This indicates a substantial desire among OFWs to balance their overseas employment with entrepreneurship, highlighting their entrepreneurial spirit and the pursuit of financial independence.
- "To transition from overseas work to full-time entrepreneurship" was selected by 30%, signifying a significant portion aiming to transition from overseas work to dedicated entrepreneurship, potentially indicating long-term entrepreneurial goals
- "To pursue a different career path or opportunity" represents 18%, indicating that a portion of OFWs is open to exploring new career avenues or opportunities outside their current trajectory.
- "Not applicable" received 4%, suggesting that a smaller group may not have defined specific career aspirations.

This data underscores the diversity of career ambitions among OFWs, encompassing a range of options from concurrent entrepreneurship while working abroad to full-time entrepreneurship and exploration of different career paths. It provides valuable insights for research on the future career trajectories and entrepreneurial tendencies of this group, potentially guiding policies and support programs aimed at facilitating their professional aspirations.

## IV. CONCLUSION AND RECOMMENDATION

The gathered data yields profound insights into the entrepreneurial inclinations of Overseas Filipino Workers (OFWs), offering a rich perspective into their motivations, challenges, and opportunities in the realm of business ownership. Additionally, it sheds light on the diverse entrepreneurial landscape within the OFW community, highlighting trends in investments, online commerce, and traditional business ventures, which are pivotal for studies focused on entrepreneurial behavior and the economic activities of OFWs. The study further unveils a spectrum of entrepreneurial ventures, ranging from small-scale startups to medium-sized enterprises, initiated by OFWs. Furthermore, the findings deliver crucial insights into the multifaceted motivations driving OFWs to embark on entrepreneurial journeys. The findings also underscore the common hurdles faced by OFWs in their entrepreneurial endeavors, including stiff competition, financial constraints, and challenges related to market knowledge and human resources. The study also provides invaluable insights into the multifaceted factors influencing OFWs' decisions concerning entrepreneurship. Lastly, the collected data accentuates the diversity of career aspirations among OFWs, encompassing a wide range of options, from concurrent entrepreneurship while working abroad to full-time entrepreneurship and exploration of various career paths.

Based on the dataset presented, several recommendations can be made to better support and understand overseas workers (OFWs) and their entrepreneurial and career aspirations:

- **Tailored Entrepreneurship Support**: With 32% of OFWs venturing into entrepreneurship during their overseas work, there's a need for tailored support programs that can provide training, mentorship, and access to financial resources.

- **Investment Promotion and Access to Capital**: Develop programs that encourage investment in overseas workers' businesses and facilitate access to capital.
- **Training and Skill Development**: Offer training programs and skill development initiatives for overseas workers (OFWs) who aspire to become entrepreneurs.
- **Support for Returning OFWs:** Develop reintegration programs for OFWs who have successfully run businesses abroad and wish to return to their home country.

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# Investigating Awareness, Preparedness and Challenges of Agency Officers in Implementing GSIS Electronic Billing and Collection System (EBCS)

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***Abstract***— *Increasing unpaid compulsory premiums and high loan default rates have led to serious discussions concerning agencies under the Government Service Insurance System (GSIS) Cabanatuan Branch Office. Substantial attention has been made to addressing these delinquencies on premiums and loan payments. One solution is the introduction of Electronic Billing and Collection System (EBCS). The 'Electronic Billing Remittance' refers to the electronic billing system of the GSIS introduced in August 2003 which required the agencies to use the electronic remittance file format of the GSIS. With the continuous improvement of the billing system, the Electronic Billing and Collection System (EBCS) was implemented in July 2014. During the first few months of program implementation, some agencies could not comply immediately. It is in no discreet information that EBCS experienced major errors and technical difficulties during its implementation phase some of it concerning the ability of the government agencies and its agency officers to adjust in using the new system. The objectives of this paper is to investigate the level of awareness of the respondents on the different functionalities of electronic billing and collection system. Additionally, the researcher analyzed are the profile of the respondents and the challenges faced by Agency Officers in using EBCS and preparation for the Agency's Electronic Remittance File (ERF). Empirical results indicated that some agency remitting officers still are not aware of all of the EBCS's features. This shows how important it is for all government agencies to improve how quickly they collect mandatory fees and loan payments. Additionally, different agency practices, budget preparation methods, and technical problems like internet connectivity make it harder to use the EBCS effectively. This shows that the system needs to be standardized and improved.*

***Keywords*— Compulsory Premiums Delinquency, EBCS, Electronic Billing File, ERF Handler, GSIS, Loan Delinquency**

## I. INTRODUCTION

Change is everywhere, and it is necessary. In modern times, for us to advance or progress not only in our daily lives but in every aspect of our society, we must accept that we must embrace change. In life, we should keep moving forward, looking forward, and experiencing new and interesting things that could bring development to us. Life can sometimes become stagnant if we don't allow ourselves to evolve and adapt to new changes that surround us. Self-discoveries or learning new skills can bring about changes you never knew were possible. There are a lot of factors affecting organizational change and development. "Larry Alton describes the rate of change in today's workplace as accelerating, and if you aren't prepared, it could dramatically impact your career." As old ideas impacted us, change is expected to happen at a constant rate wherein we always know how to adjust or adapt to these new changes in our workforce. Though you probably notice some of these changes as they start to affect your career, it's mostly up to analysts to take a step back and identify exactly what changes are rolling out and how and why. Another aspect of globalization is that technology has increased access to education and the development of the skills needed for higher-paying jobs, which have led to increases in organizational productivity (Van Paasschen, 2015).

The advancement of technology has been accepted widely. As a result, having an understanding of technology's positive and negative effects is very critical and we must comprehend why it is so crucial in our lives. Technology makes our ways of living easier and faster. The usefulness of technology in staying connected, and working from home has been evident in these modern times. Expanded security, enhanced communication, increased information, education, and, last but not least, amusement are vital aspects of technology.

In July 2014, the Government Service Insurance System (GSIS) introduced the Electronic Billing and Collection System (EBCS), a web-based application enabling GSIS to send its billing statements for premium and loan amortization to government agencies and accept payments online.

As part of GSIS initiatives to provide excellent service to its members and stakeholders by using digital platforms, the EBCS will enable all government agencies to download their regular monthly billing statements and upload their electronic remittance files even at their own pace at their most convenient day and time on or before their due dates. The EBCS is only accessible by government agencies' authorized personnel in charge of approving and remitting payments to GSIS, particularly the finance and electronic remittance file officers, or those who prepare the agency's electronic remittance file (ERF) that contains the list of members and their monthly remittances. Through this system innovation, all government agency officers can now check, or correct errors that they may encounter while uploading their electronic remittance file before remitting their agency payments for premiums, loans, and other amounts due to the GSIS. Necessary requests for updating of records of their employees are also made easy through the use of reports generated by EBCS for accounts with discrepancies between GSIS Billing and their agency remittances.

The GSIS Billing statements were made more accessible to agency officers as their basis in preparation for their agency remittance files. Government agencies are notified by the GSIS every 1st day and 15th day of the month to inform them that they can download the billing statement from the system. The agency officers through the use of EBCS billing can now more accurately prepare their agency remittance. EBCS's convenient functionalities allow them to easily upload their electronic remittance file once it matches the GSIS billing statement.

However, despite the strict implementation of the use of the website, errors and malpractices are still a major problem for some government agencies leading to unpaid compulsory premiums and loan default rates for employees concerned.

It is for these reasons that this study was conceptualized. It aimed to investigate the level of awareness of the respondents on the different functionalities of electronic billing and collection system. Additionally, the researchers analyzed the profile of the respondents and the challenges faced by Agency Officers in Using EBCS and Preparation for the Agency's Electronic Remittance File (ERF).

## II. METHODOLOGY

This descriptive research used purposive sampling technique to determine the 90 chosen respondents (Subia, 2018). They answered the questionnaires facilitated through Google forms. The statistical analysis primarily involved tabulating the data using frequency and percentage to summarize the responses. Additionally, data validity was ensured by pre-testing the questionnaire with a small sample before the full survey, allowing for adjustments to improve clarity and reliability. Roopa & Rani (2017) described that a questionnaire permits quantitative data to be gathered in a standardized and systematized method, therefore the data to be collected are internally uniform and coherent for analysis. Data was then analyzed and interpreted. Questionnaires were distributed electronically using Google Forms. Before data collection, a semi-structured interview was conducted to assess the eligibility of potential respondents for inclusion in the sample. According to Given (2008), a semi-structured interview involves asking informants a series of pre-planned yet open-ended questions. The researchers utilized Facebook Messenger to conduct brief interviews with potential respondents, adhering to predefined criteria to objectively determine sample eligibility. This approach helped mitigate biases by establishing clear selection criteria for the sample. Furthermore, it provided accessibility to the researchers, who were able to evaluate and engage with the most readily available and reachable sample members deemed qualified for inclusion.

A total of ninety (90) respondents whose job involves the use of the Electronic Billing and Collection System were asked to answer the form which can be accessed through a Google form, the main gathering data tool for this research. To further cross-check the answers provided, a review was also conducted and a secondary data gathering in the form of an interview was done.

## III. RESULTS AND DISCUSSIONS

Ninety (90) respondents whose job involves using the Electronic Billing and Collection System were involved in the study. The researcher came up with interpretations and quantitative outcomes after the tabulation of results, to wit:

### A. Demographic Profile of the Respondents

*Table 1. Distribution of Respondents According to Gender*

| Gender | Frequency | % |
|---|---|---|
| Female | 81 | 90.00% |
| Male | 9 | 10.00% |
| **Grand Total** | **90** | **100.00%** |

As seen from the table, 81, or 90.00% of the respondents were female, while only 9, or 10.00%, were male. It is important to note that gender differences and similarities should not be overgeneralized as they can vary among individuals and can be influenced by different factors such as social, cultural, biological, and other personal factors. Study shows that women are superior at communication, nurturing, and care, while men are more technically oriented than women, considering men to be mathematically, analytically, and physically stronger (Barone, 2011; Charles and Grusky, 2004; Levanon and Grusky, 2016).

*Table 2. Distribution of Respondents According to Age*

| Age | Frequency | % |
|---|---|---|
| 18 - 23 | 1 | 1.11% |
| 24 - 29 | 13 | 14.44% |
| 30 - 35 | 14 | 15.56% |
| 36 - 39 | 13 | 14.44% |
| 40 above | 49 | 54.44% |
| **Grand Total** | **90** | **100.00%** |

As shown in Table 2 below, 49 or 54.44% of the respondents were 40 years old and above. The gathered data shows that the majority of the respondents were older than young professionals. Young people aged between 20 and 40 who are employed in a profession or white-collar occupation are generally termed young professionals. They are commonly referred to as part of the Generation Y. The term "Generation Y" first appeared in literature at the beginning of the 1990s (Strauss, Howe, 1993). According to some studies, older people has the chance to have lower confidence in using technological advances than younger people (American Association of Retired Persons [AARP], 2002). This could be a disadvantage to them in successfully performing their everyday task, particularly using applications that require them to have advanced learning and experience.

*Table 3. Distribution of Respondents According to Educational Background*

| Educational Attainment | Frequency | % |
|---|---|---|
| College Graduate | 77 | 85.56% |
| Post Graduate | 13 | 14.44% |
| **Grand Total** | **90** | **100.00%** |

Of the 90 respondents, the majority 77, or 85.56% were College Graduates. It can be deduced from the above that respondents were more capable of making their abilities better in completing a specific given task. They were more likely to have the ability to learn more complex tasks and training and be more efficient in allocating work resources. However, 13 or 14.44% of the total respondents have a post-graduate education which means that they can improve their critical thinking skills and problem-solving skills.

*Table 4. Distribution of Respondents According to Marital Status*

| Marital Status | Frequency | % |
|---|---|---|
| Married | 65 | 72.22% |
| Single | 25 | 27.78% |
| **Grand Total** | **90** | **100.00%** |

It can be gleaned from the table above that 65 or 72.22% of the respondents were married, and 25, or 27.78% were single. This implies that more of the respondents were married which could mean that they could have other responsibilities out of their work. Employees' productivity varies based on different cases, but oftentimes single employees are described to be more organized and focused than married employees who might have some difficulties that prevent them from performing their work duties.

*Table 5. Distribution of Respondents According to Field of Work Experience*

| Work Experience | Frequency | % |
|---|---|---|
| Administration | 16 | 17.78% |
| Finance/Accounting | 73 | 81.11% |
| Operations | 1 | 1.11% |
| **Grand Total** | **90** | **100.00%** |

Based on the gathered data, 73 or 81.11% of the respondents have experience in accounting or their field of work experience is related to finance and accounting which could be relevant to deal with their tasks as ERF Handlers. Their work experience in the field of finance and accounting could help improve their understanding of using the EBCS.

*Table 6. Distribution of Respondents According to Years of Service*

| Years of Service | Frequency | % |
|---|---|---|
| below 1 year | 2 | 2.22% |
| 1 - 2 years | 5 | 5.56% |
| 3 - 4 years | 6 | 6.67% |
| 5 years and above | 77 | 85.56% |
| **Grand Total** | **90** | **100.00%** |

Seventy-seven or 85.56% of the 90 respondents were in the service for five (5) years and above, and only 2, or 2.22% were in the service below 1 year. It can be deduced from the findings that most respondents were not new to the service, they must be knowledgeable enough to perform their work duties.

*Table 7. Distribution of Respondents According to Years of Service as Remittance Officer*

| Years of Service as Remittance Officer | Frequency | % |
|---|---|---|
| below 1 year | 10 | 11.11% |
| 1 - 2 years | 11 | 12.22% |
| 3 - 4 years | 21 | 23.33% |
| 5 years and above | 48 | 53.33% |
| **Grand Total** | **90** | **100.00%** |

Forty-eight or 53.33% of the 90 respondents were in the service for five (5) years and above, and another 21, or 23.33% were in the service for 3 to 4 years followed by those with 1 to 2 years of service 11 respondents or 12.22% of the 90 respondents.

It can be realized from the findings that most respondents were not new to the service, hence; they must be knowledgeable enough to perform their work duties.

### B. Assessing the Level of Awareness of the Different Functionalities of Electronic Billing and Collection System (EBCS)

a. Assessing the level of training attended related to the use of EBCS

| Scale | Do you have training or seminars related to the use of EBCS? | % | Are you aware of North Luzon Webinars (last week of the month) for AAO / ERF Handler / LO? | % |
|---|---|---|---|---|
| 1 | 6 | 6.67% | 5 | 5.56% |
| 2 | 5 | 5.56% | 3 | 3.33% |
| 3 | 12 | 13.33% | 7 | 7.78% |
| 4 | 22 | 24.44% | 27 | 30.00% |
| 5 | 45 | 50.00% | 48 | 53.33% |
| **Grand Total** | **90** | **100.00%** | **90** | **100.00%** |

Forty-five (45) to Forty-eight (48) respondents answered that they have attended training related to the use of EBCS. Only five respondents answered that had not attended the seminar or training.

b. Assessing the level of compliance in using the agency's EBF and remitting 100% based on it.

| Scale | Do you know how to download your agency's Electronic Billing File (EBF)? | % | Do you download your EBF regularly every month? | % | Do you use your monthly EBF as your basis in preparing your agency's Electronic Remittance File (ERF)? | % | Does your employees' personal requests affect your preparation for your agency's ERF? | % | Do you remit 100% of compulsory premiums and loan amortizations based on the actual billing by the GSIS? | % |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1.11% | 3 | 3.33% | 2 | 2.22% | 20 | 22.22% | 3 | 3.33% |
| 2 | 1 | 1.11% | 1 | 1.11% | 3 | 3.33% | 11 | 12.22% | 2 | 2.22% |
| 3 | 2 | 2.22% | 5 | 5.56% | 4 | 4.44% | 22 | 24.44% | 1 | 1.11% |
| 4 | 8 | 8.89% | 13 | 14.44% | 19 | 21.11% | 20 | 22.22% | 15 | 16.67% |
| 5 | 78 | 86.67% | 68 | 75.56% | 62 | 68.89% | 17 | 18.89% | 69 | 76.67% |
| **Grand Total** | **90** | **100.00%** | **90** | **100.00%** | **90** | **100.00%** | **90** | **100.00%** | **90** | **100.00%** |

The majority of the 90 respondents or 68 to 78 respondents have answered that they know and they are downloading the electronic billing file regularly every month but only 62 respondents are using it as the basis for preparing their agency's electronic remittance file (ERF). It is worrying that 22 or 24.44% of the 90 respondents answered that the employees' request affects the preparation of their agency's ERF. Also, one respondent did not remit 100% compulsory premiums and loan amortizations based on the actual billing by the GSIS.

c. Assessing the level of awareness in using other EBCS Functionalities

| Scale | Are you aware of the "Weekly Notice to Deduct" functionality of the EBCS? | % | Do you use the "Weekly Notice to Deduct" functionality of the EBCS? | % | Are you aware of the "Unpaid Premiums" functionality of the EBCS? | % | Do you use the "Unpaid Premiums" functionality of the EBCS? | % | Are you aware of the "Loan Deficiency" functionality of the EBCS? | % | Do you use the "Loan Deficiency" functionality of the EBCS? | % | Are you aware of the "Exception Reports" being generated every time you upload your agency's ERF? | % | Do you regularly coordinate with your Agency Authorized Officers the Exception Reports/Comparative Reports between GSIS Billing and your Agency's ERF? | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7 | 7.78% | 12 | 13.33% | 6 | 6.67% | 11 | 12.22% | 10 | 11.11% | 14 | 15.56% | 1 | 1.11% | 3 | 3.33% |
| 2 | 1 | 1.11% | 3 | 3.33% | 4 | 4.44% | 6 | 6.67% | 5 | 5.56% | 7 | 7.78% | 3 | 3.33% | 2 | 2.22% |
| 3 | 5 | 5.56% | 12 | 13.33% | 12 | 13.33% | 22 | 24.44% | 11 | 12.22% | 16 | 17.78% | 7 | 7.78% | 5 | 5.56% |
| 4 | 17 | 18.89% | 22 | 24.44% | 24 | 26.67% | 16 | 17.78% | 20 | 22.22% | 23 | 25.56% | 15 | 16.67% | 20 | 22.22% |
| 5 | 60 | 66.67% | 41 | 45.56% | 44 | 48.89% | 35 | 38.89% | 44 | 48.89% | 30 | 33.33% | 64 | 71.11% | 60 | 66.67% |
| Grand Total | 90 | 100.00% | 90 | 100.00% | 90 | 100.00% | 90 | 100.00% | 90 | 100.00% | 90 | 100.00% | 90 | 100.00% | 90 | 100.00% |

Based on the data gathered, there are still agency remitting officers who are unaware of the different functionalities of the EBCS.

d. Assessing the level of difficulty in using the EBCS website.

| Scale | Do you have trouble using EBCS Website? | % | Is EBCS accessible at any time of the day? | % | Is EBCS convenient and easy to use? | % | Do you think the system has been functionally developed? | % | Do you agree this system is necessary for your office? | % |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 16 | 17.78% | 4 | 4.44% | 4 | 4.44% | 3 | 3.33% | 3 | 3.33% |
| 2 | 17 | 18.89% | 7 | 7.78% | 2 | 2.22% | 3 | 3.33% | 2 | 2.22% |
| 3 | 24 | 26.67% | 16 | 17.78% | 9 | 10.00% | 14 | 15.56% | 7 | 7.78% |
| 4 | 22 | 24.44% | 41 | 45.56% | 29 | 32.22% | 35 | 38.89% | 19 | 21.11% |
| 5 | 11 | 12.22% | 22 | 24.44% | 46 | 51.11% | 35 | 38.89% | 59 | 65.56% |
| **Grand Total** | **90** | **100.00%** | **90** | **100.00%** | **90** | **100.00%** | **90** | **100.00%** | **90** | **100.00%** |

Despite the need for the EBCS, there is still a need to further improve the collection efficiency in terms of compulsory premiums and loan amortization remittances from different government agencies.

**C. Assessing the Challenges Faced by Agency Officers in Using EBCS and Preparation for the Agency's Electronic Remittance File (ERF)**

a. What are usually the errors encountered in using the EBCS Website?

b. What are usually the reasons for below 100% remittance by your agency?

Among the different reasons stated by some remitting officers are the not real-time posting of payments in the EBCS and GSIS databases, the late updating of members' records, different practices or processes of some agencies like their budget or fund preparation, and other internal or system errors in using EBCS like internet connection.

## IV. CONCLUSIONS

The following conclusions are based on the findings of this study:

1. There were 45 to 48 people who answered the survey, and most of them had been trained on how to use the Electronic Billing and Collection System (EBCS).

2.Only five people had not. Out of the 90 people who answered, 68 to 78 downloaded the electronic payment file every month, but only 62 used it to make their agency's Electronic Remittance File (ERF).

3.Notably, 22 respondents (24.44%) said that requests from employees affected their planning for the ERF. One respondent also didn't pay the full amount of required premiums and loan payments that the GSIS asked for.

4.Some agency remitting officers still don't know all of the EBCS's features. This shows how important it is for all government agencies to improve how quickly they collect mandatory fees and loan payments.

5.Different agency practices, budget preparation methods, and technical problems like internet connectivity make it harder to use the EBCS effectively.

**Recommendations**

Based on the findings and conclusions, the following are recommended:

1. Prioritizing EBCS's continuous improvement and strengthening the IT Support System will help prevent technical problems and inappropriate behavior from all agency officers.
2. To reduce human errors and enhance the overall user experience, it is recommended that website users receive comprehensive training, seminars, and other measures.
3. Sanctions against the improper use of the website must be strictly implemented;
4. A proper and more efficient monitoring system of all the required postings must be implemented through a feedback mechanism to gather user experience and make necessary improvements and enhancements to the system.
5. Future researchers can expand this study by increasing and seeking respondents from other government agencies and conducting interviews with GSIS members to gain their perceptions of the new digital environment.

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# Best Practices of Clothing Businesses in Talavera, Nueva Ecija, A Foundation for Strategic Business Advancement

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***Abstract***— *This study primarily aimed to determine the best practices of clothing businesses to use it as a foundation of strategic business advancements. Moreover, the frequency with which the business's best practices are tracked, which best practices are the most targeted of the apparel firms to be retained, and how does best practices can be used as strategic business advancement. The respondents of the study is the owners of clothing businesses in Talavera, Nueva Ecija. Data were collected and analyzed using a quantitative approach and utilizing a descriptive research design. Unveiling best practices of clothing businesses as a foundation for strategic business advancement through statistical analysis: frequency and percentage, and weighted means analyzing the data in terms of identifying the most to the least important performance indicators of the businesses among all of the variables. Based on the survey conducted on clothing businesses in Talavera, Nueva Ecija, several best practices emerge across different areas of business operations. These practices are categorized into three main sections, section one being the Business Profile and Legal Requirements, followed by the tracking of indicators in terms of Product, Place, Promotion, and Price, and Key Performance Indicators (KPIs) covering finance, marketing, production, technical, and distribution aspects. The research study delved into identifying the core best practices of clothing businesses, serving as a strategic guide for their advancement. Through meticulous analysis, several key findings emerged. Firstly, prioritizing product factors, such as maintaining optimal stock levels and maximizing customer satisfaction, was deemed essential for driving sales and fostering loyalty. Additionally, selecting the right store location was crucial for visibility and accessibility, directly impacting footfall and sales. Vigilance towards competitors and demographic shifts was highlighted as essential for maintaining relevance. Understanding the relationship between marketing spend and customer acquisition proved pivotal for optimizing budgets and achieving a higher ROI. Strategic analysis of profit margins across clothing items emerged as crucial for maximizing profitability and revenue. Creating a positive customer experience, investing in employee training, and implementing effective inventory management practices were also identified as critical success factors. In essence, these findings underscored the holistic approach needed for sustainable growth in the clothing business, emphasizing the importance of product management, marketing strategies, customer experience, and operational efficiency.*

***Keywords*— *Best Practices; Clothing Business; Key Performance Indicators; Strategic Business Advancement***

## I. INTRODUCTION

Nestled in the heart of Nueva Ecija, Talavera is a town known for its depth of cultural richness. Talavera's economy has changed significantly in the last several years, with an emphasis on the apparel industry's critical role in the town's overall prosperity. Talavera's local textile businesses operate in a dynamic and competitive market as the apparel industry changes. Acknowledging the necessity for strategic insights tailored to Talavera's unique setting, this study attempts to uncover key success indicators through best practices with an emphasis on revealing tactics and possibilities that lead to strategic business advancement.

A clothing business involves designing, producing, or retailing apparel and accessories. It can range from retailing clothes in stores to operating an online boutique catering to various fashion needs. The industry is run by many people and craftspeople involved in clothes manufacturing, such as embroiders, tailors, seamstresses, etc. The industry is supported by fashion professionals, including models, hair stylists, model agents, make-up artists, photographers, and other non-fashion service providers, making up a larger ecosystem.

The clothing industry is fast-evolving with changing fashion trends and consumer demands. The internet has broadened the scope of starting a clothing brand, allowing business owners to reach target audiences across boundaries.

The purpose of this study is to provide a strategic basis for local companies and stakeholders by identifying these distinct best practices. The insights obtained herein are intended to go beyond standard business advice, giving practical information to aid decision-making processes. Finally, the purpose of this research is not only to understand the Genetics of successful clothing enterprises in Talavera, but also to provide the foundation for strategic plan that support development and resilience in this distinctive region's ever-changing economic landscape.

As Quismondo et al. (2020) pointed out, best practices in the business domain aim to provide individuals with specific direction by combining research findings with real-world experience in their advancement. By combining research and practical experience, this synthesis highlights the roots of these practices and highlights how important it is for professionals to have a thorough framework to help them navigate the complicated details of their sectors.

**Statement of the Problem**

This study aims to identify key success indicators of clothing businesses in Talavera and how they could serve as a foundation for strategic business advancement. Specifically, the study aims to determine the answers to the following questions:

1. How may the business profile of clothing businesses be describe in terms of;

1.1 Type of Business Ownership

1.2 Capitalization

1.3 Source of Capitalization

1.4 Years of Operation

1.5 No. of Employees

1.6 Monthly Income

1.7 Legal Requirements

1.8 Tax Obligations

2. How the business indicators strategy be tracked through 4P’s of Marketing Mix in terms of;

2.1 Product

2.2 Place

2.3 Promotion

2.4 Price

3. What are the key performance indicators of clothing businesses in Talavera in terms of;

3.1 Finance

3.2 Marketing

3.3 Production

3.4 Technical

3.5 Distribution

4. Formulation of business plan strategy for advancement based on the findings of the study.

**SCOPE AND DELIMITATION**

This study focuses on identifying best practices in clothing businesses and using them as a basis for strategic business advancement. Clothing business owners in Talavera, Nueva Ecija, were the primary respondents. The researchers collected the necessary data using survey questionnaires.

## II. RESEARCH METHODOLOGY

The study utilized a quantitative descriptive method to identify best practices for strategic business advancement in clothing businesses in Talavera, Nueva Ecija. Conducted in this rapidly growing municipality, the research involved twenty clothing shop owners selected through simple random sampling. Data was gathered using a survey questionnaire with three sections: business profile, tracking business indicators, and key performance indicators (KPIs). The data analysis employed frequency counts, percentages, and weighted means to classify and interpret findings. Ethical considerations included ensuring participant consent, maintaining confidentiality, and avoiding biased or misleading information. The study aimed to offer insights for strategic planning and enhancing business practices in the local clothing industry.

## III. RESULTS AND DISCUSSION

This chapter presents the findings, analysis, and interpretation of data gathered, whose main objective is to determine the best practices of clothing businesses in Talavera, Nueva Ecija, a foundation for strategic business advancement.

**1. Business Profile**

*Table 1.1 Type of Business Ownership*

| TYPE OF BUSINESS OWNERSHIP | FREQUENCY | PERCENTAGE |
|---|---|---|
| Sole Proprietorship | 19 | 95% |
| Partnership | 1 | 5% |
| Corporation | 0 | 0% |
| Limited Liability Company | 0 | 0% |
| Franchise | 0 | 0% |
| Others | 0 | 0% |
| **TOTAL:** | **20** | **100%** |

Table 1.1 presents the type of business ownership. The majority of the respondents were "sole proprietor" with a frequency of 19, which equates to 95% of the respondents, and the least was "partnership" with a frequency of 1 or 5% of the respondents. It can be noted that from the 20 respondents in the clothing businesses in Talavera, Nueva Ecija, the most significant number of respondents in the business ownership bracket was "sole proprietors".

According to Abkowitz and Roulac (2015) There is significant importance of business profile analysis in such way that it provides insights on how an entrepreneur can understand their own strengths and weaknesses as well as those of their competitors, which helps to inform strategic decision-making.

*Table 1.2 Capitalization*

| CAPITALIZATION | FREQUENCY | PERCENTAGE |
|---|---|---|
| Php. 50,000 or below | 11 | 55% |
| Php. 50,000 to 100,000 | 7 | 35% |
| Php. 100,000 to 150,000 | 1 | 5% |
| Php. 150, 000 to 200, 000 | 0 | 0% |
| Php. 200, 000 or more | 1 | 5% |
| **TOTAL:** | **20** | **100%** |

Table 1.2 presents the amount of capitalization of the clothing business. The majority of the respondents used "Php.50,000 or below," with a frequency of 11, which equates to 55% of the respondents, while "Php.50,000 to Php.100,000" respondents had the least with a frequency of 7 or 35% and the most least used a capital of "Php100,000 to Php.150,000 and Php.200,000 or more" with both the frequency of 1 that equates to 5% each for both. It shows that the greatest number of 11 among 20 respondents of clothing businesses in Talavera, Nueva Ecija used only Php.50,000 or below as capitalization.

*Table 1.3 Capitalization*

| SOURCE OF CAPIALIZATION | FREQUENCY | PERCENTAGE |
|---|---|---|
| Personal Savings | 17 | 85% |
| Bank Loans | 2 | 10% |
| Venture Capital | 0 | 0% |
| Investors | 1 | 5% |
| **TOTAL:** | **20** | **100%** |

Table 1.3 presents the source of capitalization of the respondents. Most of the respondent's capital were from "Personal Savings" with a frequency of 17, equating to 85%, while the respondents who used "Bank Loans" as source of capitalization were second the least with frequency of 2 or 10% of the respondents and the most least was through "Investors" with frequency of 1 and percentage of 5%. It shows that the greatest number of the 20 respondents of clothing businesses in Talavera, Nueva Ecija's source of capitalization was from Personal Savings.

According to Robinson (2024). Borrowers from credit, such those who use bank loans upon putting up a small business face more difficult borrowing conditions than those who avoid of debt, which is a primary motivating factor to use personal savings as a primary choice in funding their respective businesses.

*Table 1.4 Years of Operation*

| YEARS OF OPERATION | FREQUENCY | PERCENTAGE |
|---|---|---|
| Less than 1 Month to 1 Year | 8 | 40% |
| 1 to 3 Years | 5 | 25% |
| 3 to 5 Years | 2 | 10% |
| 5 to 10 Years | 1 | 5% |
| Over 10 years | 4 | 20% |
| **TOTAL:** | **20** | **100%** |

Table 1.4 presents the years of operation of the clothing businesses. Majority of respondents in the sample have been in operation for “less than 1 month to 1 year” with 40% falling into this category with the frequency of 8 respondents, least equates to 25% with the frequency of 5 respondents which operates for “1 to 2 years”, while only a small proportion of frequency of 2 among respondents which is 10%, have been operational for “3 to 5 years”, similarly, a mere 5% have been operational for “5 to 10 years” which equates 1 respondent only, the remaining 20% out of 100% equates to the 4 respondents who was in operation for “Over 10 years”.

According to Sethuraman (2014) The number of years of a business in its operation draws an empirical evidence that a business years of operation influences its success and longevity, which shows an impact on how a firm age on its performance.

*Table 1.5 No. of Employees*

| NO. OF EMPLOYEES | FREQUENCY | PERCENTAGE |
|---|---|---|
| 1 to 5 Employees | 20 | 100% |
| 6 to 10 Employees | 0 | 0% |
| 11 to 15 Employees | 0 | 0% |
| 16 to 20 Employees | 0 | 0% |
| Over 20 Employees | 0 | 0% |
| **TOTAL:** | **20** | **100%** |

Table 1.5 presents the No. of Employees of the clothing businesses in Talavera, Nueva Ecija. All of the 20 respondent’s workforce or employees were only ranging from “1 to 5 Employees” with a frequency of 20, which equates to 100% of the respondents.

According to Landers et al. (2024) It is not uncommon to see a group of employees congregating in a retail setting, it affects the the customer behavior, Drawing from social impact theory consumers feel more intimidated by groups of employees than lesser or individual employees. These feelings of intimidation lead to lower intentions to approach employees, and, through this, lower purchase intentions.

*Table 1.6 Monthly Income*

| MONTHLY INCOME | FREQUENCY | PERCENTAGE |
|---|---|---|
| Php. 50,000 or below | 18 | 90% |
| Php. 50,000 to 100,000 | 2 | 10% |
| Php. 100,000 to 150,000 | 0 | 0% |
| Php. 150, 000 to 200,000 | 0 | 0% |
| Php. 200, 000 or more | 0 | 0% |
| **TOTAL:** | **20** | **100%** |

Table 1.6 presents the Monthly Income of the clothing businesses in Talavera, Nueva Ecija. Most of the respondents have an monthly income of “Php.50,000 or below” with a frequency of 18, which equates to 90% of the respondents, and the least was “Php.50,000 to Php.100,000” with a frequency of 2 or 10% of the respondents. It shows that from the 20 respondents in Talavera, Nueva Ecija, the greatest number of respondents in the clothing businesses annual income is “Php.50,000 or below”

Based on the article written in CPBRD (Congressional Policy and Budget Research Department) House of Representatives Congress of the Philippines (2024) FF2020-19: MSMES IN THE PHILIPPINES. Micro, small and medium enterprises (MSMEs) are considered the backbone of many economies in the world including the Philippines. Accounting for 99.5% of the total number of business establishments in the country, the Department of Trade and Industry (DTI) estimated that MSMEs contributed 35.7% of the total value-added or gross domestic product in 2018. MSMEs generated 5.7 million jobs or 63.2% of the total employment in 2018. Collectively, MSMEs are those with employee size of less than 200 and with asset size of below P100 million.

*Table 1.7 Legal Requirements*

| LEGAL REQUIREMENTS | FREQUENCY | PERCENTAGE |
|---|---|---|
| DTI or SEC Registration Form. | 13 | 65% |
| Community Tax Registered | 12 | 60% |

| | | |
|---|---|---|
| Public Liability Insurance | 11 | 55% |
| Environmental Permit | 12 | 60% |
| Barangay Clearance | 11 | 55% |
| BIR Registered | 15 | 75% |
| Sanitary Permit | 12 | 60% |
| Mayor's Business Permit | 18 | 90% |
| Zoning Clearance | 11 | 55% |
| Fire Permit | 12 | 60% |
| Occupancy Permit | 14 | 70% |
| Land Title or Contract of lease | 14 | 70% |

Table 1.7 presents the legal requirements survey conducted among respondents operating clothing businesses which revealed a comprehensive overview of the regulatory landscape they navigate. Respondents reported varying degrees of compliance. Notably, the frequency distribution of responses ranged from a low of 11 to a high of 18, reflecting the spectrum of regulatory adherence among respondents. A significant majority of respondents, constituting 65%, indicated compliance with the "Department of Trade and Industry (DTI)" or "Securities and Exchange Commission (SEC) registration". This reflects a widespread understanding of the importance of formal business registration among clothing entrepreneurs with the frequency of 13, similarly, a substantial proportion of respondents, totalling 75%, reported registration with the "Bureau of Internal Revenue (BIR)". Compliance with tax obligations is crucial for legal and financial integrity, and the high percentage suggests a commendable level of tax awareness among respondents with frequency of 15, while the "Mayor's Business Permit" emerged as the most widely fulfilled requirement, with an overwhelming 90% of respondents indicating compliance. This indicates a strong regulatory culture within the surveyed business community, with the majority recognizing the necessity of obtaining the requisite permits from local authorities equates to frequency of 19 respondents, 60% of respondents reported compliance with both "Community Tax Registration" and "Environmental Permit requirements" which signify a substantial majority of respondents meeting these regulatory obligations with both has the frequency of 12 as same as also complying on having "Fire Permit", the least was other requirements such as "Barangay Clearance", "Public Liability Insurance", and "Zoning Clearance" which hovered around the 55% compliance range that equates to the frequency of 11 out of the three.

According to Holmes and Salvino (2016) It is significant to have proper contracts in business operations, it emphasizing the importance of clear and enforceable contractual agreements. In addition to business formation and contractual matters, legal framework and requirements must be met. Moreover, the authors discuss the regulatory environment in which businesses operate, covering areas such as health and safety standards, environmental regulations, taxation laws, and industry-specific compliance requirements. They underscore the importance of understanding and complying with these legal mandates to mitigate risks and ensure long-term sustainability.

*Table 1.8 Tax Obligation*

| TAX OBLIGATION | FREQUENCY | PERCENTAGE |
|---|---|---|
| Php. 50,000 or below | 20 | 100% |
| Php. 50,000 to 100,000 | 0 | 0% |
| Php. 100,000 to 150,000 | 0 | 0% |
| Php. 150, 000 to 200, 000 | 0 | 0% |
| Php. 200, 000 or more | 0 | 0% |
| **TOTAL** | **20** | **100%** |

Table 1.8 indicates a basis of a result that 100% of the respondents are in compliance with "Tax Obligation of Php.50,000 or below" that equates to frequency of 20 among all of the 20 respondents.

According to Orbitax Philippines (2024). The corporate tax rate is 20% (reduced from 30% effective 1 July 2020) for micro, small and medium enterprises (MSMEs), including domestic corporations with taxable income up to PHP 5 million and total assets (excluding land) up to PHP 100 million.

Moreover, According to Milanez 2017 the role of businesses in the tax system. In addition to being taxed directly, businesses act as withholding agents and remitters of tax on behalf of others. Businesses play an important role in the tax system, both as taxpayers and as remitters of tax.

2. **Tracking Business Indicators through 4P's of Marketing Mix**

*Table 2.1 Product*

| 2.1 PRODUCT | WEIGTHED MEAN | VERBAL INTERPRETATION |
|---|---|---|
| 1. Maintaining optimal stock levels and understanding product popularity is critical for effective inventory management. | 3.5 | Very Important |
| 2. Ensuring high customer satisfaction with product quality and variety is essential for building brand loyalty and retaining customers. | 3.6 | Very Important |
| 3. Tracking the sales performance of different product lines provides valuable insights for strategic decision-making and maximizing revenue. | 3.4 | Important |
| 4. Efficient inventory management, including monitoring stock levels and product popularity, directly impacts operational efficiency and customer satisfaction. | 3.55 | Very Important |
| 5. Customer feedback on product quality and variety helps identify areas for improvement and innovation, driving long-term success in the market. | 3.5 | Very Important |

Table 2.1 indicates the perceived importance of various aspects related to product management and customer satisfaction. “Maintaining optimal stock levels and understanding product popularity” This aspect received a weighted mean score of 3.5, indicating that respondents find it "Very Important." It underscores the critical nature of effective inventory management for businesses, highlighting the significance of staying informed about product demand and stock levels to meet customer needs efficiently. “Ensuring high customer satisfaction with product quality and variety**”** With a weighted mean score of 3.6, respondents consider this aspect "Very Important." It emphasizes the essential role of product quality and variety in building brand loyalty and retaining customers, indicating that businesses prioritize meeting customer preferences to foster lasting relationships. “Tracking the sales performance of different product lines” This aspect received a weighted mean score of 3.4, indicating that it is considered "Important" by respondents. While not as critical as the previous aspects, it highlights the value of leveraging sales data to inform strategic decision-making and revenue optimization, indicating a recognition of the importance of data-driven insights. “Efficient inventory management” This aspect received a weighted mean score of 3.55, indicating that respondents view it as "Very Important." It emphasizes the direct impact of efficient inventory management on operational efficiency and customer satisfaction, underscoring the need for businesses to monitor stock levels and product popularity closely to enhance overall performance. “Customer feedback on product quality and variety” With a weighted mean score of 3.5, respondents consider this aspect "Very Important." It underscores the importance of soliciting and leveraging customer feedback to drive continuous improvement and innovation in product offerings, highlighting its role in ensuring long-term success in the market.

Overall, the survey results reveal a consensus among respondents regarding the critical importance of various factors related to product management and customer satisfaction. Businesses are urged to prioritize strategies that optimize inventory management, enhance product quality and variety, leverage sales data for decision-making, and actively seek and incorporate customer feedback to drive sustained success in the market.

According to Salmi et al. (2022) Product-orientation and dependency on the current product portfolio affect the way the companies can transform the business models. Companies need to develop capabilities to sense opportunities, to break away from a linear business culture and restructure the firm resources accordingly.

*Table 2.2 Place*

| 2.2 PLACE | WEIGTHED MEAN | VERBAL INTERPRETATION |
|---|---|---|
| 1. Selecting a strategic store location increases visibility and accessibility, attracting more customers and driving sales. | 3.5 | Very Important |

| | | |
|---|---|---|
| 2. Regularly evaluating the competition and demographic changes in the area ensures your store location remains relevant and appealing to target customers. | 3.4 | Important |
| 3. Regularly monitoring customer traffic and footfall allows for timely adjustments to marketing strategies and store layout to maximize sales potential. | 3.45 | Important |
| 4. Implementing effective signage and way finding systems improves navigation and reduces customer frustration, leading to a better experience. | 3.45 | Very Important |
| 5. Creating a welcoming and visually appealing store environment enhances customer satisfaction and encourages longer dwell times. | 3.45 | Very Important |

Table 2.2 presents the place of the clothing business and indicates its “Strategic store location” Rated as "Very Important" with a weighted mean of 3.5, indicating a consensus among respondents about its critical role in driving sales and attracting customers. “Evaluation of competition and demographics” Considered "Important" (3.4), highlighting the need for businesses to remain relevant and appealing by staying abreast of market dynamics. “Monitoring customer traffic” Rated as "Important" (3.45), emphasizing the significance of adapting marketing strategies and store layout based on real-time data to optimize sales potential. “Effective signage and way finding” Also deemed "Important" (3.45), indicating the importance of improving navigation and enhancing the customer experience to foster satisfaction and loyalty. Lastly, “Creating a welcoming store environment” Again, rated as "Important" (3.45), underscoring the role of ambiance in customer satisfaction and engagement.

According to Rajbhadari and Acharya (2021) Businesses must utilize location theory, and decision analysis to optimize their geographical position in the realm of business and gain competitive edge in the market.

*Table 2.3 Promotion*

| 2.3 PROMOTION | WEIGTHED MEAN | VERBAL INTERPRETATION |
|---|---|---|
| 1. Regularly monitoring campaign performance enables timely adjustments to maximize reach and engagement, ensuring marketing efforts remain impactful. | 3.25 | Important |
| 2. Testing different messaging and creative elements across channels for identifying the most compelling content for target audiences. | 3.4 | Important |
| 3. Adopting a multi-channel marketing approach ensures broader reach and exposure to diverse audience segments, amplifying brand awareness and customer acquisition opportunities. | 3.45 | Important |
| 4. Understanding the relationship between promotional spending and customer acquisition enables better budgeting and forecasting for future marketing campaigns. | 3.65 | Very Important |
| 5. Utilizing analytics tools to assess campaign performance facilitates data-driven decision-making and enhances the overall effectiveness of marketing initiatives. | 3.25 | Important |

Table 2.3 presents the promotion of the clothing business and indicates how important it is when it comes to “Monitoring campaign performance” Rated as "Important" (3.25), highlighting the need for agility in adjusting marketing strategies to maximize impact. “Testing messaging and creative elements” Also rated as "Important" (3.4), emphasizing the importance of refining content to resonate with target audiences. “Adopting a multi-channel approach” Considered "Important" (3.45), indicating recognition of the value of broadening reach and exposure across diverse audience segments. “Understanding promotional spending” Rated as "Very Important" (3.65),

suggesting a strong emphasis on budgeting and forecasting for future campaigns. “Utilizing analytics tools” Deemed "Important" (3.25), highlighting the role of data-driven decision-making in enhancing marketing effectiveness.

According to Tedsungnon (2020) Clothes sales promotion activities and marketing activities are aimed at making the product acceptable and then the product is liked by the market. With this sales promotion costs are generally lighter and the results achieved can be done in the short term. Clothing sales promotion using social media Facebook will be available with advertising facilities such as sponsored stories, CPC, Facebook page post ads, pages like Ads. Tendency of clothing sales promotions expect after buying, consumers will have the brand loyalty they bought

*Table 2.4 Price*

| 2.4 PRICE | WEIGHTED MEAN | VERBAL INTERPRETATION |
|---|---|---|
| 1. Analyzing profit margins on different clothing items helps identify high-performing products and optimize pricing strategies for maximum profitability. | 3.35 | Important |
| 2. Comparing price positioning and perceived value against competitors helps identify opportunities to differentiate pricing strategies and enhance customer value perception. | 3.25 | Important |
| 3. Analyzing the impact of promotional pricing on sales and profitability helps evaluate the effectiveness of discount strategies in driving revenue and customer acquisition. | 3.15 | Important |
| 4. Understanding and monitoring price elasticity and adjustment of pricing to be made accordingly as strategies. | 3.35 | Important |
| 5. Utilizing flexible payment options such as via cash, card, money transfer, etc. assess the overall effectiveness of marketing initiatives. | 2.85 | Important |

Table 2.4 presents the price of the clothing business and indicates how important it is when it comes to “Analysis of profit margins” Rated as "Important" (3.35), indicating the importance of optimizing pricing strategies for profitability. “Comparison of price positioning” Also rated as "Important" (3.25), suggesting a need for differentiation to enhance customer value perception. “Analysis of promotional pricing impact” Considered "Important" (3.15), emphasizing the evaluation of discount strategies in driving revenue. “Understanding price elasticity” Rated as "Important" (3.35), indicating a recognition of the need for flexibility in pricing strategies. “Utilizing flexible payment option”: Deemed "Important" (2.85), suggesting a moderate emphasis on diversifying payment methods.

According to Hamdallah, et al (2014) Companies suffer a high level of competence which forces them to use costing systems in order to price their products, by taking into account material, labor and indirect costs. The study suggests that good quality and high effective cost accounting systems and modern techniques should be adopted and implemented.

## 3. Key Performance Indicators

*Table 3.1 Finance*

| 3.1 FINANCE | WEIGHTED MEAN | VERBAL INTERPRETATION |
|---|---|---|
| 1. Effective management and maximization of revenue ensure the sustainability of the business. | 3.4 | Important |
| 2. Maintaining high profitability is crucial for the business sustainability. | 3.45 | Important |
| 3. Emphasis must be placed on managing inventory turnover rate efficiently to ensure that products are sold quickly and efficiently without excessive holding costs. | 3.45 | Important |

| | | |
|---|---|---|
| 4. Placing value on regularly analyzing financial ratios such as liquidity ratios, profitability ratios, and solvency ratios to assess the financial health and performance of the clothing business. | 3.5 | Important |

Table 3.1 represents finance as a performance indicator in which, “Effective management and maximization of revenue ensures the sustainability of the business obtain the weighted mean of 3.4 which is as verbally interpreted is “Important” Second statement is “Maintaining high profitability is crucial for the business sustainability” that obtain the weighted mean of 3.45 which is also verbally interpreted as “important” While, Third statement “Emphasis must be placed on managing inventory turnover rate efficiently to ensure that products are sold quickly and efficiently without excessive holding costs” obtain the weighted mean of 3.45 which is as well as interpreted as “Important” Lastly, Fourth statement “Placing value on regularly analyzing financial ratios such as liquidity ratios, profitability ratios, and solvency ratios to assess the financial health and performance of the clothing business that obtain the weighted mean of 3.4 which is also interpreted as “Important”.

According to Fei et al.( 2023)Cash is of great significance to the production and operation of enterprises. Cash flow has always been regarded as the "blood" of enterprise. Therefore, it is necessary to study the cash flow of clothing enterprises. To add up According to Tracy (2021) To succeed in today's business world, you must understand critical financial information on your internal management. Business Financial Information Secrets is focused on the internal producers and users of financial statements/information (from the inside out). If you don't understand cash flows you fail to understand the lifeline/blood line of a business.

*Table 3.2 Marketing*

| 3.2 Marketing | WEIGHTED MEAN | VERBAL INTERPRETATION |
|---|---|---|
| 1. Minimizing the cost associated with acquiring new customers while maintaining a steady flow of new clientele. | 3.45 | Important |
| 2. Significance of having focus on increasing the lifetime value of customers by fostering long-term relationships and maximizing their overall value to the business. | 3.3 | Important |
| 3. Establishing and maintaining strong brand awareness among your target audience is important to enhance brand recognition and attract more customers. | 3.4 | Important |
| 4. Measuring the return on investment (ROI) of the marketing campaigns to ensure that resources are allocated effectively and generate positive results. | 3.4 | Important |

Table 3.2 represents marketing as a performance indicator in which, “Minimizing the cost associated with acquiring new customers while maintaining a steady flow of new clientele “ that obtain the weighted mean of 3.45 which is verbally interpreted as “Important” Second statement is about “Significance of having focus on increasing the lifetime value of customers by fostering long term relationships and maximizing their overall value to the business “ that obtain the weighted mean of 3.3 which is also verbally interpreted as “Important” while the third statement is “Establishing and maintaining strong brand awareness among your target audience to enhance brand recognition and attract more customers” that obtain the weighted mean of 3.4 which is verbally interpreted as also “Important” Lastly, fourth statement ,”Measuring the return on investment ROD of the marketing campaigns to ensure that resources are allocated effectively and generate positive results that obtain the weighted mean of 3.4 which is verbally interpreted as “Important”.

According to Kahya and Saraçgil (2015) Marketing strategies employed in apparel industry such as as branding, product positioning, pricing strategies, distribution channels, and promotional tactics, specifically tailors uniques characteristics of a clothing business which leads to effective marketing practices aiming to enhance competitiveness and market performance.

*Table 3.3 Production*

| 3.3 PRODUCTION | WEIGHTED MEAN | VERBAL INTERPRETATION |
|---|---|---|
| 1. Crucially optimize production processes and streamline operations to maximize output while minimizing resources and time. | 3.35 | Important |
| 2. Implementation of cost control measures to manage expenses effectively and ensure profitability. | 3.6 | Very Important |
| 3. Stringent quality control measures are ensured for products to meet high standards of quality and customer expectations. | 3.35 | Important |
| 4. Minimizing defect rates in the clothing business to reduce waste, improve product quality, and enhance customer satisfaction. | 3.75 | Very Important |

Table 3.3 represents the production as performance indicator of the clothing business in which, “Optimization of production processes” is rated as "Important" with the weighted mean of 3.35, indicating the significance of maximizing output while minimizing resources and time. Moreover “Implementation of cost control measures” was deemed "Very Important" with the weighted mean of 3.6, highlighting the critical importance of managing expenses effectively to ensure profitability, while “Stringent quality control measures” is considered "Important" with the weighted mean of 3.35, emphasizing the need to meet high standards of quality and customer expectations, lastly “Minimization of defect rates” is rated as high as "Very Important" with the weighted mean of 3.75, underlining the crucial role in reducing waste, improving product quality, and enhancing customer satisfaction.

According to Norum (2018) Sustainable apparel production and consumption must be addressed with an eye toward what needs to be considered as we position the discipline to address emerging issues and to prepare young professionals for the future. Given that apparel production and distribution occurs through a complex, global supply chain before reaching the consumer.

*Table 3.4 Technical*

| 3.4 TECHNICAL | WEIGHTED MEAN | VERBAL INTERPRETATION |
|---|---|---|
| 1. Efficient point-of-sale system that facilitates quick transactions, inventory management, and customer data capture must be applied. | 3.6 | Very Important |
| 2. Collection and analysis of data on customer preferences, buying behavior, and market trends to make informed business decisions and improve strategic planning. | 3.45 | Important |
| 3. Utilization of business software solutions such as inventory management systems, accounting software, and customer relationship management (CRM) tools to streamline operations and improve efficiency. | 3.35 | Important |
| 4. Developing and enhancing employees' technological skills to ensure they are proficient in utilizing digital tools and systems relevant to their roles. | 3.6 | Very Important |

Table 3.4 represents technical as a performance indicator in which, “Efficient point-of-sale system” is rated as "Very Important" with the weighted mean of 3.6, indicating the critical role in facilitating quick transactions, inventory management, and customer data capture, furthermore “Collection and analysis of customer data” is deemed "Important" with the weighted mean of 3.45, emphasizing the importance of informed decision-making and strategic planning based on market insights, moreover, “Utilization of business software solutions” is considered "Important" with the weighted mean of 3.35, highlighting the need to streamline operations and improve efficiency through technology, lastly “Development of employees' technological skills” was Rated as "Very Important" with the weighted mean of 3.6, emphasizing the significance of ensuring proficiency in utilizing digital tools and systems.

According to de Queiroz (2014) being familiarized with the benefits of the marketing information system in companies that operate in the retail business. Moreover, ccording to de Queiroz (2014) being familiarized with the benefits of the marketing information system in companies that operate in the retail business.

*Table 3.5 Distribution*

| 3.5 DISTRIBUTION | WEIGHTED MEAN | VERBAL INTERPRETATION |
|---|---|---|
| 1. Ensure the efficiency and cost-effectiveness of your wholesale distribution channels in reaching retailers and expanding market reach. | 3.6 | Very Important |
| 2. Ensure the efficiency and cost-effectiveness of your online distribution channels, such as e-commerce platforms and online marketplaces. | 3.45 | Important |
| 3. Emphasizing the assurance of on-time delivery of orders to customers to enhance satisfaction, build trust, and maintain a positive brand reputation. | 3.55 | Very Important |
| 4. Implementation of effective inventory management practices to track and synchronize inventory levels across various sales channels, including wholesale, retail, and online. | 3.85 | Very Important |

Table 3.5 represents the distribution as a performance indicator of clothing businesses in which “Efficiency of wholesale distribution channels” is Rated as "Very Important" with the weighted mean of 3.6, underlining the importance of reaching retailers and expanding market reach cost-effectively, more over “Efficiency of online distribution channels” is deemed "Important" with the weighted mean of 3.45, highlighting the significance of leveraging e-commerce platforms and online marketplaces, to add up “Emphasis on on-time delivery” is rated as "Very Important" with the weighted mean of 3.55, emphasizing the importance of customer satisfaction and brand reputation, lastly, “Implementation of effective inventory management practices” is rated as "Very Important" with the weighted mean of 3.85, underscoring the critical role in tracking and synchronizing inventory levels across various sales channels.

According to Ogunrin (2015) Distribution channels used by a apparel firms must be examined to investigate the association between the channels in use and the firms distribution involvement. In this era of sophisticated computer- and internet-mediated marketing practices, the larger proportion of entrepreneurs in developing economies deploys large marketing practices.

**4. Business Strategic Plan**

| Aspect | Description | Suggestions |
|---|---|---|
| Formulation of Business Plan Strategy for Advancement | - Product aspects are identified as most critical to success in Talavera's clothing businesses. | - Focus on product quality, variety, and uniqueness to meet customer needs and preferences effectively. |
| | - Business strategy is deemed crucial, accounting for 25% of success factors. | - Develop a clear business strategy that aligns with market demands and allows for agile responses to economic and operational challenges. |
| | - Customer involvement is recognized as important, constituting 15% of success elements. | - Engage customers through interactive experiences, personalized services, and feedback mechanisms to foster loyalty and drive sales. |
| Challenges Encountered | - Economic issues pose significant challenges, impacting 30% of clothing businesses in Talavera. | - Implement cost-saving measures, negotiate favorable terms with suppliers, and diversify revenue streams to mitigate economic risks. |
| | - Market and operational challenges also hinder success, representing 15% of obstacles faced. | - Conduct thorough market research, streamline operational processes, and invest in staff training to address these challenges effectively. |
| | - Financial challenges are prevalent, affecting the sustainability of clothing businesses. | - Seek financial support through loans, grants, or partnerships, and maintain strict budgeting and financial planning to ensure stability and growth. |

| | | |
|---|---|---|
| Resources or Support | - Business environment support is crucial, constituting 50% of success criteria for clothing businesses. | - Collaborate with local authorities, industry associations, and community organizations to create a conducive business environment and access resources. |
| | - Technological advances and modernization play a significant role, contributing 30% to success factors. | - Invest in modern technologies such as POS systems, e-commerce platforms, and data analytics to enhance operational efficiency and customer experience. |
| Situational Analysis | - Current stock levels are suboptimal, leading to stockouts. | - Implement inventory management system to track stock levels and demand patterns effectively. |
| | - Store location lacks visibility and accessibility. | - Consider relocating to a high-traffic area with easy access or invest in marketing efforts to increase awareness of the current location. |
| | - Marketing efforts lack targeted approach, resulting in inefficient resource allocation. | - Conduct market research to better understand customer demographics and preferences for more targeted marketing campaigns. |
| Strategic Goals | - Optimize stock levels and sales performance. | - Implement inventory optimization strategies to maintain optimal stock levels and drive sales. |
| | - Enhance customer satisfaction and loyalty. | - Focus on providing exceptional customer service and building a welcoming in-store atmosphere. |
| | - Improve profitability through effective pricing strategies. | - Analyze profit margins and adjust pricing strategies accordingly to maximize revenue. |
| Target Market | - Local residents and commuters in the vicinity. | - Target both residents and commuters through tailored marketing messages and promotions. |
| | - Demographic: Middle-income families and young professionals. | - Offer products and services that cater to the needs and preferences of the target demographic. |
| Competitive Advantage | - Unique product offerings and personalized service. | - Emphasize the unique value proposition and differentiate from competitors through exceptional service and product selection. |
| Marketing Sales and Strategy | - Utilize digital marketing channels to reach a wider audience. | - Invest in online advertising, social media marketing, and email campaigns to increase brand visibility and attract new customers. |
| Action Plan | Time Frame/Strategies: Implement inventory management system within 3 months. | Persons Involved: Operations Manager, Inventory Manager. |
| | Budget Allocation: ₱30,000 to 50,000 for software implementation and training. | Timeline: Month 1: Research and select inventory management software. Month 2: Implement software and train staff. Month 3: Full implementation and optimization. |
| | Time Frame/Strategies: Relocate to a high-traffic area within 6 months. | Persons Involved: CEO, Operations Manager, Real Estate Agent. |
| | Budget Allocation: ₱50,000 and above for relocation expenses and marketing efforts. | Timeline: Month 1-2: Research potential locations. Month 3-4: Negotiate lease agreements. Month 5-6: Relocation and marketing campaign. |
| Financial Projections | - Increase in sales revenue by 20% within the first year. | - Improve profit margins by 15% through optimized pricing strategies. |

| | | |
|---|---|---|
| | - Reduce customer acquisition cost by 10% through targeted marketing efforts. | - Decrease operating expenses by 5% through improved inventory management and cost-saving measures. |
| Metrics and KPI's | - Sales revenue growth rate | - Customer satisfaction scores |
| | - Customer retention rate | - Average transaction value |
| | - Inventory turnover ratio | - Customer acquisition cost |
| Contingency Plan | - If relocation is not feasible, focus on enhancing visibility and accessibility through marketing efforts. | - If inventory management system implementation faces delays, prioritize manual tracking methods temporarily to avoid stockouts. |
| | - If targeted marketing efforts do not yield desired results, reassess customer preferences through surveys. | - If pricing strategies do not improve profitability, consider revising product mix or renegotiating supplier contracts. |

## IV. CONCLUSION AND RECOMMENDATION

CONCLUSION

1. Prioritizing product factors is very important, as evidenced by the focus on maintaining optimal stock levels, maximizing customer satisfaction, and closely monitoring sales performance. By addressing these areas, businesses can ensure they offer the right products at the right time, ultimately driving sales and customer loyalty.

2. It is very important to choose the right store location is a make-or-break decision for retailers. A location that's easy to find and get to is key, as it likely attracts more customers. This can directly translate to higher sales. Additionally, keeping an eye on competitors and how the local population is changing is crucial to ensure the store stays attractive to its target audience.

3. Understanding the relationship between marketing spend and customer acquisition is the most critical factor for marketing success. By closely monitoring this Customer Acquisition Cost (CAC), businesses can optimize their marketing budgets and target their resources more effectively, ultimately achieving a greater return on investment (ROI) for their marketing efforts.

4. Strategically analyzing profit margins across various clothing items is essential for maximizing profitability. By closely examining profit margins, businesses can identify high-performing clothing lines and optimize their pricing strategies to ultimately increase overall revenue.

5. Creating a positive experience for customers is crucial for retailers. This includes providing excellent service, actively seeking customer thoughts, and building a welcoming atmosphere in-store. By focusing on these areas, businesses can build customer loyalty, keep them coming back, and ultimately boost sales and profits.

6. Actively gathering customer feedback emerges as the most critical element for building strong customer relationships, according to the data. This likely translates to providing customers with a platform to voice their opinions and feel valued by the business. By prioritizing customer feedback, retailers can gain valuable insights into customer preferences and satisfaction, ultimately allowing them to improve their offerings and strengthen customer loyalty.

7. Prioritizing employee training and development is very important for retail success. By investing in employee training, businesses can equip their staff with the necessary skills and knowledge to deliver exceptional customer service, ultimately enhancing customer satisfaction and driving sales growth.

8. Investing in employee training and development is critical for retail success, as evidenced by the data in this table. This focus on employee training likely translates to a more knowledgeable and skilled staff, which can in turn provide exceptional customer service. By prioritizing employee development, retailers can create a more positive customer experience, ultimately leading to increased customer satisfaction and loyalty.

9. Approach to inventory management is crucial for optimizing stock levels and warehouse space utilization, according to the findings presented in this table. While all the listed factors are considered important, implementing effective inventory management practices is likely to have the most significant impact. By closely monitoring stock levels, analyzing sales trends, and forecasting future demand, businesses can ensure they have the right products in stock at the right time, ultimately minimizing stock outs and storage costs while maximizing sales and profitability.

## RECOMMENDATION

1. Focus on maintaining optimal stock levels, maximizing customer satisfaction, and closely monitoring sales performance. Offer the right products at the right time to drive sales and customer loyalty.

2. Select a location with high visibility and easy access to attract more customers. Regularly evaluate competitor activity and demographic changes to ensure the store remains relevant to the target audience.

3. Track and analyze customer acquisition cost (CAC) to optimize marketing budgets and target resources effectively. This will maximize return on investment (ROI) for marketing efforts.

4. Regularly examine profit margins across various products to identify high-performing items. Use this information to optimize pricing strategies and maximize overall revenue.

5. Provide excellent service, actively seek customer feedback, and build a welcoming in-store atmosphere. This fosters customer loyalty, repeat business, and ultimately boosts sales and profits.

6. Equip staff with the skills and knowledge to deliver exceptional customer service. This leads to a more positive customer experience, increased customer satisfaction, and ultimately drives sales growth and loyalty.

7. Closely monitor stock levels, analyze sales trends, and forecast future demand. This ensures having the right products in stock at the right time, minimizing stock outs, storage costs, and maximizing sales and profitability.

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# Mapping the Eco-Tourism Potential of Bato Ferry in Laur, Nueva Ecija: A Foundation for Strategic Development Planning

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***Abstract*— This study explores the ecotourism potential of Bato Ferry in Laur, Nueva Ecija, aiming to formulate strategic development plans in collaboration with local tourism entrepreneurs. The research engaged 100 respondents including locals, tourists, tourism businesses, and government officials. It highlights Bato Ferry's natural attractions, cultural richness, and the need for sustainable ecotourism practices. Key findings underscore the significance of rivers, mountains, and cultural landmarks, emphasizing their role in ecotourism experiences while balancing environmental conservation. Local tourism entrepreneurs demonstrate strengths in hospitality but require enhancement in tour guiding and interpretation. Stakeholder collaboration emerges as crucial for maximizing economic benefits while safeguarding cultural heritage. The study advocates for inclusive practices and shared responsibility among stakeholders to ensure sustainable ecotourism development in Bato Ferry.*

***Keywords*— Ecotourism, Development strategies, Local tourism entrepreneurs, Natural attractions, Cultural values, Environmental impact**

## I. INTRODUCTION

The Philippines is renowned for its stunning natural landscapes, rich biodiversity, and vibrant cultural heritage, making it a prime destination for tourists worldwide. The country's archipelago, comprising over 7,000 islands, offers a unique and diverse array of attractions, including pristine beaches, majestic mountains, lush jungles, and historic cities. Tourism has historically been a significant contributor to the nation's GDP, accounting for approximately 12% of it. Notable attractions such as the rice terraces, an underground river, world-class diving sites, and lively festivals further bolster the Philippines' appeal as a top travel destination.

Among the many potential tourism hotspots, Bato Ferry in Laur, Nueva Ecija, stands out due to its unique natural features and cultural significance. According to Mayor Tupe Christopher B. Daus, Bato Ferry is named after the large rock formations believed by locals to be inhabited by fairies. The decision to develop Bato Ferry as a tourism destination stems from its untapped potential and advantageous location, being closer to the city and possessing abundant water sources.

The development plans for Bato Ferry include constructing bridges to connect different spots along the river, building floating and overnight cottages, and promoting water activities to attract tourists. These initiatives are expected to create numerous job opportunities for local residents and foster community involvement in maintaining and enhancing the area.

Despite the promising potential, several challenges need to be addressed to ensure sustainable and successful ecotourism development in Bato Ferry. These challenges include potential environmental risks, issues with parking and littering, and the need for careful planning to mitigate negative impacts on cultural heritage.

Ecotourism, as defined by the United Nations World Tourism Organization (UNWTO), is a nature-based form of tourism where the primary motivation for tourists is the observation and appreciation of nature and traditional cultures. It involves educational and interpretive features and is typically organized for small groups by specialized tour operators. Ecotourism aims to minimize negative impacts on the natural and socio-cultural environment while generating economic benefits for host communities and supporting the conservation of natural areas.

This research study aims to assess the ecotourism potential of Bato Ferry, Laur, Nueva Ecija, through a comprehensive analysis of its natural resources, biodiversity, cultural heritage, and infrastructure. The study seeks to identify the strengths and weaknesses of Bato Ferry as an ecotourism destination and to develop sustainable development strategies that maximize the benefits of ecotourism while minimizing its negative impacts on the environment and local communities.

**Statement of the Problem**

The ecotourism potential of Bato Ferry in Laur, Nueva Ecija presents a promising opportunity for sustainable development. However, realizing this potential requires a comprehensive understanding of the region's specific resources, the needs of local stakeholders, and the challenges involved. This research aims to address the following key issues to formulate a strategic development plan for Bato Ferry:

**1. Demographics of the Respondents:**

1.1 Age

1.2 Gender

1.3 Civil Status

**2. Assessment of Ecotourism Potential in Bato Ferry:**

2.1 Significance of Natural Features and Cultural Assets

2.2 Evaluation of historical landmarks, local crafts, and scenic areas

**3. Mapping Ecotourism Potential in Bato Ferry:**

3.1 Inventory of natural and cultural assets

3.2 Identification of sensitive ecological areas to minimize environmental impact

3.3 Assessment of skills, experience, and needs of local tourism entrepreneurs

3.4 Development of training and support programs

3.5 Implementation of a collaborative planning process

**4. Propose an Eco-tourism Development Plan:** Based on the findings of the study, propose a comprehensive eco-tourism development plan that balances environmental protection, tourist satisfaction, and cultural preservation.

**Scope and Delimitation**

This study maps the eco-tourism potential of Bato Ferry, Laur, Nueva Ecija, focusing on local stakeholders' insights. It evaluates natural and cultural assets, environmental impacts, and stakeholder capabilities. Conducted during 2023-2024, it aims to inform strategic development plans that balance conservation, tourist satisfaction, and cultural preservation for sustainable growth.

## II. RESEARCH METHODOLOGY

This study employs a mixed-methods research design to comprehensively map the eco-tourism potential of Bato Ferry, Laur, Nueva Ecija. By integrating qualitative and quantitative approaches, the research aims to gather robust data from diverse stakeholders including tourists, tourism business owners, and government officials. The methodology focuses on purposive random sampling to ensure representation across different demographics and stakeholder groups.

## III. RESULTS AND DISCUSSION

### 1. Profile of the Respondents

*Table 1: Age of the Respondents*

| Age of All Respondents | Frequency | Percentage (%) |
|---|---|---|
| 25 and below | 21 | 21% |
| 26-30 years old | 9 | 9% |
| 31-35 years old | 10 | 10% |
| 36-40 years old | 14 | 14% |
| 41-45 years old | 9 | 9% |
| 46 and above | 37 | 37% |
| **Total** | **100** | **100%** |

Table 1 illustrates the age distribution of respondents. The largest age group is those 46 and above, comprising 37% of respondents, indicating a significant representation of older individuals. The next prominent group is those 25 and below, accounting for 21% of respondents, reflecting a notable presence of younger individuals. The intermediate age groups (26-45 years) exhibit varying frequencies: 14% for 36-40 years, 10% for 31-35 years, and 9% each for 26-30 and 41-45 years. This diverse age distribution ensures the survey results encompass a wide range of perspectives and experiences, enhancing the validity and applicability of the findings to a broader audience. Including a mix of younger and older respondents captures the diverse needs and viewpoints of the target population, making the survey more representative and comprehensive.

*Table 2: Gender of the Respondents*

| Gender of All Respondents | Frequency | Percentage (%) |
|---|---|---|
| Male | 55 | 55% |
| Female | 43 | 43% |
| LGBTQ+ | 2 | 2% |
| **Total** | **100** | **100%** |

Table 2 displays the gender distribution of the survey participants. Males constitute 55% of the respondents, females 43%, and individuals identifying as LGBTQ+ make up 2% of the total. This distribution ensures a reasonably balanced representation across different gender groups, which is crucial for obtaining diverse perspectives on the research topic. With males forming the majority at 55%, followed by females at 43%, and a smaller representation of LGBTQ+ individuals, the survey achieves a broad spectrum of insights from different gender viewpoints.

The near-equal representation between males and females, along with the inclusion of LGBTQ+ respondents, enhances the reliability and validity of the survey data. This balance mitigates the risk of gender bias, ensuring that the findings reflect the views and experiences of a diverse population. A balanced gender representation in research is essential for fairness and inclusiveness, demonstrating a commitment to considering diverse perspectives and producing accurate, representative statistics.

Furthermore, studies by Boley et al. (2017) emphasize the importance of considering gender dynamics in tourism, highlighting that perceptions and experiences can vary significantly between genders. This consideration is crucial for effective destination marketing and management strategies. Similarly, research by Rinaldi and Salerno (2020) underscores the tourism gender gap and its potential impact on the development of emerging countries, stressing the need for gender-balanced research in tourism development.

*Table 3: Civil Status of the Respondents*

| Civil Status | Frequency | Percentage (%) |
|---|---|---|
| Single | 58 | |
| Married | 40 | |
| Widowed | 2 | |
| **Total** | **100** | **100%** |

Table 3 presents the civil status distribution of the respondents. The majority of respondents, 58%, are single, indicating that over half of the survey participants are unmarried. Married respondents constitute 40% of the sample, representing a substantial portion of the population. Only a small fraction, 2%, are widowed.

This distribution suggests that single individuals are the most represented group in the survey, followed closely by married individuals. The presence of widowed respondents, although minimal, adds to the diversity of perspectives captured in the survey.

The significant representation of both single and married respondents ensures that the survey results reflect a broad spectrum of experiences and viewpoints related to civil status. This diversity is important for understanding the varying needs and preferences of different demographic groups within the community. The data highlights the necessity of considering civil status in developing comprehensive and inclusive ecotourism strategies that cater to the diverse population of Bato Ferry.

By including respondents from various civil status categories, the research findings are more likely to encompass a wide range of perspectives, thereby enhancing the validity and applicability of the study to the broader community.

## 2. Assessment of Ecotourism Potential in Bato Ferry

*Table 2.1: Significance of Natural Features and Cultural Asset*

| Significance of Natural Features and Cultural Asset | Frequency | Percentage (%) |
|---|---|---|
| Eco friendly Cottage | 20 | 20% |
| Bamboo rafting | 19 | 19% |
| Wildlife viewing areas | 2 | 2% |
| Recreational activities | 34 | 34% |
| Fishing | 11 | 11% |
| River | 88 | 88% |
| Man made Lake | 5 | 5% |
| Mini-Forests | 6 | 6% |
| Mountains | 58 | 58% |

The table above illustrates the perceived significance of various natural and cultural assets in Bato Ferry, Laur, Nueva Ecija, as identified by respondents. Here are the key insights:

Highly Valued Natural Assets:

River (88%): The river is overwhelmingly recognized as a crucial natural feature, highlighting its importance for ecotourism activities such as bamboo rafting and recreational activities.

Mountains (58%): Significant emphasis is placed on the mountains, indicating their potential for hiking, wildlife viewing, and possibly eco-friendly cottage stays.

Moderate to Lower Significance:

Recreational Activities (34%): While popular, recreational activities like fishing and eco-friendly cottages receive moderate attention compared to the river and mountains.

Mini-Forests (6%) and Man-made Lake (5%): These features are seen as less central to Bato Ferry's ecotourism potential, suggesting they may require more development or promotion.

Cultural and Recreational Activities:

Bamboo Rafting (19%) and Fishing (11%): These activities, although popular, receive less attention than broader categories like recreational activities and the river itself.

This data underscores the importance of prioritizing sustainable development around the river and mountain landscapes for ecotourism initiatives in Bato Ferry. It also suggests potential opportunities to enhance activities like bamboo rafting and recreational offerings to further attract tourists.

*Table 2.2 Evaluation of historical landmarks, local crafts, and scenic areas*

| **Evaluation of historical landmarks, local crafts, and scenic areas** | **Frequency** | **Percentage (%)** |
|---|---|---|
| Scenic Areas | 74 | 74% |
| Historical Landmarks | 62 | 62% |
| Local Crafts | 60 | 60% |

Table 2.2 presents the preferences of respondents regarding historical landmarks, local crafts, and scenic areas in Bato Ferry, Laur, Nueva Ecija.

Scenic areas received the highest approval rating, with 74% of respondents acknowledging their significance. This suggests a strong demand for natural landscapes that offer aesthetic appeal and opportunities for relaxation and recreation.

The high percentage underscores the importance of preserving and promoting scenic spots to enhance Bato Ferry's ecotourism appeal. It also indicates potential economic benefits, as scenic areas often attract tourism and contribute to local economies.

Historical landmarks are also highly valued, with 62% of respondents expressing appreciation for them. These landmarks likely play a significant role in preserving cultural heritage and attracting tourists interested in history and heritage tourism.

The slightly lower percentage compared to scenic areas still reflects their importance as attractions that contribute to the overall tourism experience in Bato Ferry.

Local crafts received a 60% approval rating, indicating a substantial interest in authentic artisanal products among respondents. This suggests a market for locally-made goods that showcase cultural identity and craftsmanship.

Supporting local crafts can contribute to economic diversification and community empowerment, aligning with sustainable tourism principles that emphasize local participation and cultural preservation.

The data highlights distinct preferences among respondents in Bato Ferry, with scenic areas garnering the highest approval, followed closely by historical landmarks and local crafts. This diversity in preferences underscores the need for a balanced approach to tourism development that integrates natural, cultural, and artisanal elements. Enhancing scenic areas, preserving historical sites, and promoting local crafts can collectively enrich the ecotourism experience in Bato Ferry while supporting sustainable economic growth and cultural heritage preservation.

## 3. Mapping Ecotourism Potential of Bato Ferry

Table 3.1 : Inventory of natural and cultural assets

| **Indicator** | **Mean** | **Descriptive Rating** |
|---|---|---|
| Engaged relevant stakeholders for input and collaboration. | 4.39 | Perfectly Suitable |
| Conducted surveys and field observations to gather data. | 4.28 | Perfectly Suitable |
| Provided opportunities for community participation in data collection. | 4.39 | Perfectly Suitable |
| Developed strategies to minimize environmental impact of ecotourism activities | 4.37 | Perfectly Suitable |
| Collaborated with local authorities to implement inventory recommendations | 4.42 | Perfectly Suitable |

*Legend: 3.50 – 4.00 Perfectly Suitable; 2.50 – 3.49 Very Suitable; 1.50 – 2.49 Not Very Suitable; and 1.00 – 1.49 Unsuitable*

Table 3.1 outlines the assessment of various indicators related to inventorying natural and cultural assets for ecotourism development in Bato Ferry, Laur, Nueva Ecija. Here are the key insights:

Collaboration with Local Authorities (4.42): The highest mean rating and a descriptive rating of "Perfectly Suitable" indicate that stakeholders highly value collaboration with local authorities. This partnership ensures that inventory recommendations align with regulations and guidelines, facilitating efficient and compliant sustainable development projects.

Community Participation (4.39): Stakeholders also rated opportunities for community participation in data collection as "Perfectly Suitable." This approach fosters community involvement and ownership in ecotourism initiatives, enhancing local support and sustainability.

Environmental Impact Strategies (4.37): Developing strategies to minimize environmental impact received a high mean rating, highlighting stakeholders' commitment to sustainable practices in ecotourism development.

Surveys and Field Observations (4.28): While slightly lower in mean rating compared to other indicators, conducting surveys and field observations is still rated as "Perfectly Suitable." This method provides essential firsthand data on Bato Ferry's natural and cultural resources, informing informed decision-making.

The data from Table 3.1 underscores critical aspects of compiling a comprehensive inventory for sustainable ecotourism in Bato Ferry. Collaboration with local authorities is pivotal for regulatory compliance and effective project implementation. Community participation enhances local engagement and support. Developing environmental strategies ensures sustainable practices, while surveys and field observations provide essential data for informed decision-making.

These findings align with principles emphasized in tourism research, highlighting the importance of stakeholder collaboration and data-driven approaches for sustainable tourism development (Boley et al., 2017; Kanika, 2024). By integrating these strategies, stakeholders can establish a robust framework for maximizing the ecotourism potential of Bato Ferry while preserving its natural and cultural heritage.

*Table 3.2: Sensitive ecological areas and minimize environmental impact*

| **Indicator** | **Mean** | **Descriptive Rating** |
|---|---|---|
| Gathered existing data from environmental organizations, government agencies, and previous studies | 4.42 | Perfectly Suitable |
| Utilized aerial surveys, satellite imagery, and drones to gain a comprehensive understanding of the landscape | 4.27 | Perfectly Suitable |
| Organized workshops and focus group discussions to gather insights from experts on key ecological indicators. | 4.28 | Perfectly Suitable |
| Engaged local communities and indigenous groups to gather traditional knowledge about ecologically sensitive areas. | 4.31 | Perfectly Suitable |
| Implemented sustainable land management practices, such as reforestation and erosion control, to enhance ecosystem resilience. | 4.33 | Perfectly Suitable |

*Legend: 3.50 – 4.00 Perfectly Suitable; 2.50 – 3.49 Very Suitable; 1.50 – 2.49 Not Very Suitable; and 1.00 – 1.49 Unsuitable*

Table 3.2 evaluates methods for identifying sensitive ecological areas and minimizing environmental impact in Bato Ferry for ecotourism development. Here are the key insights:

Gathered Existing Data (4.42): Gathering existing data from various sources received the highest mean rating, indicating its effectiveness in informing ecological mapping efforts. This approach leverages prior knowledge and information to streamline mapping processes and ensure accuracy.

Implemented Sustainable Land Management Practices (4.33): Implementing sustainable land management practices, such as reforestation and erosion control, received the second-highest mean rating. This approach emphasizes proactive measures to protect and restore ecosystems, promoting resilience and sustainability.

Community Engagement (4.31): Engaging local communities and indigenous groups to gather traditional knowledge about ecologically sensitive areas was also highly rated. This participatory approach enriches understanding of local ecosystems and fosters community ownership in conservation efforts.

Workshops and Focus Groups (4.28): Organizing workshops and focus group discussions with experts on key ecological indicators was rated as "Perfectly Suitable," providing valuable insights for ecological mapping and conservation planning.

The ratings in Table 3.2 underscore effective strategies for ecologically sensitive mapping and environmental management in Bato Ferry. Utilizing existing data sources, engaging local communities, and implementing sustainable practices are essential for minimizing environmental impact and promoting ecosystem health. These approaches align with global recommendations for sustainable tourism development, emphasizing the importance of informed decision-making and community involvement (World Bank, 2021; De Zoysa, 2021).

By integrating these strategies, stakeholders can enhance ecotourism development while preserving Bato Ferry's natural heritage and promoting long-term environmental sustainability.

*Table 3.3: Skills, experience, and needs of local tourism entrepreneurs*

| **Skills, experience, and needs of local tourism entrepreneurs** | **Mean** | **Descriptive Rating** |
|---|---|---|
| Business management skills | 4.35 | Perfectly Suitable |
| Marketing and promotional strategies | 4.31 | *Perfectly Suitable* |
| Knowledge of ecotourism principles | 4.28 | Perfectly Suitable |
| Sustainable practices implementation | 4.25 | Perfectly Suitable |
| Cultural heritage presentation | 4.22 | Perfectly Suitable |
| *Legend: 3.50 – 4.00 Perfectly Suitable; 2.50 – 3.49 Very Suitable; 1.50 – 2.49 Not Very Suitable; and 1.00 – 1.49 Unsuitable* | | |

Table 3.3 assesses the skills, experience, and needs of local tourism entrepreneurs in Bato Ferry, Laur, Nueva Ecija.

Business Management Skills (4.35): Local tourism entrepreneurs are highly proficient in business management skills, indicating a strong foundation in operational and financial management crucial for sustainable business practices.

Marketing and Promotional Strategies (4.31): Entrepreneurs exhibit strong capabilities in marketing and promotional strategies, essential for attracting tourists and enhancing destination visibility.

Knowledge of Ecotourism Principles (4.28): There is a solid understanding of ecotourism principles among local entrepreneurs, highlighting their commitment to sustainable tourism practices that respect and preserve natural and cultural resources.

Sustainable Practices Implementation (4.25): Implementing sustainable practices is rated highly, showcasing efforts to minimize environmental impact and promote responsible tourism development.

Cultural Heritage Preservation (4.22): Preservation of cultural heritage is also recognized as important, indicating efforts to maintain and promote local traditions and identities through tourism initiatives.

Table 3.3 illustrates that local tourism entrepreneurs in Bato Ferry possess strong skills and knowledge in business management, marketing, ecotourism principles, sustainable practices, and cultural heritage preservation. These competencies are crucial for fostering sustainable tourism development that benefits both the local community and visitors.

By continuing to support and enhance these skills, entrepreneurs can effectively contribute to the growth of ecotourism in Bato Ferry while ensuring the preservation of its natural and cultural assets.

*Table 3.4: Training and support programs*

| **Training and support programs** | **Mean** | **Descriptive Rating** |
|---|---|---|
| Ecotourism Education and Training | 4.4 | Perfectly Suitable |
| Business Management Skills | 4.34 | Perfectly Suitable |
| Access to Resources and Networks | 4.28 | Perfectly Suitable |
| ilding in Community Engagement | 4.03 | Perfectly Suitable |
| Environmental Conservation Practices | 4.39 | Perfectly Suitable |
| Market Development and Promotion | 4.23 | Perfectly Suitable |
| Monitoring and Evaluation | 4.43 | Perfectly Suitable |
| acy and Compliance Assistance | 4.48 | Perfectly Suitable |

| |
|---|
| *Legend: 3.50 – 4.00 Perfectly Suitable; 2.50 – 3.49 Very Suitable; 1.50 – 2.49 Not Very Suitable; and 1.00 – 1.49 Unsuitable* |

Table 3.4 highlights the effectiveness of various training and support programs crucial for ecotourism development in Bato Ferry:

Policy Advocacy and Compliance Assistance (4.48): This indicator received the highest mean rating, emphasizing its critical role in supporting local entrepreneurs to navigate regulatory frameworks and advocate for policies that foster sustainable ecotourism practices.

Monitoring and Evaluation (4.43): Rated as highly effective, monitoring and evaluation enable local businesses to assess the impact of ecotourism activities systematically. This helps in identifying areas for improvement and ensuring accountability in development efforts.

Other Key Areas:

Ecotourism Education and Training (4.40) and Environmental Conservation Practices (4.39) are also highly rated, indicating strong support for educating stakeholders and implementing sustainable practices.

Business Management Skills (4.34) and Market Development and Promotion (4.23) further underscore the importance of entrepreneurial skills and marketing strategies in enhancing ecotourism initiatives.

These findings underscore the importance of comprehensive support systems for local entrepreneurs in Bato Ferry. By focusing on policy advocacy, compliance assistance, and robust monitoring practices, stakeholders can promote sustainable development and innovation in ecotourism.

*Table 3.5 Collaborative planning process*

| **Collaborative planning process** | **Mean** | **Descriptive Rating** |
|---|---|---|
| Local community members and residents | 4.5 | Perfectly Suitable |
| ous groups and tribal representatives | 3.56 | Very Suitable |
| sinesses and tourism entrepreneurs | 4.12 | Perfectly Suitable |
| agencies and local authorities | 4.28 | Perfectly Suitable |
| nmental organizations and conservation groups | 4.2 | Perfectly Suitable |
| stitutions and research organizations | 3.97 | Very Suitable |
| Tour operators and travel agencies | 3.73 | Very Suitable |
| *Legend: 3.50 – 4.00 Perfectly Suitable; 2.50 – 3.49 Very Suitable; 1.50 – 2.49 Not Very Suitable; and 1.00 – 1.49 Unsuitable* | | |

Table 3.5 highlights the importance of collaborative planning involving various stakeholder groups for ecotourism development in Bato Ferry:

Local Community Members and Residents (4.50):

Local community involvement received the highest mean rating, indicating their crucial role in shaping ecotourism initiatives. Their firsthand knowledge of local needs, resources, and cultural values ensures that projects are sustainable, respectful of community values, and beneficial for local well-being.

Government Agencies and Local Authorities (4.28):

Rated second highest, government agencies and local authorities provide essential policy support, infrastructure development, and regulatory oversight. Their participation ensures that ecotourism plans align with broader governmental objectives and policies, fostering coordinated and sustainable development.

Other Stakeholder Groups:

Environmental Organizations and Conservation Groups (4.20) play a significant role in advocating for environmental protection and sustainability in ecotourism projects.

Local Businesses and Tourism Entrepreneurs (4.12) contribute entrepreneurial skills and economic perspectives essential for ecotourism growth.

Academic Institutions and Research Organizations (3.97) and Tour Operators and Travel Agencies (3.73) bring research insights and market expertise, although rated slightly lower, are still considered very suitable for their contributions to planning and promoting ecotourism.

This data underscores the necessity of inclusive decision-making processes that integrate diverse stakeholder perspectives. By involving local communities, government bodies, environmental advocates, businesses, and academic institutions, ecotourism development in Bato Ferry can be holistic, sustainable, and aligned with both local priorities and global sustainability goals.

## IV. PROPOSED ECOTOURISM DEVELOPMENT PLAN

Based on the findings from the study conducted in Bato Ferry, Laur, Nueva Ecija, here's a proposed comprehensive eco-tourism development plan that integrates environmental protection, tourist satisfaction, and cultural preservation:

**1. Environmental Protection**

Identification and Preservation of Ecologically Sensitive Areas:

- Utilize existing data from environmental organizations and conduct aerial surveys, satellite imagery, and field assessments to identify and map ecologically sensitive areas.
- Engage local communities and indigenous groups to gather traditional knowledge about these areas.
- Implement sustainable land management practices such as reforestation, erosion control, and waste management to enhance ecosystem resilience and minimize environmental impact.

Regulatory Framework and Compliance:

- Collaborate closely with government agencies and local authorities to develop and enforce regulations that protect natural resources and biodiversity.
- Provide training and support to local businesses and tourism entrepreneurs on environmental conservation practices and compliance with regulations.

**2. Tourist Satisfaction**

Infrastructure Development:

- Improve access to key ecotourism sites through responsible infrastructure development, ensuring minimal disruption to natural habitats.
- Enhance facilities such as eco-friendly accommodations, visitor centers, and sustainable transportation options (e.g., ATV, bike rentals).

Diversified Ecotourism Activities:

- Promote activities that highlight Bato Ferry's natural beauty and cultural heritage, such as guided nature walks, bamboo rafting on the river, birdwatching, and cultural tours to historical landmarks.
- Encourage responsible wildlife viewing and photography tours that respect animal habitats and behaviors.

Visitor Education and Interpretation:

- Develop educational programs and interpretive signage at key sites to raise awareness about local ecosystems, biodiversity, and cultural significance.
- Engage tourists in hands-on conservation activities like tree planting or river clean-ups to foster a sense of environmental stewardship.

**3. Cultural Preservation**

Promotion of Local Culture and Traditions:

- Collaborate with indigenous groups and local artisans to showcase traditional crafts, cuisine, and performances.
- Incorporate cultural experiences into ecotourism packages, such as workshops on traditional farming methods or storytelling sessions.

Support for Community-Based Tourism Initiatives:

- Empower local communities to participate in tourism enterprises through training in hospitality, guiding, and sustainable business practices.
- Ensure equitable distribution of economic benefits from tourism to enhance community well-being and support local livelihoods.

**4. Marketing and Promotion**

Destination Branding and Marketing Strategies:

- Develop a cohesive brand identity for Bato Ferry as an eco-friendly destination that values sustainability and cultural authenticity.
- Use digital marketing platforms and partnerships with travel agencies to attract responsible travelers interested in eco-tourism experiences.

Tourism Monitoring and Feedback Mechanisms:

- Implement monitoring and evaluation systems to assess the impact of tourism activities on the environment and local communities.
- Regularly solicit feedback from tourists, residents, and stakeholders to continuously improve ecotourism offerings and ensure alignment with community values.

**5. Capacity Building and Collaboration**

Stakeholder Engagement and Collaboration:

Foster partnerships among government agencies, NGOs, academia, and private sector stakeholders to leverage expertise and resources for sustainable tourism development.

Organize regular forums, workshops, and training sessions to build capacity in ecotourism management, community engagement, and environmental conservation.

## V. CONCLUSION

1. The survey captured a broad age range and gender representation among respondents, reflecting a

balanced demographic mix. This diversity ensures that the ecotourism development strategies proposed are inclusive and cater to varied interests and needs.

2. Natural features such as rivers and mountains are highly valued by respondents, indicating significant potential for activities like bamboo rafting, wildlife viewing, and hiking. Cultural assets such as historical landmarks and local crafts also received considerable attention, highlighting their role in enhancing the tourism experience in Bato Ferry.
3. Stakeholders rated collaboration with local authorities, community engagement in data collection, and implementation of sustainable practices as perfectly suitable. These strategies are crucial for minimizing environmental impact and preserving the ecological integrity of Bato Ferry while promoting sustainable tourism practices.
4. Local tourism entrepreneurs demonstrate strong capabilities in business management, marketing, ecotourism principles, and cultural heritage preservation. Continued support through training programs focused on policy advocacy, environmental conservation, and market development will further enhance their capacity to drive sustainable tourism growth.
5. The involvement of local community members, indigenous groups, government agencies, environmental organizations, and academic institutions in the planning process is vital. Their collective input ensures that ecotourism initiatives align with local values, environmental goals, and regulatory frameworks.

**Recommendations**

1. Foster ongoing dialogue and engagement with local communities and indigenous groups to ensure their active participation in decision-making processes and benefit-sharing mechanisms.
2. Prioritize the protection and sustainable management of sensitive ecological areas through collaborative efforts involving environmental organizations, government agencies, and local stakeholders.
3. Promote the preservation and promotion of cultural heritage sites and local crafts to enrich the tourism experience and support community identity.
4. Provide comprehensive training programs and access to resources for local tourism entrepreneurs to enhance their skills in sustainable business practices and market competitiveness.
5. Advocate for policies that support sustainable tourism development, including incentives for eco-friendly practices and regulations that safeguard natural and cultural resources.
6. Establish robust monitoring and evaluation frameworks to assess the impact of ecotourism activities on the environment, community well-being, and economic growth.
7. Develop targeted marketing strategies that highlight Bato Ferry's unique natural and cultural assets, appealing to responsible tourists interested in eco-friendly travel experiences.

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# Building information modeling for Public Private Partnership Projects A literature review and future research directions

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***Abstract*****—***The main focus of the Public Private Partnership (PPP) is to maximise the projects' profitability. Building Information Modeling (BIM) can help decision-makers make educated decisions throughout the project's life cycle. However, despite the number of studies on BIM for PPP projects, many challenges, inconveniencies, and hurdles still face the successful and feasible implementation of BIM in PPP projects. The study presents a systematic review based on an in-depth review of 56 journal articles published from 2012 to 2022 of the status of Building Information Modeling (BIM) adoption in Public Private Partnerships (PPP) projects, highlights current trends and patterns, and systematically outlines future research agenda. Finally, it is hoped that this research will argue for the future development of a smoother BIM adoption in PPP projects to overcome hurdles and improve overall project outcomes. The results of this study clarify the current research areas and future research agenda in the field of BIM for PPP projects. Defining current and future research on the topic will help the smooth implementation of BIM in PPP projects to reap the benefits, overcome the challenges and provide key decision-makers with the ability to make educated decisions across the project life cycle.*

***Keywords*— *Building Information Modeling (BIM), Public-Private Partnerships (PPP), Literature Review, Content Analysis, Bibliometric analysis, Performance Management***

## I. INTRODUCTION

Public-Private Partnership (PPP) Projects are operationally complex and involve many fields, such as law, finance, engineering, and management, and stakeholders from the public and private sectors with conflicting interests(Chen et al., 2021). Effective performance management in PPP projects is essential to recognise the Value for Money (VfM), which makes an in-depth understanding of PPP projects' performance problems critical (Yuan et al., 2020); for example, it is estimated that 60% to 90% of construction change orders occur due to poor design documentation (Regan et al., 2015) Value for Money (VfM) can be considered the procurement justification assessment approach in PPP project feasibility analysis. However, this performance measurement lacks automation and an information exchange scheme (Ren et al., 2019).

The main focus of PPPs is to maximise the projects' profitability. Building information modelling can digitally represent the assets' physical and functional characteristics and help decision-makers make educated decisions throughout the project's life cycle (Love et al., 2015). BIM also allow for fast testing, high flexibility in design changes and adjustments, and critical feedback in construction projects, reducing the political stakeholders' demand for significant design changes before and during construction (Rothengatter, 2019). BIM adoption also seems to ease communication due to the greater clarity for all stakeholders across the project's lifecycle (Patil & Laishram, 2016). However, using BIM alters the traditional work practices for organisations, initiates changes to the government's procurement policies[8], and exposes users to additional risks regarding reducing sharing information barriers (Habib et al., 2020).

This paper addresses the following objectives: first, to assess academic journals' literature by mapping trends according to the reviewed articles' content and contribution regarding BIM adoption in PPP projects. Second, to identify research and organise research into relevant domain topics. Third, to present future research agenda for each domain based on the literature.

## II. RESEARCH METHODOLOGY

This study utilises a quantitative and qualitative research method to analyse and categorise existing BIM for PPP from 2012 to 2022. The bibliometric analysis provides statistical methods to analyse trends in academic publications and citations to assess the current research performance and future research patterns. The analysis consists of six steps, as shown in Fig.1: (1) Scopus database keywords search; (2) selecting filters for target BIM for PPP projects, English language, and Journal articles (3)selecting journals with CiteScore greater than one (4) Searching journal databases (5) Removing any duplicates (6) categorising articles based on their topics.

keyword research in the Scopus database was searched using different keywords: (1) “BIM”; (2) “Building Information Modeling”; (3) “Building Information Modelling” (4) "PPP" (5) "PPP Projects" (6) "Public Private Partnership" (7) "3P" (8) "triple P" (9) "BOT" (10) "BOOT" (11) "DBFO" (12) "DBFM" (13) "DBMFO" (14) "DCMF". The search yielded 430 articles; then, we filtered articles to all journals related to BIM in the PPP projects published in English, which resulted in 80 articles. Journals are then filtered with a CiteScore higher than one (CiteScore: citations received by a journal in a year to documents published in three previous years, all divided by the number of documents indexed in Scopus published in these three years). Individual selected journals' databases were searched in the previous step to overcome any limitations of the Scopus database. The final step was combining search results from Scopus and individual selected journals and removing duplicated articles. The final number of relevant research articles that passed the selection criteria is 56. The study adopted content analysis to generate a qualitative analysis of 56 articles' patterns and derive a future research agenda for each proposed section.

## III. BIBLIOMETRIC ANALYSIS RESULTS

The bibliometric analysis shows a noticeable growth in the total number of publications per year on BIM for PPP projects from 2012 to 2022. however, because this research was ready before the end of 2022, it does not represent the year. More than 50% of publications were done in the past 3 years, which indicates that the subject is gaining interest. Table 1 and Fig. 2 shows the number of publication over the last decade.

The largest publications based on the selection criteria over the past ten years in the field of BIM for PPP projects were published in "Automation in Construction", totalling 8 articles. They were followed by "Engineering, Construction and Architectural Management" with 4 articles. Table 1 and Fig. 3 show each journal's annual publication for the past ten years.

The bibliometric analysis shows that the largest number of publications over the last decade were from (1) China (2) the United Kingdom (3) Australia (4) Malaysia, as shown in Fig. 4. China is expected to have the largest proportion of publications in BIM for PPP projects since PPP projects are a widely used procurement method in China. Furthermore, three of the top ten most cited articles were published in “Automation and Construction”. Table 2 shows the top ten cited articles using the Scopus citation metric. Fig. 5 demonstrates keyword clustering for the most frequent keywords, as found in the literature review.

### 1. *Content analysis*

selected articles were analysed and reviewed to generate qualitative analysis and to propose future research agendas. Articles were categorised into twelve categories based on their contribution, as shown in Fig. 6.

### 1. *Research Gap and Future agenda*

The following section presents research trends regarding Building Information Modeling (BIM) applications in Public-Private Partnership (PPP) projects and suggests future research in each pattern's scope.

***Category 1: Stakeholders Management***

Building information modelling implementation in public-private partnership projects is reforming the traditional building mode, which requires stakeholders to cooperate actively. BIM has become a meaningful way to solve the cross-organization information collaboration of PPP projects effectively. Promoting BIM implementation in PPP projects has become a challenge to be solved urgently. However, when governments promote the reduction of BIM costs or are punished by superior management authorities, they will choose the active promotion strategy, and the behaviour gradually converges (Jia et al., 2021). Critical success factors for BIM implementation, stakeholder management, and BIM project performance were identified and tested. Structural equation modelling was used to analyse the data. It found that the effective use of BIM can directly improve project performance (Zhang et al., 2022) and introduce a new tool to integrate stakeholder information for stakeholder collaboration improvement(Xue et al., 2020). Due to the essential role of stakeholders, another research developed an integrated project delivery IPD-inspired framework to measure the integration of stakeholder integration in PPP projects(Malaeb & Hamzeh, 2021). A different research direction analysed the procurement process sustainability in PPP projects and found that adopting a building information modelling (BIM) system can improve stakeholder communication can promote decision-making participation (Patil & Laishram, 2016) (Patil et al., 2021).

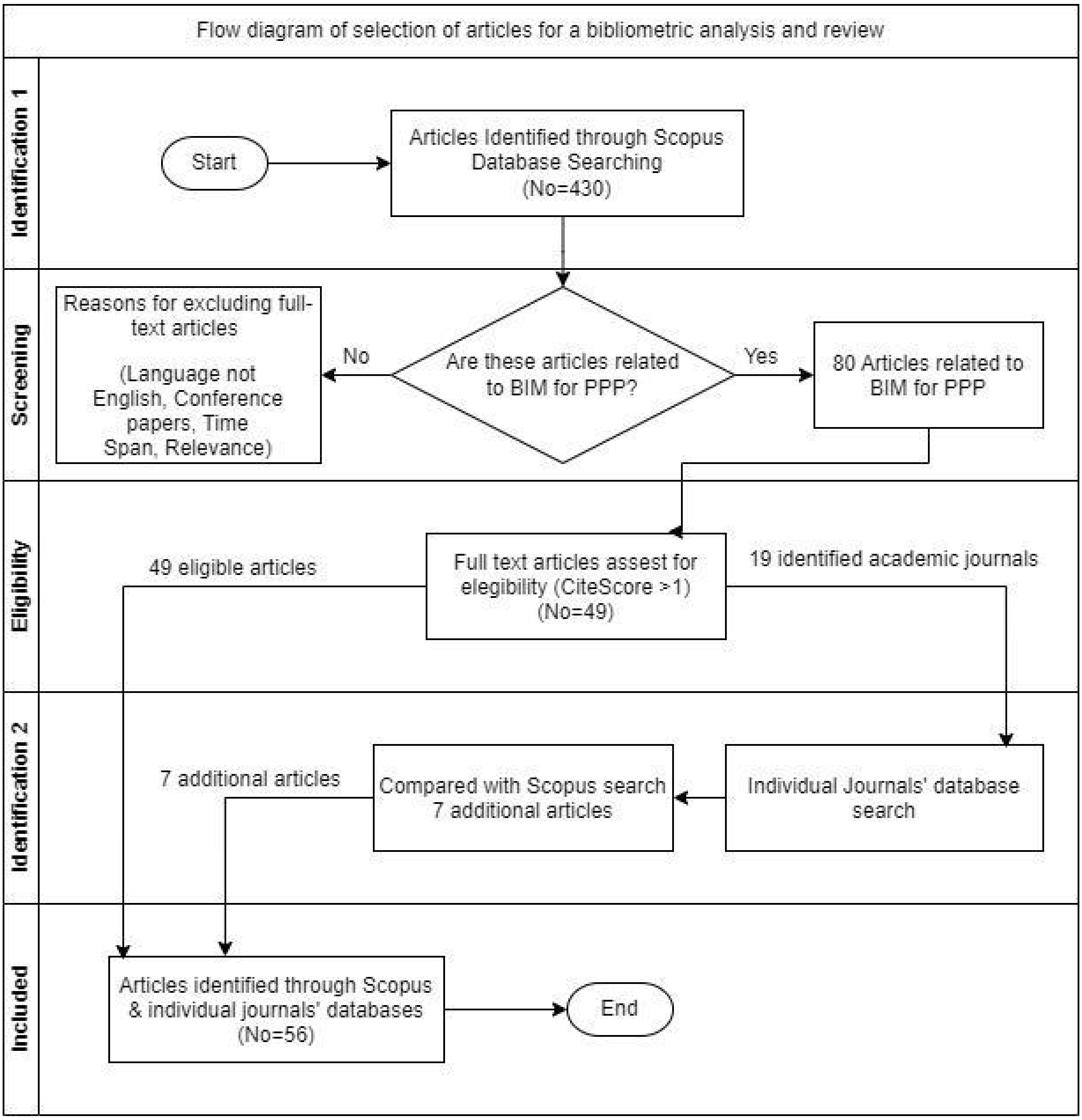


*Fig. 1. Flow diagram of selection of articles for bibliometric analysis on BIM for PPP.*

Public-private partnership projects are complex, have a long-life cycle, and involve many fields like engineering, management, finance, and law. PPP projects include conflicting interest stakeholders from the government and private sector. Therefore, the reasonable selection of sustainable building materials can reduce costs significantly. The new (BIM) technology has become a hot research area in sustainability(Chen et al., 2021). BIM allows for fast testing, high flexibility in design changes and adjustments, and critical feedback in construction projects, reducing the political stakeholders' demand for significant design changes before and during construction(Rothengatter, 2019). Future research agenda could involve: exploring the impact of stakeholders' variety and complexity according to various contractual arrangements and types of BIM-enabled projects (Zhang et al., 2022), identifying additional collaboration metrics, factors rating based on the respondents' background, and investing in other case studies (Malaeb & Hamzeh, 2021), address feedback mechanism when the consistency level is low in decision experts(Chen et al., 2021), and improve the accountability of mega projects in terms of evaluation that leads sustainability goals (Rothengatter, 2019).

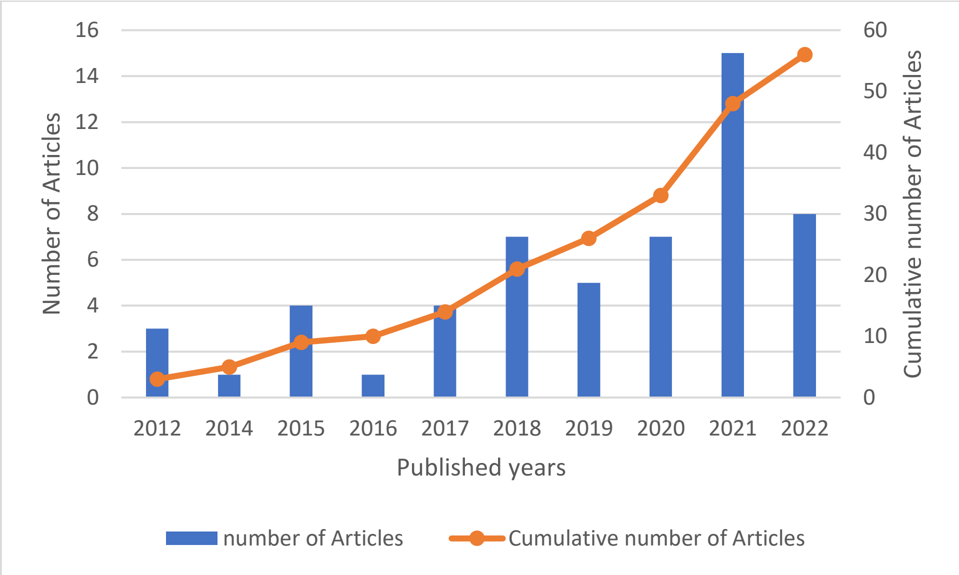


*Fig. 2. BIM for PPP articles published over the last decade.*

***Category 2: Value for Money (VfM)***

Value for Money (VfM) for PPP projects is mainly the overall procurement justification performance assessment that still lacks automation and an information exchange scheme (Ren et al., 2019) (Ren et al., 2021). This study tries to address this issue by developing an information exchange scheme concerning Value for Money assessment in Public-Private Partnerships utilising the potential of the emerging BIM technology (Ren et al., 2019) (Yuan et al., 2020). However, a different approach is used to automate the evaluation by aligning BIM goals for information support with ontology for knowledge process enhancement (Ren et al., 2021). Another study tries to shed light on issues concerning performance management in PPP and provides an experimental BIM system to improve PPP performance(Ren et al., 2020). The future research agenda addresses comprehensive performance assessment for PPP projects (Ren et al., 2019). Development of an information exchange scheme for VfM, creating a Vfm knowledge base, creating a VfM database that includes project externalities(Ren et al., 2021) (Ren et al., 2020), and finally, performance improvement by engaging designers in PPP PM, real-time performance monitoring and measurement (Yuan et al., 2020).

***Category 3: Performance Evaluation***

Effective performance measurement and evaluation are critical to successfully implementing PPP projects (Love et al., 2015) (Xu et al., 2020). However, the traditional ex-post evaluation only focuses on the budget and predetermined timeline. Building Information Modelling (BIM) can enable coordination and integration, as it not only provides a digital representation of the physical and functional characteristics of an asset but also provides key decision-makers with the ability to make educated decisions across a project's life cycle. This study reviews and proposes performance measurement, and a life-cycle PPP project evaluation approach is suggested (Love et al., 2015). That is the reason that a conceptual framework of life-cycle performance measurement can help ensure resilience(Liu et al., 2019). On the other hand, other researchers studied the impact and relationship between contractual flexibility and BIM-enabled PPP project performance, especially during construction. The results reveal that both content flexibility and executing flexibility significantly positively impact the performance of BIM-enabled PPP projects during the construction phase(Xu et al., 2022) and performance evaluation utilising IFC extension and the enhanced matter-element method to evaluate PPP project performance accurately and efficiently. (Xu et al., 2020). Other research took a different approach by combining empirical with experimental study, starting with semi-structured interviews to build BIM Based Performance Management System(BPMS) by combining it with Web and Cloud technology(Yuan et al., 2020). Another approach is identifying and prioritising 63 stage-based performance indicators (KPIs) for build-operate-transfer (BOT) projects. An integrated project delivery system with BIM implementation can be used throughout the BOT project's lifecycle. To meet emerging information and sharing project requirements(Budayan et al., 2020).

Two studies targeted the cost performance of infrastructure rail projects. The studies show that BIM enables visualisation that assists in defining the requirements of the public sector and identifying the 'best' route for an LRT system(Love, Ahiaga-Dagbui, et al., 2017) and improves cost certainty during the construction of rail projects(Love, Zhou, et al., 2017). Researchers integrated different dimensions of behavioural responses, and different levels of contextual factors quantify the multidimensionality of behavioural responses to BIM implementation in construction projects throughout the post-adoption period. Data was collected from BIM-based construction projects in China(Cao et al., 2021). Other research studied the role of mediating stakeholder management in the relationship between BIM implementation and project performance and found that effective stakeholder dynamics and stakeholder engagement or empowerment positively affect BIM implementation and project performance(Zhang et al., 2022). Scope changes, inability to adapt and respond to risk and uncertainty, ineffectual project management and governance, and optimism bias, impact hospital projects' performance adversely. Because of hospital projects' complexity, it may be argued that if BIM had not been used, their costs would have been much higher than those incurred(Love & Ika, 2022). Nevertheless, Exploring information exchange and the role of a cloud-Based BIM in calculating the life-cycle building performance under the PPP procurement process(Redmond et al., 2012). However, a different study tries to predict completion risk in PPP projects using Big Data Analytics, including oracle financials, BIM models, and Primavera(Owolabi et al., 2018).

The future research agenda involves the use of BIM for managing asset performance(Love et al., 2015), the impact and usage of BIM on various payment methods, more potential variables, the impact of contract flexibility(Xu et al., 2022), creating a PPP project performance evaluation case database(Xu et al., 2020) and cost overrun in historical PPP projects(Owolabi et al., 2018), performance improvement by engaging designers in PPP PM, real-time performance monitoring and measurement(Yuan et al., 2020), investigate the complex behavioural responses from a dynamic standpoint(Cao et al., 2021), better determine construction cost contingencies in the lights of BIM and SIM(Love, Zhou, et al., 2017), Explore the impact of stakeholders' variety and complexity according to various contractual arrangements and types of BIM-enabled projects(Zhang et al., 2022) how to measure Key Performance Indicators(Budayan et al., 2020), and examine the feasibility of the developed performance measurement framework(Liu et al., 2019).

***Category 4: Sustainability***

The sustainability of public-private partnership (PPP) projects is influenced by project life cycle characteristics, automation, and robotic technologies; this study investigates the role of automation and robotics in the sustainability of PPP infrastructure projects. The results demonstrate that collaboration actions, experimentation, and automation platforms promote sustainability throughout the project life cycle (Hoeft et al., 2021). Another research deals with BIM and energy simulations to help make better decisions and enhance sustainability. The progressive BIM methodology advises providing appropriate information to match the objective of an ongoing restoration design process, emphasising energy performance(Stegnar & Cerovšek, 2019). Another research investigating BIM for a better selection of sustainable building materials could improve buildings' sustainability and reduce costs significantly (Chen et al., 2021). A different research direction analysed the procurement process sustainability in PPP projects and found that adopting a building information modelling (BIM) system can improve stakeholder communication, facilitate the integration of the strategies, and can promote decision-making participation (Patil & Laishram, 2016) (Patil et al., 2021). Another research studied emerging construction practices such as BIM, prefabrication construction, green building, and integrated project delivery in the big chinse construction market. The results provide insights for industry practitioners and government officials on the latest sustainable practices of China's construction industry (Ma et al., 2018).

Future research agenda can involve: investigating Multi-disciplinary research designs linked to infrastructure projects and the impact of automation and robotics (Hoeft et al., 2021), addressing feedback mechanisms when the consistency level is low in decision experts (Chen et al., 2021), monitoring various interaction activities among the stakeholders (Patil & Laishram, 2016), reanalyse the system dynamics model to comprehend the new structure of the system (Patil et al., 2021), and finally, more case studies to evaluate the impact of BIM on the performance of different types of projects (Ma et al., 2018).

***Category 5: Infrastructure***

Infrastructure projects, in many cases, are large complex projects. They can cause many challenges for planners, constructors, managers and policymakers because of their volume, complexity and expected sublimes. BIM allows for greater flexibility for necessary changes and adjustments, which improves efficiency (Rothengatter, 2019). Studying the current issues affecting the Value for Money (VfM) is essential. Adopting BIM throughout the PPP lifecycle could support decision-making and determine whether the provided value is sufficient (Ren et al., 2020). Justifying and identifying the cost performance for Light Rail Transit (LRT) projects is essential for effective project delivery (Love, Ahiaga-Dagbui, et al., 2017), the cost performance of rail infrastructure projects has gotten much attention because they are rarely completed on time (Love, Zhou, et al., 2017). The studies show that BIM enables visualisation that assists in defining the requirements of the public sector and identifying the 'best' route for an LRT system(Love, Ahiaga-Dagbui, et al., 2017) and improves cost certainty during the construction of rail projects(Love, Zhou, et al., 2017). Another research used a case study to study BIM implementation in handover management for an underground rail transit project (Wang & Zhang, 2021). Performance measurement is prominent in ensuring transport infrastructure functions optimally and is resilient to external changes. This research focuses on a conceptual framework of lifecycle performance measurement that will help ensure the resilience of transport infrastructure assets(Liu et al., 2019).

It has been estimated that 60% to 90% of change orders in Australian construction projects result from poor design documentation, which is where BIM technology adoption can readily address. One research direction focuses on public infrastructure procurement, differentiating adversarial and non-adversarial contracting methods(Regan et al., 2015). On the other hand, another research is trying to bridge the gap of future-proofing large-scale transport infrastructure assets utilising a procurement policy-making pathway(Love et al., 2021). Another research direction is the role of digital practices in Civil Integrated Management (CIM) in infrastructure asset management, particularly in highway projects. The study statistically analysed three alternative delivery methods that showed similarities between CIM and BIM(Sankaran et al., 2018). Another study identifies how project life cycle characteristics, automation, and robotic technologies influence the sustainability of public-private partnership (PPP) infrastructure projects (Hoeft et al., 2021). Future research agenda can involve: improving the accountability of mega projects in terms of evaluation that leads to sustainability goals (Rothengatter, 2019), development of an information exchange scheme for VfM, creating a Vfm knowledge base, creating a VfM database that includes project externalities(Ren et al., 2020), to better determine construction cost contingencies (Love, Zhou, et al., 2017), examine the feasibility of the developed performance measurement framework (Liu et al., 2019), developing new forms of contract and insurances (Love et al., 2021), future case studies needs to facilitate deep industry-academic cooperation (Wang & Zhang, 2021), Multi-disciplinary research designs linked to infrastructure projects and the impact of automation and robotics (Hoeft et al., 2021), and finally, developing guidance for STAs for the selection of CIM technologies and anticipated performance benefits (Sankaran et al., 2018).

***Category 6: Contractual Flexibility***

Public-Private partnership (PPP) projects are complex procurement method that usually takes a long time to execute. Therefore, an effective and flexible contract of BIM-enabled PPP procurement is still unresolved. The study results demonstrate that content flexibility and executing flexibility assuredly impact the performance of BIM-enabled PPP projects(Xu et al., 2022). Another research direction identified positive and negative interactions of 28 legal and contractual issues with BIM-based construction projects(Abd Jamil & Fathi, 2018). One research direction focuses on public infrastructure procurement, differentiating adversarial and non-adversarial contracting methods. BIM technology adoption can readily address change orders related to poor design documentation(Regan et al., 2015). A different research approach deals with the similarities and differences between project partnering, project alliancing and integrated project delivery. Early involvement of key parties, transparent financials, shared risk and reward are critical features incorporated in all the arrangements(Lahdenperä, 2012). The future research agenda can be summarised as the impact and usage of BIM on various payment methods, more potential variables, the effect of contract flexibility (Xu et al., 2022), and creating framework analyses of BIM implementation throughout the whole life cycle of projects (Abd Jamil & Fathi, 2018).

***Category 7: Risks and Challenges***

Building Information Modelling (BIM) is a mechanism to improve collaboration and integration in PPP projects. However, BIM also exposes its users to additional risks when reducing information sharing-barriers. That is the driving motive to investigate the BIM risk factors significantly impacting PPP projects implementing BIM (Habib et al., 2020). An information management method was developed to cope with the risk problems involved in dealing with the increasing complexity of public-private partnership (PPP) projects. PPP failure cases and an extensive literature review establish a domain framework for risk knowledge(Jiang et al., 2022). The risk of accurate prediction of potential delays is another valuable information relevant to planning and mitigating the completion of PPP projects. a Big Data Analytics predictive modelling technique for completion risk prediction is suggested (Owolabi et al., 2018). Organisational and people-centred issues pose the most significant challenge for BIM implementation; However, the maturity and adoption of BIM depend mainly on the client or the owner in construction projects. BIM partnering-based public procurement framework is proposed to ensure the best value in construction projects(Porwal & Hewage, 2013). Another challenge facing BIM is legal and contractual issues, which represent positive and negative interactions. This study critically identifies the possible interactions between the legal and contractual aspects of BIM project procurement and the practical aspects of BIM project delivery(Abd Jamil & Fathi, 2018).

Another study deals with BIM implementation's collaboration and change management perspectives in construction to help manage PPP risks and share and reuse risk knowledge(Matthews et al., 2018). Government pressure and cultural factors are the main drivers for BIM adoption in the public sector, while competitor pressure and communication behaviour are in the private sector(Belay et al., 2021). The last research direction is to analyse the motivation, definition, and implications of servitisation in construction and its transformation pathway (Liu et al., 2021). The future research agenda is summarised as addressing technical competencies, social and legal impacting PPP projects(Habib et al., 2020), promoting interoperability between ontologies, and combining ontology technologies with BIM(Jiang et al., 2022), extensive data analysis investigation of historical overruns in PPP projects (Owolabi et al., 2018), national guidelines to scale BIM implementation in the construction industry (Porwal & Hewage, 2013), creating framework analyses of BIM implementation throughout the whole life cycle of projects (Abd Jamil & Fathi, 2018) (Belay et al., 2021), and finally, overcoming limitation to promote servitisation in construction(Liu et al., 2021).

***Category 8: Energy Management***

Building Information Modeling (BIM) and energy simulations are commonly utilised to help make better decisions. The progressive BIM methodology advises providing appropriate information to match the objective of an ongoing restoration design process, emphasising energy performance(Stegnar & Cerovšek, 2019)**.** A different approach suggests efficiently considering BIM techniques can reduce and lessen construction waste using a case study of a waste-to-energy project(Ajayi et al., 2017). Future studies should consider key design strategies critical to designing out construction waste and preventing waste-inducing activities(Ajayi et al., 2017).

***Category 9: Facility Management***

Facility management is potentially the area that can benefit the most from BIM adoption, yet it is still the least developed regarding implementation. Furthermore, even though there are an increasing number of publications about BIM-FM, the publication is unequal between public and private, and research regarding BIM for facility management for public organisations lacks standardisation(Pinti et al., 2022). However, the wide use of BIM and learning and innovation culture are significant opportunities for facility management development(Meng, 2015). Integration of FM in the development process is essential. Therefore, another research direction aims to establish the critical success factors for the facility management development process (FM-DP) framework. The study also found that BIM can help facility management adapt to PPP projects (Tucker & Masuri, 2018). Furthermore, another research direction aims to develop a strategic information taxonomy framework for facility management for healthcare facilities(Demirdöğen et al., 2021). Another research direction studied the cross-sectional fields of urban heritage conservation and urban facility management and found a potential application of BIM in urban heritage facility management that can be adapted to reuse in PPP projects (Prabowo et al., 2021). Future research agenda for this category could involve: Test the framework on different scenarios, building types and other FM software solutions, and Big Data Analytics implementation to enable efficient and faster queries(Demirdöğen et al., 2021), and further studies to understand how FM could be better integrated into the urban heritage management field (Prabowo et al., 2021).

***Category 10: Healthcare***

Healthcare facilities must ensure that patients receive safer services without interruption, and management requires precise and rapid information to facilitate decision-making processes. Therefore, the first research direction in this category aims to develop a strategic information taxonomy framework for facility management for healthcare facilities (Demirdöğen et al., 2021). Am automated portfolio-based strategic asset management based on deep neural image classification was investigated to accommodate the needs of operation and maintenance inspection-repair processes (Fang et al., 2022). Furthermore, a different research approach examines the hospital building project misperformance and finds that risk associated with procurement method choice is one of the main reasons for some hospital projects' misperformance (Love & Ika, 2022). Another research proposes recommendations for adopting an automated compliance system to check the design of healthcare buildings due to the complexity and extensive requirement for healthcare building design (Soliman-Junior et al., 2021). As an example of a successful BIM adoption in healthcare buildings, this research clarifies that a hospital design plan to combat Covid-19 in China was completed within 24 hours, and the construction of the hospital finished in only 60 hours (Abbas et al., 2021). The research agenda for this category could involve: Test the framework on different scenarios, building types and other FM software solutions, and Big Data Analytics implementation to enable efficient and faster queries (Demirdöğen et al., 2021), a hybrid solution for the automation application system should be further explored (Soliman-Junior et al., 2021), and finally to test and exploit the performance of the image classification system should be investigated (Fang et al., 2022).

***Category 11: Critical Success Factors***

BIM-enabled Project success factors cost, time and quality management, safety management, resource utilisation, conflict management, facility management, and interface management in PPP projects are the most critical to success(McArthur & Sun, 2015), starting by presenting a modern method for selecting up-to-date multi-attribute procurement for procurement methods in construction is essential (Naoum & Egbu, 2016). Key performance indicators (KPIs) of build-operate-transfer (BOT) projects were identified and analysed to study successful automated collaboration in construction (Budayan et al., 2020). Variables with active relations and cooperative working in design meetings were analysed to find the requirements for successful automated cooperation in the construction industry(Van Gassel et al., 2014). Furthermore, issues around project development stage integration must be tackled to achieve building lifecycle integration concerning the interface between the client and project organisations (Kamara, 2012). However, to improve the integration of projects, another study analysed the requirements for cloud-based BIM governance solutions to facilitate team collaboration in socio-organisational, legal, and technical requirements (Alreshidi et al., 2018). Another aspect of success factors indicates that effective use of BIM can directly improve project performance, and stakeholder management has a critical and positive role in BIM implementation (Zhang et al., 2022). Because rework negatively impacts project performance, addressing and mitigating rework occurrence in the construction industry is essential (Love et al., 2022).

Expanding BIM usage in construction can build a more promising future for proactive management utilising online cooperative possibilities. The BIM model enables contractors to be involved early in design decision-making (Meng, 2020). A different area of research deals with organisational conditions for BIM's role in rational and enriching the information flows among contractually bound supply chain partnerships (Papadonikolaki & Wamelink, 2017). A different research approach deals with the similarities and differences between project partnering, project alliancing and integrated project delivery. Early involvement of key parties, transparent financials, shared risk and reward are critical features incorporated in all the arrangements (Lahdenperä, 2012). The last research direction in this category deals with the influential role of BIM implementation in survey investment analysis in PPP projects(Boniotti, 2019). Future research agenda in this category can be described as the manner in which Key Performance Indicators could be measured (Budayan et al., 2020). To objectively develop and measure the level of success of recently completed projects based on an expert-based system (Naoum & Egbu, 2016), ensure effective integration and exchange of information from project development to project and from project to FM (Kamara, 2012), implement a prototype to produce a cloud-based BIM governance platform (Alreshidi et al., 2018), Explore stakeholders' impact and relationships under various contractual arrangements and contrasting BIM-enabled projects (Zhang et al., 2022), and supply chain collaboration performance with or without BIM implementation (Papadonikolaki & Wamelink, 2017).

***Category 12: Information Exchange & Cloud-BIM***

Public-Private Partnership is one of the most used procurement methods in government construction projects; PPP projects typically involve multidisciplinary and multi-actor collaborations that generate massive amounts of data over their lifecycle. Therefore, cloud-based governance solutions are suggested (Alreshidi et al., 2018). However, to analyse the requirements for cloud-based BIM governance solutions to facilitate team collaboration in socio-organisational, legal, and technical requirements and improve the integration of projects. The information exchange mechanism for Cloud BIM reflects the results of the semi-structured interviews. The concept's core is based on developing a cloud platform that hosts web-based BIM applications (Redmond et al., 2012). Another study deals with BIM progressive methodology to support energy renovation. Therefore, the proposed method suggests specifying adequate information to match the purpose of the progressive renovation design process (Stegnar & Cerovšek, 2019). Since Value for Money (VfM) is an essential assessment approach in PPP projects, developing an information exchange scheme using Building Information Modeling (BIM) can provide an appropriate way to address this challenge.(Ren et al., 2019), while a different approach aligned using BIM with ontology for information exchange and retrieval. Future research agenda can involve implementing a prototype to produce a cloud-based BIM governance platform (Alreshidi et al., 2018) and exploring addressing comprehensive performance assessment for PPP projects (Ren et al., 2019).

*Table 1 Review sources of 34 academic journals and the identified articles during 2012–2022*

| Journal | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Automation in Construction | **1** | **1** | **1** | **1** | 0 | 0 | **1** | 0 | 0 | **2** | **1** | **8** |
| Engineering, Construction and Architectural Management | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **2** | **1** | **1** | **4** |
| applied sciences | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | **1** | **3** |
| J. of Building Engineering | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 0 | **1** | 0 | **3** |
| Engineering | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **2** | **3** |
| Sustainability | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | **1** | 0 | **2** |
| Built Environment Project and Asset Management | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | **2** |
| construction innovation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | **2** |
| Production Planning & Control | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | **2** |
| J. of public procurement | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **2** |
| Transportation Research Part A | 0 | 0 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | **2** |
| International J. of Managing Projects in Business | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | **2** |
| Complexity | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** |
| J. of Infrastructure Systems | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** |
| Planning Malaysia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | **1** |
| Advances in Civil Engineering | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** |
| IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **1** |
| Energy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | **1** |
| Research in Transportation Economics | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** |
| International J. of Project Management | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | **1** |
| Renewable and Sustainable Energy Reviews | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | **1** |
| Transport Policy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | **1** |
| Transportation Research Part D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | **1** |
| Applied Soft Computing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** |
| Built Environment | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| J. of Management and Governance | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** |
| BUILDING RESEARCH & INFORMATION | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | **1** |
| International Archives of the Photogrammetry, Remote Sensing & Spatial Information Sciences | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | **1** |
| Tunnelling and Underground Space Technology | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Architectural Engineering and Design Management | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| Property Management | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| Requirements engineering | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **1** |
| Construction management and economics | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| **Total Per Year** | **3** | **1** | **1** | **4** | **1** | **4** | **7** | **5** | **7** | **15** | **8** | **56** |

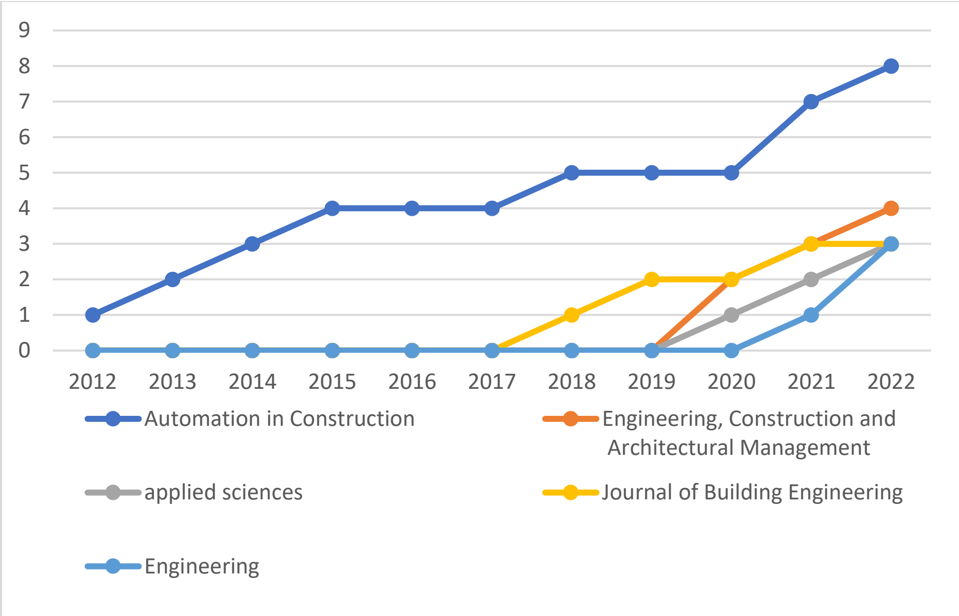


*Fig.3. Articles per year per source (Top 5 journals).*

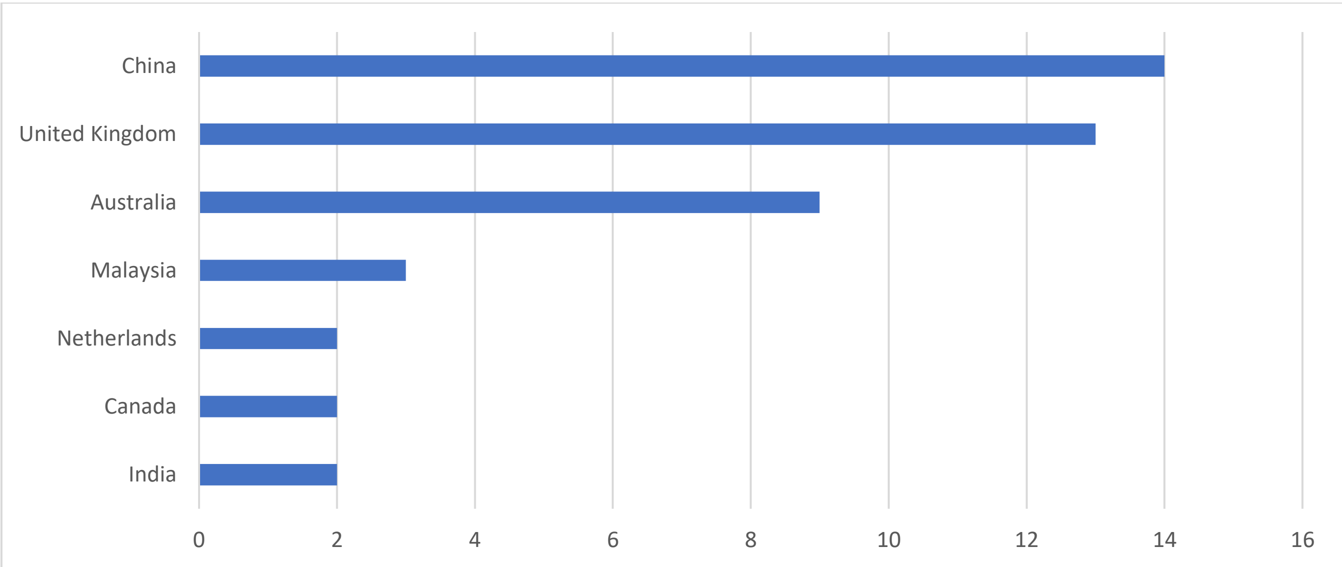


*Fig. 4. Articles by country or territory (Top 7 countries)*

*Table 2 The top ten cited articles according to the Google Scholar citation metric*

| Citat-ion | Author | Title | Journal | Year |
|---|---|---|---|---|
| 600 | (Porwal & Hewage, 2013) | Building Information Modeling (BIM) partnering framework for public construction projects | Automation in construction | 2013 |
| 522 | (Lahdenperä, 2012) | Making sense of the multi-party contractual arrangements of project partnering, project alliancing and integrated project delivery | Construction management and economics | 2012 |
| 356 | (Redmond et al., 2012) | Exploring how information exchanges can be enhanced through Cloud BIM | Automation in Construction | 2012 |
| 133 | (Love et al., 2015) | Future proofing PPPs: Life-cycle performance measurement and building information modelling | Automation in Construction | 2015 |
| 98 | (Alreshidi et al., 2018) | Requirements for cloud-based BIM governance solutions to facilitate team collaboration in construction projects | Requirements engineering | 2018 |
| 98 | (Matthews et al., 2018) | Building information modelling in construction: insights from collaboration and change management perspectives | Production Planning & Control | 2018 |
| 94 | (Papadonikolaki & Wamelink, 2017) | Inter- and intra-organizational conditions for supply chain integration with BIM | BUILDING RESEARCH & INFORMATION | 2017 |
| 57 | (Love, Zhou, et al., 2017) | Off the rails: The cost performance of infrastructure rail projects | Transportation Research Part A | 2017 |
| 57 | (Ajayi et al., 2017) | Attributes of design for construction waste minimization: A case study of waste-to-energy project | Renewable and Sustainable Energy Reviews | 2017 |
| 41 | (Abd Jamil & Fathi, 2018) | Contractual challenges for BIM-based construction projects: a systematic review | Built Environment Project and Asset Management | 2018 |

## IV. FINDINGS DISCUSSION

The study of reviewing Building Information Modeling (BIM) and its applications in Public Private Partnership (PPP) projects encompass a wide range of categories. The content analysis results (Fig. 6.) of this study identified 12 main key themes of research, which are: stakeholders management, value for money, performance evaluation, sustainability, infrastructure, contractual flexibility, risks and challenges, energy management, facility management, healthcare, critical success factors, and information exchange & cloud-BIM. Each key theme highlights an essential aspect of BIM for PPP in a holistic approach.

Several Keywords were used to explore the literature on the topic. However, keyword clustering shows the most commonly used keywords for the issues related to BIM for PPP, as shown in (Fig. 5.) is It was found that “architectural design,” “building information modeling,” “project management,” “public-private partnership,” “performance assessment,” “performance measuring,” and “value for money” were the most frequently used keywords. Keyword clustering shows the critical and relevant application of BIM in PPP construction projects and highlights the importance of evaluating, assessing, and measuring their success.

Many studies were conducted, and many publications were published on BIM related to PPP projects. However, the top publications in various academic journals are shown in Table 1 and Figure 3 from 2012 and 2022. The most ranked journals were Automation in Construction, Engineering Construction and Architectural Management, and Applied Sciences, each with 8, 4, and 3 publications, respectively. The findings highlight the importance and relevance of this topic which increases in publication, indicating that further research can and should be done to understand better and cover the research gaps.

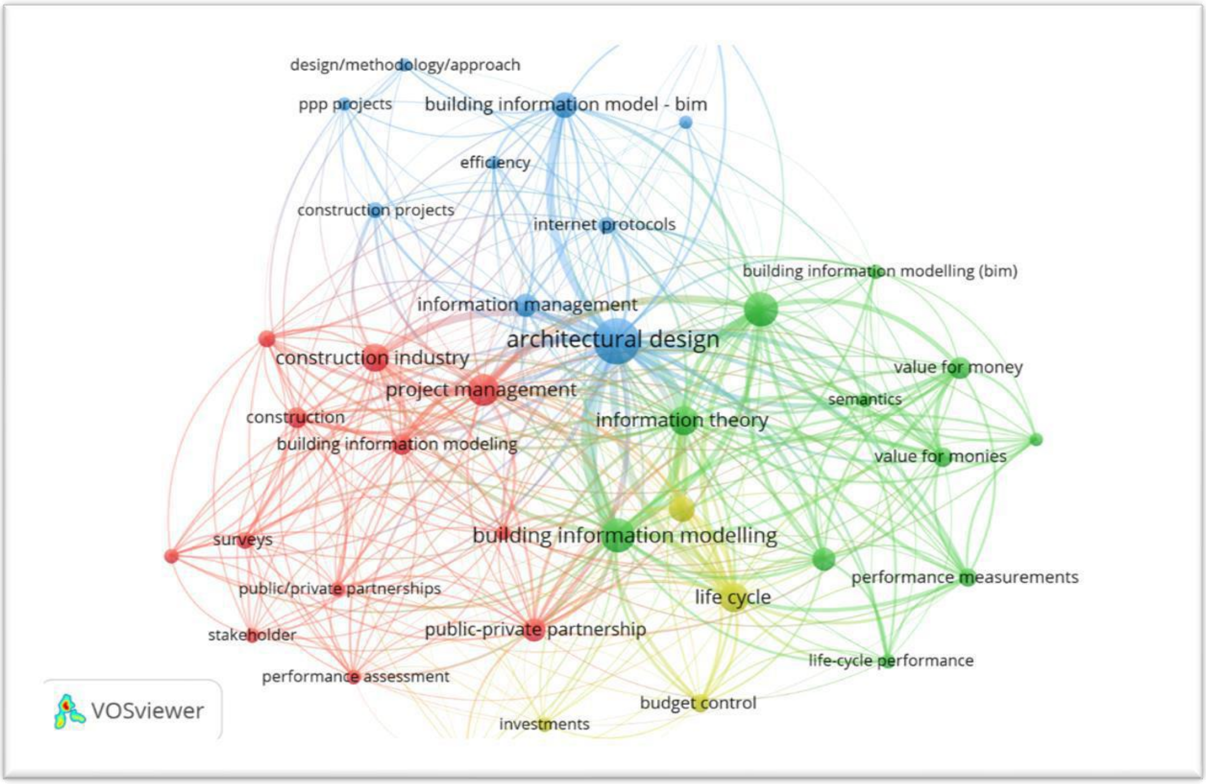


*Fig. 5. Keyword Clustering.*

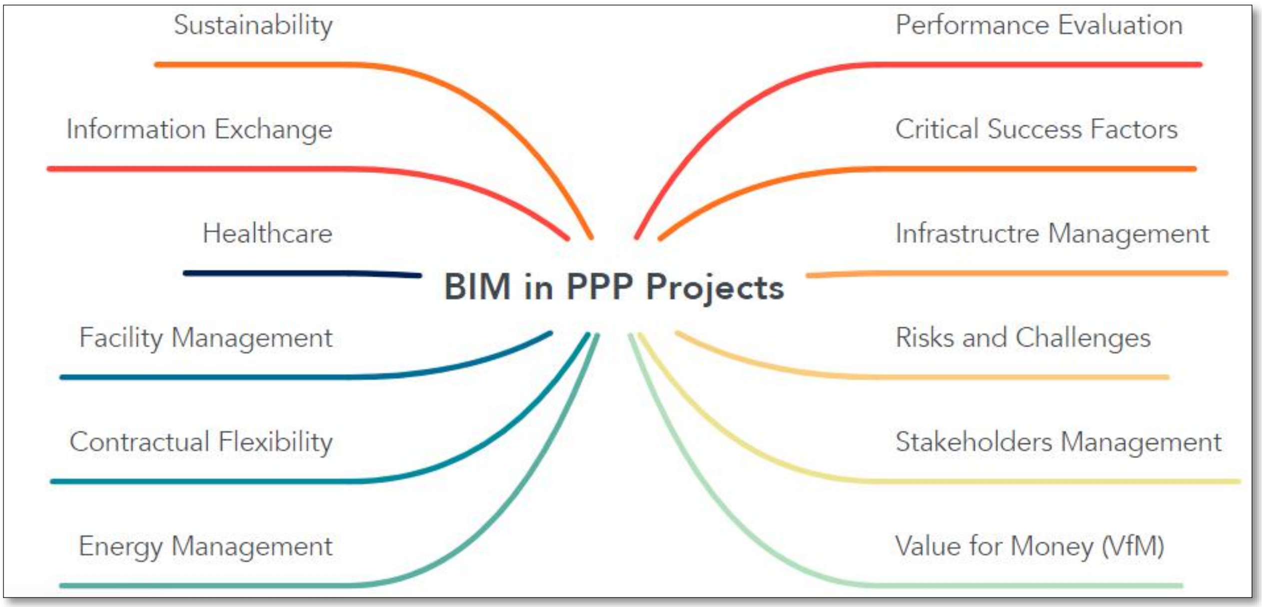


*Fig. 6. Content analysis results.*

The top cited articles within the 56 articles selected in this review, as shown in Table 2, were "Building Information Modeling (BIM) partnering framework for public construction projects" by Porwal and Hewage, published in 2013, with 600 citations. Lahdenperä's article "Making sense of the multi-party contractual arrangements of project partnering, project alliancing and integrated project delivery" from 2012 is the second most cited article with 522 citations. The third most cited article is "Exploring how information exchanges can be enhanced through Cloud

BIM" by Redmond et al., published in 2012 with 356 citations. The number of citations for these publications suggests that BIM for PPP is still a relatively new topic that many studies still investigate to understand further the collaboration and performance enhancement this new technology can provide for the construction industry.

From a country point of view, as elaborated in Figure 3, China has the highest publication at 14, followed closely by the United Kingdom at 13. The third and fourth places were Australia, then Malaysia at 9 and 3 publications. The results suggest that the previously mentioned countries are the most active in studying this field and have invested more resources into research in this area.

Overall the implication of this study suggests that BIM implementation for PPP projects can enhance stakeholder management, improve the value for money, enhance performance evaluation and sustainability, and help better manage risk for PPP. Furthermore, this study highlights the importance of analyzing critical success factors to overcome challenges related to BIM for PPP projects. This review analysis can provide valuable insights for practitioners and policymakers dealing with PPP projects.

## V. CONCLUSION

This paper provided an overview of BIM adoption in PPP projects, shedding light on research areas, future research agenda, and current risks and challenges in different types of PPP projects. Fifty-six articles published between 2012 and 2022 were recalled and systematically reviewed, where existing literature gaps and future research opportunities were traced. Implementation of BIM in PPP projects can be successfully achieved based on this analysis through: More case studies from the real world to investigate the current state of BIM implementation in PPP projects, addressing technical competencies, social and legal impacting PPP projects, developing national guidelines to scale BIM implementation in the construction industry, creating framework analyses of BIM implementation throughout the whole life cycle of projects, and ensuring a standardised process for feedback loops between operations and design phases.

Eventually, it is hoped that this paper will clarify the current research areas and future research agenda, which will help the smooth implementation of BIM in PPP projects to reap the benefits and overcome the challenges. Despite this study's strengths, further review studies should consider different types of PPP projects and explore their challenges, risks, and future developments throughout the whole building life cycle. BIM implementation in PPP projects will be a growing research area for many years. To overcome the current challenges, developments in this area necessitate the collaboration of academics and practitioners from the industry.

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# A Political, Sustainable, and Management Building Information Modelling (BIM) Key Performance Indicators (KPIs) for Public-Private Partnership (PPP) Projects

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***Abstract***— *Public-Private Partnership (PPP) is a partnership between the public and private sectors to deliver a project or service generally provided by the public sector. many studies suggests that Building information modelling can help in making better decisions throughout the project. However, despite the number of studies on BIM for PPP, there is still no consensus on a standardized comprehensive performance evaluation. The study presents a review based on in-depth review of 26 articles to find KPIs for the purpose of evaluating the impact of adopting Building Information Modeling (BIM) in Public-Private Partnership (PPP) projects. It is hoped that this research will establish a standardized the performance evaluation of such complex projects to overcome to fully understand the benefits and overcome challenges. The KPIs afterward is subcategorized into (Internal/External) and (Technical/Non-Technical) Indicators. The results of this study clarify Key performance indicators (KPIs) to evaluate the Public-Private Partnership (PPP) projects for the main purpose of measuring the impact of adopting the new technology BIM on the overall status of these projects, and to overcome the challenges of merely evaluating the projects based on time and cost used in the current traditional performance management. KPIs are divided into Management (cost, time, quality), Sustainable (manpower, machine, material) and finally political KPIs.*

***Keywords*— *Building Information Modeling (BIM), Public-Private Partnerships (PPP), Key Performance Indicators (KPIs), Political, Management, Sustainability, Performance Management.***

## I. INTRODUCTION

Public-Private Partnership (PPP) projects are gaining momentum worldwide. Typically, PPP is characterised by complexity, long-term construction, operation and maintenance periods (Liang & Wang, 2019). PPP projects deal with multiple stakeholders in various contract duration, which uncovers working and information integration risks (Habib et al., 2020). Public infrastructure projects operate based on Public-Private partnership PPP, where this procurement method often ensures value for money. However, other issues arise, such as cost and schedule overruns (Love et al., 2015). Accurate performance evaluation needs to be improved in many Public-Private Partnership (PPP) projects (Xu et al., 2020). Effective performance measurement/evaluation is critical to the successful delivery of PPP projects, as the traditional post-evaluation focuses only on budget and schedule and disregards other elements that make a project successful (Love et al., 2015).

Building information modelling (BIM) is seen as a mechanism for improving collaboration and integration in public-private partnerships (PPPs) (Habib et al., 2020). BIM adoption increases the quality and efficiency of AEC (Architecture, Engineering and Construction) projects (Ma et al., 2019). Using BIM effectively for PPP performance evaluation for projects is quite challenging (Xu et al., 2020). BIM execution framework for PPP performance management helps to guide stakeholders and improve work efficiency (Yuan et al., 2020). BIM can also provide a digital representation of the physical and functional characteristics of the projects throughout the whole project life cycle (Love et al., 2015) However, BIM can introduce users to additional risk because information sharing increases (Habib et al., 2020).

In public-private partnership (PPP) projects, effective performance management (PM) is critical to achieving value for money (VFM) (Yuan et al., 2020). Numerous urban rail transit PPP projects face cost overruns, schedule deviations, and poor quality. The lack of good project performance is a critical issue to be solved (Wang et al., 2021). BIM can also combine Web and Cloud technology and help in performance monitoring and performance-based payments (Yuan et al., 2020). There needs to be more research on the sustainability aspects of the performance assessment of buildings (Olawumi & Chan, 2021). Accurate performance evaluation needs to be improved in many Public-Private Partnership (PPP) projects (Xu et al., 2020).

## II. RESEARCH METHODS AND DATA COLLECTION

This study uses quantitative and qualitative research methods to analyse and categorize academic publications to perceive political, sustainable, and management Key Performance Indicators (KPIs) to measure the impact of adopting Building Information Modelling (BIM) in Public-Private Partnership (PPP) projects. The study consists of seven steps, as shown in Figure.1.

**Step 1:** To locate Key Performance Indicators (KPIs) for Public-Private Partnership projects to eventually evaluate BIM-based projects. A wide range of publications was analysed using different keyword-based combinations (BIM, building information modelling, PPP, public-private partnership, assessment, evaluation, sustainability, management, political, key performance indicators, KPI, benefits, measuring, and impact).

**Step 2:** Explore academic publications based on the previous keyword search and extract Key Performance Indicators (KPIs) for PPP.

**Step 3:** The selected KPIs are then sorted based on their recurrence in the selected previous publications to find the KPIs studied the most in the literature.

**Step 4:** Sort the selected KPIs that recurred in more than one publication (a single KPI found in more than one publication) and eliminate the KPIs found only once.

**Step 5:** After determining PPP projects' KPIs, each is assigned Political, Sustainable (manpower, machine, material), and Management (time, cost, quality) triangle constraints.

**Step 6:** From a different perspective, the KPIs also were categorised into Technical/Non-Technical and External/Internal performance indicator

**Step 7:** Sorted and categorized data is then summarized into readable and comprehensive tables. The resulting tables will be used to evaluate the impact of adopting BIM in PPP projects.

Twenty-six publications are yielded to extract thirty-three Key Performance Indicators (KPIs) to evaluate adopting Building Information Modelling (BIM) in Public-Private Partnership (PPP) projects. Management KPIs are the most frequent method of evaluating any project. Management KPIs and what are also called project management constraints are divided into time, cost, and quality. Sustainable constraints are divided into manpower, machine, and material KPIs.

### *1. Building Information Modelling in Public-Private Partnership Projects*

Performance assessment and evaluation if done effectively are crucial to successfully implement Public-Private Partnership (PPP) Projects (Love et al., 2015; Xu et al., 2020). The traditional ex-post evaluation of projects, on the other hand, is only concerned with the budget and the predetermined timeline. However, BIM can trigger collaboration and improve integration due to the digital representation of physical functional project features, and can help making educated decision throughout the projects (Love et al., 2015). Therefore, Life-cycle conceptual framework of performance management can contribute to resilience construction (Liu et al., 2019). Other researchers, on the other hand, investigated the impact and relationship between contractual flexibility and BIM-enabled PPP project performance, particularly during construction. The findings show that both content and executing flexibility have a significant positive impact on the performance of BIM-enabled PPP projects during the construction phase (Xu et al., 2022). And accurate and efficient performance evaluation of PPP projects through the use of the IFC extension and the enhanced matter-element method (Xu et al., 2020). Other studies adopted a different strategy, integrating empirical and experimental research, beginning with semi-structured interviews and progressing to the development of a BIM Based Performance Management System (BPMS) by connecting it with Web and Cloud technologies (Yuan et al., 2020).

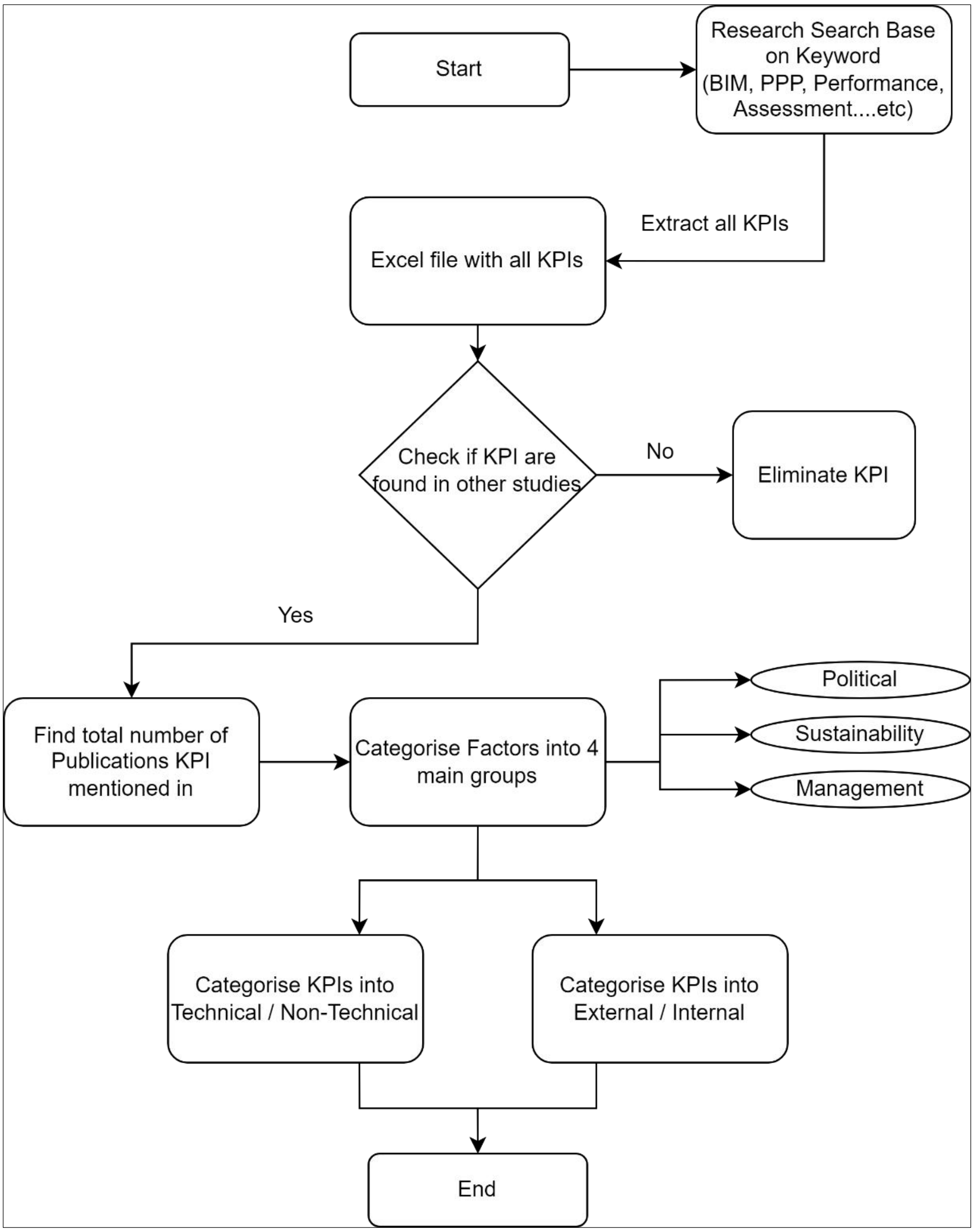


*Fig.1. Flow diagram of selection of BIM KPIs for PPP performance evaluation.*

Cost performance of infrastructure rail projects were found in two different studies, where BIM shows the ability to help in visualisation which assist in defining the public requirements for the best LRT route for the LRT (Love, Ahiaga-Dagbui, et al., 2017) as well as helps increase the cost certainty throughout the project construction phase (Love, Zhou, et al., 2017). Researchers used different levels of contextual factors to measure the multidimensionality of behavioural responses to BIM adoption in construction projects (Cao et al., 2021). effective stakeholder dynamics and stakeholder engagement or empowerment positively plays an important role in BIM implementation and project performance (Zhang et al., 2022). BIM may have reduced expenses, Scope changes, failure to adjust to risk and uncertainty, ineffective project management and governance on a hospital project performance (Love & Ika, 2022). Nevertheless, exploring the BIM cloud-Based and information exchange to evaluate the performance of Public-private partnership PPP projects' throughout the building life cycle (Redmond et al., 2012). Nevertheless, anticipating the risk of completion of PPP projects using Big Data analysis is the main goal of another study, which include oracle finance, BIM models, and finally Primavera (Owolabi et al., 2018).

### 2. *Performance Evaluation for PPPs*

#### a. *Political and Legal Key Performance Indicators*

Public-private partnership projects are generally considered one of the most complex procurement methods that take longer to execute than traditional ones (Xu et al., 2022). Objective and comprehensive performance evaluation for Public-private partnership projects is often missing. However, efficiently evaluating the performance of PPP projects adopting Building Information Modelling (BIM) is quite harder (Xu et al., 2020). Many studies have tried to develop BIM models for a specific segment in PPP Projects, such as improving the Value for Money (VfM) by supporting the decision-making process (Ren & Li, 2017), studying and mitigating the impact of risks associated with BIM adoption in PPP (Habib et al., 2020), and exploring the impact of contractual flexibility on project performance in PPP (Xu et al., 2022).

*Table 1: Political Key Performance Indicators (KPIs)*

| **Category / Indicator** | | Publication |
|---|---|---|
| **Political – Legal** | Risk of Adverse changes in law, policy or regulations | (Cheng et al., 2020; Doloi, 2012; Du et al., 2018; Habib et al., 2020; Ke et al., 2010; Ren & Li, 2017) |
| | Organization structure | (Doloi, 2012; Ke et al., 2010) |
| | Risk of Force majeure | (Hoeft et al., 2021; Li et al., 2020) |

The public-private partnership (PPP) procurement approach is a relatively new concept developed in the early 1990s as an acceptable and better solution for many municipalities' procurement issues and challenges (Ke et al., 2010). However, the operation phase in PPP projects is normally longer and more complex than traditional procurement methods, which can lead to amplified risks (Doloi, 2012). Building Information Modelling (BIM) is a new integration tool for the public and private sectors to help collaborate and integrate PPP projects (Habib et al., 2020). A comprehensive and holistic evaluation of the impact of adopting Building information modelling (BIM) in Public-private partnership (PPP) projects is essential to fully understand whether it is justifiable to adopt BIM in PPP projects. For this purpose, fragmented political and legal performance indicators were collected from the literature as shown in table.1.

Public-private partnerships are project management concepts focusing mainly on value-for-money procurement benefits (Ren & Li, 2017). Investors and financiers show concerns with the capital market, laws, and regulations (Du et al., 2018). Risk of adverse changes in law, policy, or regulations are one of the most issues regarding PPP projects, because it can involve external factors that results in adversely affecting the project performance, such as: change in law and tax regulation changes (Doloi, 2012; Ke et al., 2010). Change of BIM policies was ranked eleventh between twenty three other risk factors related to PPP projects (Habib et al., 2020). On the other hand, a proper organizational structure requires action from both public and private stakeholders (Hoeft et al., 2021) to support project sustainability (Hoeft et al., 2021; Li et al., 2020).

#### b. *Sustainability Key Performance Indicators*

Public-private partnership projects are generally considered one of the most complex procurement methods that take longer to execute than traditional ones (Xu et al., 2022). Objective and comprehensive performance evaluation for Public-private partnership projects is often missing. However, efficiently evaluating the performance of PPP projects adopting Building Information Modelling (BIM) is quite harder (Xu et al., 2020). Many studies have tried to develop BIM models for a specific segment in PPP Projects, such as improving the Value for Money (VfM) by supporting the decision-making process (Ren & Li, 2017), studying and mitigating the impact of risks associated with BIM adoption in PPP (Habib et al., 2020), and exploring the impact of contractual flexibility on project performance in PPP (Xu et al., 2022). PPP projects' performance measurements are essential to maintain stakeholders' sustainable interest, ensuring future generations' interest in social, economic, and environmental development (Liang & Wang, 2019).

Table 2: Sustainability Key Performance Indicators (KPIs)

| Category / Indicator | | | Publication |
|---|---|---|---|
| Sustainability | Manpower | Experience and knowledge gains | (Chen et al., 2020; Habib et al., 2020; Liang & Wang, 2019; Wang et al., 2021) |
| | | employment opportunities | (Hossain et al., 2018; Li et al., 2020; Wang et al., 2021; Xu et al., 2020) |
| | | Specialized Expertise | (Eadie et al., 2013; Hossain et al., 2018; Porwal & Hewage, 2013) |
| | | Technical Staff Resources | (Cheng et al., 2020; Porwal & Hewage, 2013; Xu et al., 2020) |
| | | Staff training | (Habib et al., 2020; Yuan et al., 2020) |
| | Machine | Equipment/ Material/ condition and number | (DENG et al., 2017; Ren & Li, 2017; Xu et al., 2020; Yuan et al., 2020) |
| | | effective interface management | (Budayan et al., 2020; Love et al., 2015; Wang et al., 2021) |
| | Material | Use of construction waste | (Hoeft et al., 2021; Li et al., 2020; Olawumi & Chan, 2021; Ren & Li, 2017; Yuan et al., 2020) |
| | | Equipment/ Material/ condition and number | (DENG et al., 2017; Ren & Li, 2017; Xu et al., 2020; Yuan et al., 2020) |
| | | Use of innovation materials | (Hoeft et al., 2021; Li et al., 2020) |

sustainable development and sustainability in construction has become a theme for this time. Sustainability key performance indicators are categorised into three main subcategories, which are manpower, machine, and material or what is known as (3Ms). Each subcategory contains performance indicators that will be later utilised to evaluate the sustainable performance of PPP projects adopting BIM, as shown in table 2. The manpower subcategory contains (experience and knowledge gains, employment opportunities, specialised expertise, technical staff resources, and staff training). Manpower describes the operational and functional labour or people indicators engaged in delivering a product or a service. On the other hand, from a different perspective, materials indicators are (the use of construction waste, the use of innovative materials and the number and condition of materials). The materials subcategory deals with components and consumables to satisfy the construction deliverables. Furthermore, the machine subcategory deals with project facilities, systems, and equipment. The materials indicators are (equipment number /condition and effective interface management).

### c. Management Key Performance Indicators

Measuring the expected and actual business success of projects focuses on project management constraints which are time, cost, and quality (PMBOM 7th). Public-Private partnership PPP projects are generally a more complex and more extended type of project (Xu et al., 2022). Plenty of projects are experiencing remarkable schedule and cost overruns during construction (Love et al., 2015). Public-Private Partnership (PPP) Projects are highly complex, significant investments with long-term relationships among many stakeholders, leading to a high risk of project mis-performance (Liang & Wang, 2019). BIM adoption is still challenging and requires changing the existing work practice. Public procurements need a different collaborative BIM approach, where the owner needs procedural and legal frameworks (Porwal & Hewage, 2013).

*Table 3: Management Key Performance Indicators (KPIs)*

| Category / Indicator | | | Publication |
|---|---|---|---|
| Management | Time | on-time or earlier project completion | (Chan et al., 2019; Cheng et al., 2020; Liang & Jia, 2018; Xu et al., 2020) |
| | | Completion/Time Delay | (Doloi, 2012; Ren, 2019; Ren & Li, 2017) |
| | | schedule variance | (Chen et al., 2020; Xu et al., 2020) |
| | cost | Investment life cycle Cost and return | (Budayan et al., 2020; Chan et al., 2019; Eadie et al., 2013; Habib et al., 2020; Hoeft et al., 2021; Hossain et al., 2018; Liang & Wang, 2019; Love et al., 2015; Porwal & Hewage, 2013; Ren, 2019; Wang et al., 2021; Xu et al., 2020) (Cheng et al., 2020; DENG et al., 2017; Du et al., 2018; Li et al., 2020; Liang & Jia, 2018) |
| | | Construction Cost overrun | (Du et al., 2018; Ren & Li, 2017) |
| | | Cost management | (Chen et al., 2020; Liang & Wang, 2019) |
| | | cost variance | (Chen et al., 2020; Xu et al., 2020) |
| | Quality | contract management and control | (Budayan et al., 2020; Cheng et al., 2020; Hossain et al., 2018; Love et al., 2015; Porwal & Hewage, 2013; Ren & Li, 2017; Wang et al., 2021; Xu et al., 2020) |
| | | Relationship quality within the project team | (Budayan et al., 2020; Chen et al., 2020; Cheng et al., 2020; Hossain et al., 2018; Xu et al., 2022; Yuan et al., 2020) |
| | | Effectiveness of facility management | (Budayan et al., 2020; DENG et al., 2017; Li et al., 2020; Love et al., 2015; Ren, 2019; Wang et al., 2021) |
| | | quality and innovation public service | (Hossain et al., 2018; Liang & Jia, 2018; Liang & Wang, 2019; Ma et al., 2019; Wang et al., 2021) |
| | | Design Quality and innovation | (Budayan et al., 2020; Doloi, 2012; Love et al., 2015; Ren & Li, 2017) |
| | | Technical specifications | (DENG et al., 2017; Doloi, 2012; Liang & Wang, 2019; Porwal & Hewage, 2013) |
| | | Life-cycle evaluation and monitoring | (Hossain et al., 2018; Ren, 2019; Ren & Li, 2017; Yuan et al., 2020) |
| | | qualification rate (Qualified unit/inspection unit) * 100% | (Chen et al., 2020; Hoeft et al., 2021; Li et al., 2020; Xu et al., 2020) |
| | | constructability and maintainability analysis | (Budayan et al., 2020; Doloi, 2012; Du et al., 2018; Ren & Li, 2017) |
| | | The third-party assessment results | (Wang et al., 2021; Yuan et al., 2020) |
| | | Change in scope | (Cheng et al., 2020; Doloi, 2012) |
| | | periodic performance reports | (Cheng et al., 2020; Yuan et al., 2020) |
| | | reduce the rework | (Chan et al., 2019; Yuan et al., 2020) |
| | | continuous improvement | (Hoeft et al., 2021; Li et al., 2020) |

Project management key performance indicators are the most commonly utilized to evaluate projects. Management KPIs are divided based on the project management constraints (cost, time, and quality) (PMBOM 7th). Each subcategory or management constraint contains several KPIs that will be later used to evaluate the performance of PPP projects that adopt BIM, as shown in table 3. Fourteen quality constraints are gathered from the literature. However, the most frequent KPIs in the quality subcategory are (contract management and control, relationship quality with the project team, effectiveness of quality management, and quality and innovation of public services). On the other hand, for time KPIs, we found that (on-time or earlier project completion, time delays, and schedule variance) are the essential KPIs to evaluate projects. However, the KPIs are most used to assess the cost of PPP projects (Investment life cycle cost and return, construction cost overrun, cost management, and cost variance).

## III. RESULTS AND DISCUSSION

This study investigates the Political, sustainable, and management Key Performance Indicators (KPIs) to evaluate the Public-Private Partnership PPP Projects, with the main goal of evaluate the impact of adopting Building Information Modelling (BIM). The results of the literature analysis reveal thirty-three Key Performance Indicators (KPIs) to evaluate the Public-Private partnership (PPP) projects, and were divided into three main categories: Political, Sustainable, and Management. Each indicator is also categorized into (Internal/External) and (Technical/Non-Technical) KPIs, where after evaluation each project will perceive the status of performance and understand the strength and weaknesses aspects of each project as shown in Tables 4,5,6.

From the theoretical perspective, this study enriches the performance management of PPP projects, and provide a new comprehensive of performance system to evaluate and assess PPP project from different perspectives. The findings of this research provide a systematic reference for the public and private sectors to broadly evaluate from political, sustainable, and management perspectives. Furthermore, evaluating the impact of adopting BIM will be more accurate due to the comprehensive performance evaluation, on the contrary to the traditional evaluation focusing on time and cost of construction.

Eventually, it is hoped that this paper will clarify the comprehensive performance evaluation of PPP projects and smoothing the evaluation of Building information modelling (BIM) implementation in Public-Private Partnership (PPP) projects. Despite this study's strengths, the method of evaluating BIM adoption using the selected KPIs are not included in this article. However, in the future, evaluating the impact of adopting BIM using the selected indicators will be conducted and analysed. Future research may also consider the different character of different fields, countries, or PPP type, future studies also may focus on one specific area or country to make deep analysis.

*Table 4: Political Key Performance Indicators (KPIs)*

| Category / Indicator | | External | Internal | Technical | Non-Technical |
|---|---|---|---|---|---|
| **Political – Legal** | Risk of Adverse changes in law, policy or regulations | ✓ | - | - | ✓ |
| | Organization structure | - | ✓ | ✓ | - |
| | Risk of Force majeure | ✓ | - | - | ✓ |

*Table 5: Management Key Performance Indicators (KPIs)*

| Category / Indicator | | | External | Internal | Technical | Non-Technical |
|---|---|---|---|---|---|---|
| **Management** | **Time** | on-time or earlier project completion | - | ✓ | ✓ | - |
| | | Completion/Time Delay | ✓ | - | - | ✓ |
| | | schedule variance | - | ✓ | ✓ | - |
| | **cost** | Investment life cycle Cost and return | ✓ | - | ✓ | - |
| | | Construction Cost overrun | ✓ | - | - | ✓ |
| | | Cost management | - | ✓ | ✓ | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | cost variance | - | ✓ | ✓ | - |
| | Quality | contract management and control | - | ✓ | ✓ | - |
| | | Relationship quality within the project team | - | ✓ | - | ✓ |
| | | Effectiveness of facility management | - | ✓ | ✓ | - |
| | | quality and innovation public service | - | ✓ | - | ✓ |
| | | Design Quality and innovation | - | ✓ | ✓ | - |
| | | Technical specifications | - | ✓ | ✓ | - |
| | | Life-cycle evaluation and monitoring | - | ✓ | ✓ | - |
| | | qualification rate (Qualified unit/inspection unit) * 100% | - | ✓ | ✓ | - |
| | | constructability and maintainability analysis | - | ✓ | ✓ | - |
| | | The third-party assessment results | ✓ | - | ✓ | - |
| | | Change in scope | ✓ | - | - | ✓ |
| | | periodic performance reports | - | ✓ | ✓ | - |
| | | reduce the rework | - | ✓ | ✓ | - |
| | | continuous improvement | - | ✓ | - | ✓ |

*Table 6: Sustainability Key Performance Indicators (KPIs)*

| **Category / Indicator** | | | External | Internal | Technical | Non-Technical |
|---|---|---|---|---|---|---|
| Sustainability | Manpower | Experience and knowledge gains | - | ✓ | - | ✓ |
| | | employment opportunities | ✓ | - | ✓ | - |
| | | Specialized Expertise | ✓ | - | ✓ | - |
| | | Technical Staff Resources | - | ✓ | ✓ | - |
| | | Staff training | - | ✓ | - | ✓ |
| | Machine | Equipment/ Material/ condition and number | - | ✓ | ✓ | - |
| | | effective interface management | ✓ | - | - | ✓ |
| | Material | Use of construction waste | - | ✓ | - | ✓ |
| | | Equipment/ Material/ condition and number | - | ✓ | ✓ | - |
| | | Use of innovation materials | ✓ | - | ✓ | - |

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# A Research Paper on the Corporate Social Responsibility (CSR) of SM Foundation Inc. (SMFI)

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***Abstract***— *This study examined the Corporate Social Responsibility (CSR) of SM Foundation Incorporated in the City of Cabanatuan. It focused on the following: (1) Demographic profile of the respondents, (2) Level of customer awareness, (3) Impact of SMFI CSR Activities, (4) Factors considered in formulating the CSR programs of SMFI, (5) Hindrances affecting the implementation of CSR programs, (6) The best good governance and CSR practices. The descriptive research design involved 500 participants who are customers and employees of SM. Using descriptive research, participants were selected using non-probability sampling and surveyed using a questionnaire. The data-gathering procedures used were surveys. Furthermore, data analysis employed mean frequency percentage, Krustal-Wallis (ANOVA), and Tukey's Honest Significant Difference (HSD) test. The findings indicated: (1) The general profile of the respondents was aged 15-25, with most having incomes P10,000 and below, and occasionally visiting SM Cabanatuan, (2) Customers were highly aware of SMFI's CSR initiative, (3) The CSR program has improved SMFI's company image since customers of SMFI preferred companies with a good reputation for CSR and Good Governance, (4) Factors considered in formulating the CSR programs were team engagement, company values, and community needs, (5) The hindrances affecting the implementation of CSR program were lack of participation in program implementation, (6) The best good governance practice of SMFI are the management of a company informs the purpose of its activities and the outcomes of its action, (7) The best CSR practice at SMFI was implementing employee and community relations CSR programs.*

***Keywords*— *Corporate Social Responsibility (CSR), Customer Awareness, Good Governance, Impact, SM Foundation Incorporated***

## I. INTRODUCTION

"Bringing back to the community" is a phrase that encapsulates the idea of individuals, businesses, organizations, or governments giving back to the communities in which they operate. This concept involves contributing to the betterment of the community through various means, such as financial support, volunteerism, or other resources. Corporate Social responsibility is one of the ways businesses engage in "Bringing back to the community." Businesses can engage in CSR activities by supporting local initiatives, investing in community development projects, or sponsoring events that benefit the community. This demonstrates a company's commitment to social and environmental responsibility. Corporate Social Responsibility (CSR) refers to businesses and corporations' ethical and voluntary efforts to contribute positively to society beyond their primary goal of generating profits. CSR initiatives are designed to positively impact various stakeholders, including employees, customers, communities, the environment, and society. The key aspects of CSR are environmental sustainability, community engagement, philanthropy, employee welfare, ethical sourcing and fair labor practices, diversity and inclusion, transparency and accountability, consumer protection, human rights, social impact investing, corporate governance, and sustainability reporting. SM Foundation, Incorporated (SMFI) is the CSR arm of the SM Group of Companies, one of the largest conglomerates in the Philippines. SMFI is actively engaged in a wide range of CSR initiatives to impact Philippine society positively. Some critical aspects of SM Foundation's CSR are education, healthcare, community development, disaster response, livelihood and skills training, environmental initiatives, health and wellness, arts and culture, disability inclusivity, employee engagement, transparency, and accountability. SMFI’s CSR activities align with the SM Group's broader commitment to corporate social responsibility. Through its multifaceted initiatives and collaborations with various partners, SMFI strives to make a meaningful and lasting difference in Filipinos' lives and the communities where the SM Group operates. SMFI is the organization the SM Group uses to bring back to the community where it operates. This is essential to social responsibility and community engagement as it fosters a sense of shared responsibility and solidarity within the community, strengthens social bonds, and enhances residents' overall quality of life. Whether through financial support, volunteer work, or other resources, individuals and entities can make a positive difference in their communities by giving back. Generally, this study aims to describe, assess, and analyze the Corporate Social Responsibility (CSR) of SM Foundation Incorporated (SMFI) in the City of Cabanatuan. Specifically, the objectives of this study were the following: (1) To determine the demographic profile of the respondents in terms of Age, Sex, Employment Type, Monthly Income, (2) To describe the level of customer awareness about the CSR of the SMFI, (3) To describe the impact of SMFI's CSR activities, (4) To determine the factors being considered in formulating the CSR programs of SMFI, (5) To determine the hindrances affecting the implementation of CSR programs of SMFI, (6) To determine the best Good Governance practice of SMFI, (7) To determine the best CSR practice of SMFI.

## II. METHODOLOGY

Quantitative descriptive research was employed by the researchers to determine the impact of the implementation of CSR and Good Governance of SM Foundation Incorporated. The study was conducted in Region III, Province of Nueva Ecija, specifically Cabanatuan. The population in Region III, as determined by the 2020 Census, is 327,325. The respondents of the study were the customers and employees of SM. A sample of 500 participants who are customers of SM was selected. Thirty (30) employees from the 2 Malls of SM in Cabanatuan City were surveyed. non-probability sampling for the selection of the respondents. Limtinco (2012) stated that non-probability sampling was subjective when field workers had to choose a subject. Purposive sampling was used in selecting the respondents. Lindgreen et al, (2010) say that purposive sampling is a non-probability sampling determined based on a population's characteristics and the study's objective. This type of sampling can be advantageous when you need to reach a targeted sample quickly and where sampling for proportionality is not the primary concern. Meanwhile, questionnaires were deemed to be most suitable for this study. A questionnaire is a method of gathering primary data that is ordered. It usually consists of written questions that respondents must answer (Kuokkanen et al, 2019). The research instrument used was the checklist questionnaires formatted as Google Forms and applied two (2) sets of questionnaires of customers and employees. The questions were derived from various readings and previous reports from the references mentioned at the end of this research paper; however, the researchers modified them with the help of the adviser and a statistician. The primary data contained all the information extracted from the questionnaires the respondents answered. There were three sections in the questionnaire. The first section established the respondents' profiles in terms of age, sex, civil status, highest educational attainment, and household income. The next section of the survey asked respondents to assess their awareness of SM's Corporate Social Responsibility and Good Governance initiative through its philanthropic arm, SM Foundation Inc. The respondents were required to answer their part using the following scale: 5 (Strongly Agree), 4 (Agree), 3 (Neutral), 2 (Disagree), 1 (Strongly Disagree). The last part contained suggestions on how SM Foundation Inc. can improve its CSR activities and implement good governance. The data collected from the locale was encoded, tallied, and analyzed. Statistical tools were utilized in its analysis. Specifically, mean frequency percentage was used to describe the demographic profile, and level of customer and employee awareness to determine employee retention and satisfaction and describe the best CSR and Good governance of SMFI. Subsequently, Krustal-Wallis, or one-way ANOVA, was used to determine relationships between customers' demographic factors such as age, sex, employment status, and income and their awareness of SMFI's CSR activities. On the other hand, Tukey`s Honest Significant Difference (HSD) was used to check if there were significant differences between pairs of group means. The group means were the average scores obtained from the respondents' responses to the questions about CSR awareness.

## III. RESULTS AND DISCUSSION

### 1. Socio-demographic Information of Participants

A total of 500 people participated in this study. The majority were between the ages of 15 and 25, with a percentage of 57.4%. However, the corresponding percentage for those between the ages of 46 and above is 1.80%, which is the lowest. There were 287 (57.40%) participants aged 15 to 25, 176 (35.2%) participants aged 26 to 35, 28 (5.6%) participants aged 36 to 45, and 9 (1.8%) participants aged 46 and up. Meanwhile, it was noted that there were more female participants than male participants. There were 330 females (66%), and 170 males (34%). Five types of employment were identified: 182 (36.40%) students, 272 (54.40%.) employed, 29 (5.80%) self-employed, 15 (3%) unemployed, and 2 (0.40%) others. On the other hand, most of the participants' monthly income falls between P10,000 and below. There were 220 participants (44%) who fell into this income bracket. It was then followed by the income bracket of P10,001- 20,000 with a frequency of 137 (27.4%), P20,001 - 30,000 with a frequency of 86 (17.2%), P30,000 - 40,000 with a frequency of 32 (6.4%), and 25 people said they were earning P40,000 and above (5%). For the frequency of customers visiting SMFI-affiliated establishments, 297 (59.40%) participants said that they visited SMFI-affiliated establishments occasionally. Meanwhile, there were 123 (24.60%) participants who said they went to SMFI-affiliated establishments only occasionally and 80 (16%). stated they went very frequently. For the SMFI-affiliated establishments that the participants often visited, 175(35%) visited SM Cabanatuan, 120 (24%) visited SM Mega Center, 86 (17.20%) visited Waltermart, 59 (12%) participants have visited Save More Amigo, 35 (7%) participants for others, and 25 (5%) participants for Watson Store - Pacific.

### 2. Level of Customer awareness about the CSR of the SMFI

For the level of customer awareness about the CSR of the SMFI, Table 1 shows the level of customer awareness. The ANOVA test showed that the customer's age and the frequency of visits have significant findings at the 5% significance level. The age was 0.033, while the frequency of visits was 0.047. On the other hand, sex, employment, monthly income, and branches often visited do not show any significant results. Mean ranks were also computed to analyze the results further. Participants in bracket 46 above, with a mean rank of 362.22, had the highest awareness of SMFI's CSR programs. Regarding the frequency of visits, the 80 participants with a mean rank of 278.89 who usually visited SMFI-affiliated establishments are the most aware of all the participants in SMFI's CSR programs. Other criteria, such as sex, type of employment, monthly income, and branches often visited, show the same perception. In this result, the clients 46 years old and above are more aware of the SMFI CSR programs, which gives us the impression that clients in this age bracket are very observant and concerned about how companies contribute to communities. Customers in their 40s also have more experience and knowledge about what has happened over the years, so the CSR concept is not new to them. The practice of CSR grew during the 1960s and 1970s, and this growth occurred more due to the impact of Howard R. Bowen's work, Social Responsibility of the Businessman, published in 1953 (Gimbel, 2018). According to Gimbel, the CSR concept has already been growing since the 1950s, and this may support the study's results that the generations in their 40s and above are well aware of the CSR programs incorporated by companies like SMFI. So, aside from the prices of SMFI's products, these customers are curious about its CSR programs. Based on the gathered results, the highest mean was on Questions 7 and 3, with 4.02 and 4.1.08, respectively. With this information, it was found that most of the customers agreed that they were aware that SMFI provides employment to working students and agreed that it is essential for a company to have CSR and good governance. Despite SMFI`s colossal success, it continuously strives to improve its imperfections. It also aims to be the top employer choice of students who belong to top universities: UP, ADMU, and DLSU (Co et al., 2007). CSR and good governance are two sides (Sala et al, 2021). The first step towards good CSR is practicing good corporate governance. A company should always look first at its internal value towards its employees, and with that, it can satisfy the expectations of its external stakeholders. Companies that practice good corporate governance are also socially and environmentally responsible (Sala et al, 2021). Corporate Governance helps establish a good communication channel between a shareholder and an organization's leadership. If there is good communication between the internal stakeholders and the management, all the matters for the decision-making are always in place and result in smooth operations and transactions. According to Thacker (2019), "The relevance and importance of corporate social responsibility (CSR) is highly significant today in this capitalist economy to ensure the sustainability of life and business in the future." Through CSR, company value increases, and it indicates profit. The more the company is recognized, the more customers will be curious and fond of it. The welfare of the community is being given emphasis and monitored through CSR. With the continuous involvement of the company in CSR, the community has also been taken care of.

*Table 1. Level of Customer Awareness of the Customers Tested at 5% Significance Level*

| | Age | Sex | | Employment | Monthly Income | Frequency of Visiting | Branch |
|---|---|---|---|---|---|---|---|
| Chi-Square | 8.766 | 0.148 | | 1.123 | 2.533 | 5.054 | 6.214 |
| Df | 3 | 1 | | 4 | 4 | 2 | 5 |
| Asymp. Sig. | 0.033* | 0.701 | | 0.891 | 0.639 | 0.047* | 0.286 |
| | *a. Kruskal Wallis Test* | | | | | | |
| | *b. * Significant at a 5% level of Significance* | | | | | | |

**3. Impact of SMFI CSR activities**

Based on the ANOVA results, none of the values computed show any significant differences. This implies that regardless of age, sex, employment, monthly income, frequency of visiting, and number of branches visited, all were agreeable. Mean ranks were also computed to analyze the data further. According to the mean ranks computed, participants, regardless of age, sex, employment, monthly income, frequency of visits, and branch, had the same perception and agreed. There were only minor differences that were not statistically significant. Meanwhile, the highest mean was on Question number 10, with a mean of 4.122. Most participants agreed they would recommend companies with good reputations on CSR and Good Governance. A company's dedication to embracing moral and ethical business practices determines its reputation for Corporate Social Responsibility (CSR) and Good Governance. Companies dedicated to CSR and Good Governance generally go above and beyond mere adherence to national and international legal requirements. They work hard to have a beneficial influence on both the environment and their local communities. According to Clements (2010), increasing numbers of consumers can be categorized as ethical consumers since they judge a product not only on its own merits but also on the behavior of the firm that provides it. In light of this, engaging in corporate social responsibility (CSR) may be the right thing to do morally and benefit the business. Thus, the success of Jollibee in increasing its customers can be attributed to its good reputation for CSR and good governance.

**4. Factors considered in Formulating the CSR Program of SMFI**

The management is considering various things before developing CSR programs. “In today's competitive economic world, corporate social responsibility (CSR) programs must go beyond "doing good.” The most successful CSR initiatives tell a company's story, implement customer and employee feedback, position a company as a leader on social issues, and guide how community investment is best spent. However, CSR programs must strategically align with a company's business model to achieve this. Corporate citizenship efforts are less likely to be successful and serve a long-term purpose if they do not demonstrate value to customers, employees, shareholders, and the community” (Morrissey, 2020). Table 2 shows that the overall mean was 4.51, and the SD was 0.80, under the “Strongly Agree” range, implying that participants strongly agreed that the mentioned factors were considered in formulating CSR programs. The highest meaning was noted in Q14, stating that they were considering team engagement in formulating CSR. The lowest mean was in the Q15 concerning external partnerships. The survey shows that the highest formulation of CSR is "company values," meaning that SMFI prioritizes the company's values. One’s company values can help outline a brand, an expectation, and guidelines for how one wants to be remembered and represented. The foundation of an organization's existence, how social norms are established, and how choices are made to accomplish objectives and achieve its vision should all be based on its values. It must be sincere and reasonably focused so the team can relate to it. This is just as true for an organization as it is in people's personal lives. Sixty-three percent of customers say they prefer doing business with organizations whose goals align with their beliefs and values. Consumers will even go out of their way to avoid businesses that do not share their values, demonstrating that a company's core principles have internal and external implications. Meanwhile, on the ANOVA test, none of the values computed for the variables indicate significant differences. This means that regardless of age, sex, and monthly income, all agreed. On the other hand, all mean ranks computed do not show any significant differences, implying that regardless of age, sex, and monthly income, there were no significant differences.

*Table 2. Factors Considered in Formulating the CSR Programs of the SMFI Mean and SD*

| Factors | Mean | SD | |
|---|---|---|---|
| 11. In formulating CSR, we are considering the company values. | 4.57 | 0.77 | Strongly Agree |
| 12. In formulating CSR, we are considering the community's needs. | 4.53 | 0.73 | Strongly Agree |
| 13. In the formulation of CSR, we are considering the strategies of other companies. | 4.43 | 0.86 | Strongly Agree |
| 14. In the formulation of CSR, we are considering team engagement. | 4.63 | 0.81 | Strongly Agree |
| 15. In the formulation of CSR, we are considering external partnerships. | 4.37 | 0.81 | Strongly Agree |
| Total | 4.51 | 0.80 | Strongly Agree |

**Strongly disagree 1.00 – 1.80, Disagree 1.81 – 2.60, Neutral 2.61 – 3.40, Agree 3.41 – 4.20, and Strongly agree 4.21 – 5.00*

**5. Hindrances affecting the implementation of the CSR Programs at SMFI**

The overall computed mean was 4.01, and the SD was 1.15, which was under the range of Agree, implying that participants agreed that the mentioned hindrances were affecting the implementation of CSR. The highest mean was noted in Q16, stating that the most common hindrance to implementing CSR is a lack of participation. The lowest mean was in Q19, implying that human and financial resources were the least common among the hindrances mentioned. The highest result of the survey was a lack of participation; therefore, SMFI has to increase its CSR involvement. Corporations that lack participation need to measure their social impact, which prevents them from designing successful initiatives. According to the Kantar Purpose 2020 study, "there was a direct correlation between perceived positive impact and brand value growth. Companies that the public considers highly impactful demonstrated brand value growth of 175% over 12 years, while businesses with a low positive impact showed only 70% growth". Volunteering one's time (and the time of one's workers) to local organizations or participating in community activities says a lot about the company's integrity. One can demonstrate an interest in particular concerns and social causes when one's business performs good deeds without asking for anything in return. ANOVA showed values of 0.795 (age), 0.846 (sex), and 0.722 (monthly income), implying there were no significant differences in the participants' answers, and all strongly agreed. The computed mean ranks also showed no significant differences between the participants's answers.

**6. The best good governance practice of SMFI**

The overall mean was 4.54, and the SD was 0.92, which was under the range of "Strongly Agree," implying that participants strongly agreed that SMFI has good governance practices. The highest mean was noted in Q6 and Q7. Participants strongly agreed that the management of a company informs the purpose of its activities and the outcomes of its actions. With the same mean of 4.67, participants strongly agreed that the management ensures the execution of the duties of the board of directors. Communicating a firm's corporate governance is crucial to community and investor relations (Montalbo et al, 2015). The result indicates positive corporate governance initiated by the company's board of directors down to the managers and the rank-and-file employees. All personnel across all levels embody the Code of Business Ethics. New hires must undergo the employee onboarding program to disseminate the Ethics Code, and existing personnel are refreshed by the training sessions developed and implemented annually. Additionally, the company conducts its business in compliance with laws and regulations in the places it operates as part of its corporate governance practice. Based on the survey results, the group was able to integrate its corporate governance principles, including integrity, respect, fairness, and confidentiality, into its daily business dealings. Focusing on the ANOVA results found in Table 3, all the values computed were more outstanding than 0.05, implying no significant differences in the customers' answers and that all strongly agreed with the statements. Furthermore, the mean ranks for SMFI's good governance practices showed that the perceptions of the participants were similar.

*Table 3. Best Good Governance Practice of SMFI Tested at 5% Significance Level*

| | Age | Sex | Monthly Income |
|---|---|---|---|
| Chi-Square | 0.855 | 0.558 | 0.254 |
| Df | 3 | 1 | 1 |
| Asymp. Sig. | 0.836 | 0.455 | 0.614 |
| *a Kruskal Wallis Test* | | | |

**7. Best CSR practice of SMFI**

The overall mean was 4.45, and the SD was 0.90, which was under the range of "strongly agree," implying that participants strongly agreed that SMFI has the best CSR practices. The highest mean was computed on Q9, implying that participants strongly agree that the company is implementing CSR programs for employee and community relations. The survey result was "Strongly Agree," implying that Jollibee has a well-established relationship with its employees and customers. Companies must develop relationships with their workers and the community at large to foster a good reputation and market their goods and services. According to (Bello et al, 2021), "customer satisfaction, repurchase intent, and service quality are all directly and favorably impacted by perceived CSR". "Additionally, the influence of perceived CSR on repurchase intention is mediated (uniquely and sequentially) by service quality and satisfaction" (Bello et al, 2021). More so, consumer rights awareness modifies the impact of perceived CSR on opinions of service quality and willingness to make additional purchases. The ANOVA values were more outstanding than 0.05 which implies no significant differences. Similarly, the mean rank for the participant's perception also showed no significant differences.

## IV. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were drawn from the above-mentioned results of the study:

1. The general profile of the respondents was: out of 500 customers who participated in this research, participants were ages 15-25; it was noted that there were more female participants than male; participants were employed; most of the participants' income fell between P10,000 and below; and participants occasionally visited SMFI affiliated establishment - SM Cabanatuan.
2. The participants' preferences in identifying the SMFI CSR programs and activities were at the level of customer awareness that a company needs to have CSR and good governance.
3. The SMFI's impact on customers regarding its CSR program was that having a good CSR program can improve the company's image, and customers would recommend companies with a good reputation for CSR and Good Governance.
4. Factors considered in formulating the CSR programs of the SMFI were team engagement, company values, and the community's needs.
5. The hindrances affecting the implementation of CSR programs were the lack of participation in program implementation and transparency issues.
6. The best good governance practices of SMFI are that the management of a company informs the purpose of its activities and the outcomes of its actions, and the management also ensures the execution of the duties of the board of directors.
7. The best CSR practice at SMFI was implementing CSR programs regarding employee and community relations.

Based on the findings and conclusions, the following are recommended:

1. Further studies are needed regarding the hindrances affecting the implementation of CSR programs.
2. Further studies on strategies regarding CSR awareness in the community, specifically the new CSR programs of SMFI.
3. Further studies on the CSR programs of other companies to improve SMFI plans and for the company's program of work and development (Subia, 2020).

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# Evaluation of Newtonian Cooling

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***Abstract*— *This paper evaluates the accuracy of Newton's law of cooling or Newtonian Cooling at standard conditions at four different temperatures and two different thermal conditions. Graphical data is collected via experiments and other plots are analyzed to quantify the inaccuracy in theoretical models, modeling the observed data. Post-analysis results show that the Law provides higher accuracy in predicting temperatures at lower temperature differences between ambient temperature and the temperature of the object in question; moreover, heat loss through thermal radiation, conduction, and convection increased the accuracy of predicting the temperatures when comparing the accuracy to the case where heat transfer through conduction and radiation was allowed.*

***Keywords*— Newton's Law of Cooling· Thermal Radiation· Conduction· Convection· Coefficient of Determination**

## I. INTRODUCTION

A temperature difference between any two bodies leads to an energy transfer from the hotter to the colder object using typically 3 methods of heat transfer: conduction, convection, and radiation [9]. Modeling the heating and cooling of objects is crucial for designing and optimizing various small-scale and large-scale thermodynamic systems like HVAC control units, heat sinks, and radiators. Several laws and methods exist for modeling the cooling of hot objects with specific strengths and limitations. One such law that incorporates the cooling of hot objects is Newton's law of cooling. Newton's law of cooling first appeared as a verbal definition in 1701, in a short article named 'Scala Graduum Caloris' read by Sir Issac Newton at the Royal Society, which stated that the rate of loss of heat of a hot object is directly proportional to the difference between the object's temperature and the overall temperature of the system or, in other words, the ambient room temperature. Newtonian cooling is one of the strongest theories used to model the temperature change of an object; however, there are some well-researched shortcomings of this law.

Newtonian cooling does not consider the dynamic temperature changes in the surroundings of the thermal system; moreover, the law fails to account for the different media of heat transfer. It works well only where temperature differences are small. More sophisticated attempts at measuring the rate of cooling of a hot object, like the Stefan-Boltzmann law and the Dulong-Petit law utilize different methods of heat transfer in the thermodynamic systems. Stefan-Boltzmann law of cooling can be used to accurately predict the thermal energy transfer of an object and its surroundings if radiation is the only means of energy transfer. The Dulong-Petit law works well for solid substances and is less reliant on assumptions on the system conditions. This law incorporates the thermal properties of solids which makes it more robust than Newtonian cooling. Nevertheless, Newtonian cooling can provide accurate models of the temperature of an object, especially in cases with static constraints like the fluid used and the environment. Evaluative work has been done on Newtonian Cooling using various calorimetric techniques, experimental conditions, and materials. For example, a comparative evaluation by O'Sullivan et al. [11] is performed using Newtonian cooling, Dulong-Petit law, and Stefan-Boltzmann cooling. Vollmer [12] provides a detailed analysis of cooling models using separate laws for conduction and radiation. The study gives insights into the range of temperatures for which Newton's law of cooling gives appreciable results. A few applications are also studied in various research especially relating to nanoparticles and ferrofluids. Researchers have recently proposed new perspectives and refinements to enhance the application of Newton's law of cooling. For instance, Bas et al. [1] introduced a novel approach by considering Newton's law of cooling with fractional conformable derivatives, which yielded improved results compared to traditional integer order derivatives. Additionally, da Silva et al. [4] presented a refined technique for analyzing experimental data using Newton's law of cooling, involving curve fittings and extrapolations to determine temperatures and uncertainties more accurately. Meng et al. [8] proposed a combined device model of a thermoelectric cooler and generator system, if heat transfer obeys Newton's law in the system's operation. Kumar et al. [7] conducted a study on the effect of temperature-dependent properties of fluids on the hydrodynamic and thermal performance of curved tubes under cooling and heating conditions. The study used water and diethylene glycol as different fluids and varied the Reynolds number. Bazgir et al. [2] investigated the effects of performance parameters on thermal separation in a vortex tube with cooling water, showing higher cold air temperature differences and efficiencies compared to a vortex tube without cooling water. Waqas [13] highlighted the use of cooling liquids like water, propylene glycol, and ethylene glycol in various applications, emphasizing the importance of heat transportation enhancement.

While Newton's law of cooling is commonly used in theoretical analyses, some studies have pointed out limitations and deviations associated with its application. For example, Kawashimo et al. [6] noted that the error in Newton's law becomes significant as temperature increases, prompting the exploration of alternative approaches such as Stefan-Boltzmann's law of radiation. Newton's law of cooling remains a valuable tool for analyzing heat transfer phenomena, although researchers continue to explore its limitations and refine its application in various contexts. A brief history of cooling laws is provided by Besson [3] which shows why Newton's law of cooling was and is widely used despite its obvious shortcomings. This paper evaluates the extent to which Newton's law of Cooling models observed data by using hot water as the test fluid. Moreover, the paper looks at the methods to increase the accuracy of the law in modeling the experimental data. The experimental data gathered was used to mathematically derive the modeling equation. The theoretical equations were used to compare the observed cooling curve of water at different temperatures. Initial observations show that the theoretical model is more accurate when all three methods of heat transfer (radiation, conduction, and convection) are allowed in the thermodynamic system; the paper also discusses a different assessment of Newtonian cooling to increase the reliability of the cooling constant k to improve its accuracy.

## II. NEWTONIAN COOLING

Newtonian cooling states that the rate at which a body loses heat is proportional to the difference in temperature between the body and the surroundings [5]. The law can be mathematically represented as

$$\frac{dT}{T_f - T_a} = kdt$$

$$\frac{dT}{dt} = k(T_f - T_a)$$

$$\int_{T_i}^{T_f} \frac{dT}{T - T_a} = \int_0^t kdt$$

$$ln(T_f - T_a) - ln(T_i - T_a) = k(t - 0)$$

$$ln\frac{T_f - T_a}{T_i - T_a} = kt$$

$$e^{ln\frac{T_f - T_a}{T_i - T_a}} = e^{kt}$$

$$\frac{T_f - T_a}{T_i - T_a} = e^{kt}$$

$$T_f = T_a + (T_i - T_a)e^{kt}. \qquad (1)$$

Where $T_f$ is the temperature at time t; $T_i$ is the initial temperature; $T_a$ is the ambient temperature; $k$ is the cooling constant.

To derive a usable model for a thermodynamic system, the value of the cooling constant k is generally determined by substituting the surrounding temperature, the initial temperature of the object, and the temperature readings of the object at t = 1; for this paper, the experimental data was collected at a rate of 1 sample per minute. The general form of the cooling constant k for this paper can be written as the following:

$$ln\left(\frac{T_1 - T_a}{T_i - T_a}\right) = k \qquad (2)$$

Where $T_1$ is the temperature at $t$ = 1; $T_i$ is the initial temperature; $T_a$ is the ambient temperature; $k$ is the cooling constant.

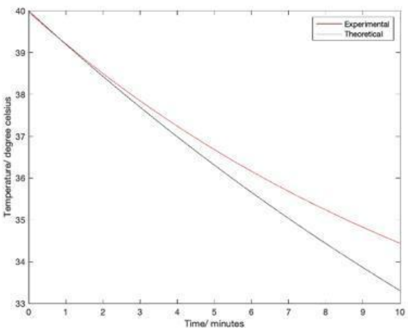
## III. METHODOLOGY

To assess the accuracy of the law, two scenarios were synthesized which allowed heat loss through different methods of heat transfer. In the first scenario, 150 mL of boiling tap water at 100$^\circ$ C was added to a 200 ml borosilicate beaker, and the top of the beaker was covered by a thick wooden plank with a tiny hole for the digital thermometer probe, to allow heat loss only through radiation. In the second scenario, the previous setup was replicated but the top was left open to allow heat loss through convection currents and radiation. The setup was placed on a granite platform and it was ensured that no sudden drafts interrupted the cooling of the water beaker. The temperature readings were digitally recorded via a Vernier Go Direct® Temperature Probe. The experimental data was collected at different temperatures of water, specifically at 40$^\circ$ C, 60$^\circ$ C,80$^\circ$ C, and 100$^\circ$ C. Temperature was recorded every minute for a span of 10 minutes for each of the four initial temperature points of water. The experimental data was used to model the equation for each temperature point using the equations (1) and (2). To plot the curve of best fit for the experimental data, MATLAB was used. A statistical measure called 'Coefficient of determination' was used to assess the quality of the curve of best fit. The coefficient of determination ($R_2$) quantifies the proportion of variance explained by a statistical model and a higher coefficient of determination shows that the model closely predicts the observed data [10]. The equations of the curve of best fit did not follow the format defined by Newton's law in (1) but rather followed a general form of:

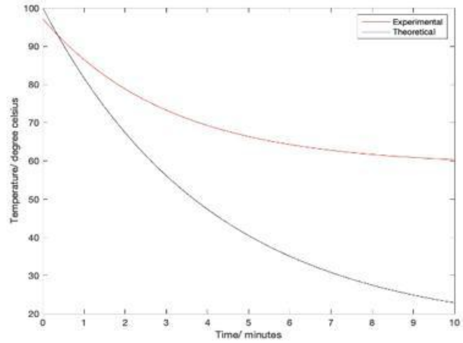
$$ab^t + c \qquad (3)$$

## IV. RESULTS

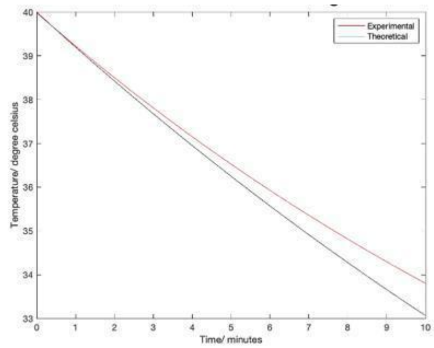
The theoretical equations that model the experimental data took the form presented in (1) and were plotted against the curves of best fit for each temperature. The plots for scenario 1 and scenario 2 for temperatures 40$^\circ$ C and 100$^\circ$ C are given below.



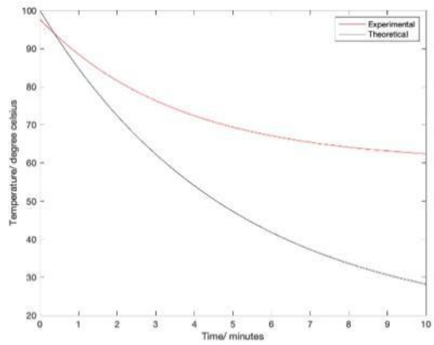

(a) *Initial Temperature: 40°C Scenario 1: Convection attenuated*




(b) *Initial Temperature: 100°C Scenario 1: Convection attenuated*




(a) *Initial Temperature: 40°C Scenario 2: Convection allowed*




(b) *Initial Temperature: 100°C Scenario 2: Convection allowed*

*Table 1: Coefficient of determination for Scenario 1, convection attenuated*

| Initial Temperature/°C | $R_2$ |
|---|---|
| 40 | 0.9996 |
| 60 | 0.9994 |
| 80 | 0.9991 |
| 100 | 0.9691 |

*Table 2: Coefficient of Determination for Scenario*

| Initial Temperature/°C | $R_2$ |
|---|---|
| 40 | 0.9998 |
| 60 | 0.9999 |
| 80 | 0.9999 |
| 100 | 0.9797 |

*2, convection allowed*

It can be observed that out of the two scenarios, scenario 2- where convection, along with radiation, was allowed- performed much better in modeling the experimental data as compared to the plots of scenario 1. In the experiment environment above, the average room temperature was around 17.1℃; as the difference between the ambient temperature and the object's initial temperature increases (from 40$^\circ C$ to 100$^\circ C$ ), the weaker the model gets as evidenced by an increase in the deviation between experimental and theoretical curves. The y-intercept of Figures 1b and 2b for both the experimental and theoretical plots is not at 100 $^\circ C$ as there are some experimental inaccuracies in the measurement. This trend is followed over the range of temperatures mentioned in Tables 1, and 2. As the initial temperature of water increases, the deviation from the curve of best-fit increases. This follows the limitations of Newtonian cooling which states that the law works well with smaller temperature differences.

## V. DISCUSSION

### A. Observing the error effect of the theoretical model on different values of k

Keeping in mind the significant deviation of the curve produced by Newton's law of cooling from the observed data, the effect of variance in the cooling constant k on this deviation is measured to establish a better representation of the observed data following Newton's law of cooling. Since the data was collected for 10 minutes, values of k are calculated by taking temperature and time readings at time t = 3, 6, and 9 minutes. This is done to investigate which reading provides a better graph with relatively less deviation from the original plot. The graph with the maximum visible deviation, which was scenario 1 with the initial temperature at 100$^\circ C$ (Fig. 2), was chosen at first to analyze whether a different approach to calculating k improves the accuracy of Newton's law of cooling.

To determine the value of k, the following equation from the derivation of (1) was taken:

$$k = \frac{ln\left(\frac{T_t - T_a}{T_i - T_a}\right)}{t} \quad (4)$$

where $T_t$ is the temperature of the object at time $t$; $T_a$ is the ambient temperature; $T_i$ is the initial temperature of the object. $k$ is the cooling constant.

The graph depicting this variation is presented below.

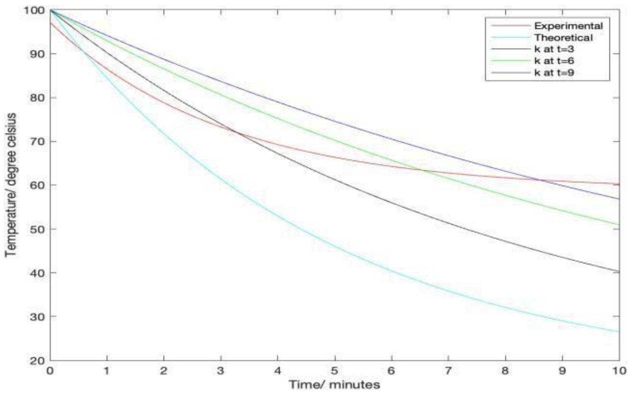



*Fig.3: Plots at different values of k*

As observed in Fig. 3, the closest plot to the actual data is observed with the equation with the cooling constant value at time t = 6. Additionally, the y-intercept of Fig. 3 for both the experimental and theoretical plots is not at 100 $^\circ C$ as there are some experimental inaccuracies in the measurement. This shows that it is possible to get better approximations of observed data with modifications in the method used to calculate the cooling constant in Newtonian cooling.

### B. Error Analysis

To quantify the deviation of the theoretical models derived from Newton's law of cooling, the Integral Absolute Error method was used.

Consider two real-valued functions f(x) and g(x) defined for $x|x \in [0,10]$, where f(x) is defined for the experimental model and g(x) is defined for the theoretical model; the formula to calculate the deviation or error percentage of g(x) with respect to f(x) is given as

$$E = \frac{\int_0^{10} |f(x) - g(x)| dx}{\int_0^{10} |f(x)| dx} \times 100$$

The error percentages for the variations are tabulated below.

*Table 3: Scenario 1*

| Initial Temperature/$^\circ$C | E of model with k at t = 1 | E of model with k at t = 3 | E of model with k at t = 6 | E of model with k at t = 9 |
|---|---|---|---|---|
| 40 | 1.177 | 0.7878 | 0.3418 | 0.4247 |
| 60 | 0.2068 | 0.2176 | 0.0927 | 0.06766 |
| 80 | 3.584 | 1.854 | 0.8991 | 1.181 |
| 100 | 33.01 | 11.01 | 7.241 | 8.825 |

*Table 4: Scenario 2*

| Initial Temperature/°C | E of model with k at t = 1 | E of model with k at t = 3 | E of model with k at t = 6 | E of model with k at t = 9 |
|---|---|---|---|---|
| 40 | 0.8311 | 0.349 | 0.196 | 0.2249 |
| 60 | 1.0871 | 0.5672 | 0.2693 | 0.3193 |
| 80 | 3.165 | 1.517 | 0.844 | 1.101 |
| 100 | 27.64 | 9.01 | 5.734 | 6.723 |

## VI. CONCLUSION

The data in Tables 3 and 4 corroborate the initial assumption that changing the values of the cooling constant will yield better results. For each case, apart from the anomaly of Table 3 at 60°C, the error percentage is the lowest when the k is calculated with the corresponding values at time t = 6 minutes. As the difference between the temperature of the water and the temperature of the room increases, the error percentage is higher which means that the law is less accurate at higher temperature differences. Furthermore, between the two thermal settings, Newton's law of cooling was more accurate in modeling the observed data in scenario 2 where heat transfer through all mediums was allowed. For this experiment and study, Newtonian cooling produced the best results in modeling experimental data when thermal convection and radiation were allowed and when the cooling constant k was measured using the temperature at the 6th minute in the sample size of 10 minutes. There can be other variations in this experimental setup to increase precision or study different properties of Newtonian cooling. The experiment can also be conducted over different fluids at different sampling rates to further corroborate the results in this paper. Newton's law of cooling is, to date, one of the extensively used theories to simulate and manufacture products and study natural phenomena, and increasing its reliability and accuracy will greatly benefit upcoming products and research.

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# Agricultural Profitability through Resilience: Smallholder Farmers' Strategies for Coping with Extreme Weather in Guimba, Nueva Ecija

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***Abstract***— *This study investigated the knowledge strategies and coping utilized by smallholder farmers in Guimba, Nueva Ecija to reduce and adjust to the effects of climate change. Smallholder farmers, who are frequently susceptible to climate change, utilize various traditional and innovative methods to strengthen their ability to withstand and recover from these consequences. Based on the results of this study, farmers in Guimba, Nueva Ecija demonstrate a profound comprehension of the adverse weather conditions, such as typhoons, droughts, and excessive rainfall, which they ascribe to climate change. While they have a fundamental understanding of climate change and its effects, their knowledge of scientific intricacies is restricted, indicating a need for information that is particular to the context. Although farmers possess knowledge about climate change, they are not actively engaging in proactive actions to adapt to it. Instead, they rely on reactive coping mechanisms. This highlights the necessity for targeted educational and communicative endeavors to promote the acceptance and implementation of approaches. Furthermore, the absence of available resources poses a significant barrier to achieving successful adaptation, highlighting the importance of pushing for inexpensive and feasible measures for adaptation. Farmers recognize the benefits of agroforestry and have started integrating the growth of fruit trees, particularly mangoes, into their coping techniques.*

***Keywords*— *Climate Change, Knowledge, Practices, Smallholder Farmers, Strategies***

## I. INTRODUCTION

Global agricultural systems face significant challenges due to climate change, with smallholder farmers particularly vulnerable due to limited resources and infrastructure (*Balangkas ng Pamamahala sa Kapaligiran at Panlipunan para sa proyekto ng GCF na "Pag-Aakma ng Agrikultura ng Pilipinas sa Pagbabago ng Klima"*, FAO, Publications, September 2022*)*. Over generations, these farmers have developed extensive knowledge and techniques to cope with changing environmental conditions. This study investigates how smallholder farmers in Guimba, Nueva Ecija, are adapting to climate change through their practices and knowledge. It aims to identify patterns, barriers, and opportunities for enhancing adaptive capacity, exploring both traditional and novel adaptation strategies. The role of collaboration between researchers, policymakers, and farmers in leveraging indigenous and scientific knowledge is also examined *(Empowering Rice Farmers in Nueva Ecija, Philippines: A Strategic Approach to Boosting Income through Special Purpose Rice Production*, Published in Scientific Research an Academic Publisher*)*. This research contributes to the growing body of knowledge on climate change adaptation in agriculture, informing policy and development interventions (ADB, 2019). By examining the knowledge, practices, and attitudes of smallholder farmers in Guimba Nueva on climate change, this study aims to provide an explanation for their current activities. Specifically, it described the following:

1. The impacts of extreme events observed by smallholder farmers in Guimba.
2. Smallholder farmer's coping strategies and adaptation practices to typhoons.
3. Smallholder farmer's coping strategies and adaptation practices to drought.
4. Smallholder farmer's coping strategies and adaptation practices to intense rains.

## II. METHODOLOGY

This study employs a descriptive survey research design to investigate the adaptation strategies and knowledge of smallholder farmers in Guimba, Nueva Ecija, towards climate change (Bhat, 2023). Data collection involved a self-administered survey questionnaire developed based on an extensive literature review and pilot testing.

The research was carried out in Nueva Ecija's Guimba. In the Philippine province of Nueva Ecija, Guimba—officially known as the Municipality of Guimba (Tagalog: Bayan ng Guimba; Ilocano: Ili ti Guimba)—is a first-class municipality. The Guimba Farmers were the study's responders. Respondents to this study came from Lennec, Bacayao, Pacac, Narvacan 1, Narvacan 2, Casongsong, and Galvan Guimba, Nueva Ecija, using stratified random sampling.

Stratified random sampling was used to select respondents from various barangays in Guimba (Iliyasu & Etikan, 2021). The questionnaire focused on farmers' responses to extreme weather events such as typhoons, droughts, and heavy rains, exploring their coping mechanisms and adaptation practices. The study also conducted follow-up surveys to understand motivations and barriers influencing farmers' adaptation behaviours.

## III. RESULTS AND DISCUSSION

The gathered information from the farmers of Guimba focuses on how they react in different climate events that affect their crops and farm income. Since their main source of income is farming, they are heavily affected with different climate phenomena such as typhoon, drought, and heavy rain. Survey is conducted to collect information on how they are affected form different climate events and how they react or what are their coping mechanisms during those times of climate events (Langkulsen, et al., 2022).

Reduced farm income due to damaged crop form typhoon and heavy rains and reduced farm income due to slow growth of crop from dried land caused by drought were the remarkable impact to farmers during their experience from these climate events as identified on Table 2. Damaged crops were the result of the farmers' inability to react on different climate events. They are not able to make preventive actions to avoid or at least reduced the amount of damage to their crop. They are biased to old practices and are not changing their methods. They are not also changing their types of crop that will wind stand on the specific climate event to have alternative source of income from farming related activities still (Mudatsir, 2021).

*Table 1. Top impacts of extreme events observed by smallholder farmers in Guimba*

| TYPHOON | DROUGHT | EXCESSIVE RAIN |
|---|---|---|
| Damage crops that caused the reduction of harvest | Reduce yields due to dry crops which causes growth to be sluggish | Reduce harvest due to crop damage because of excessive rain/flooding |
| Decrease in farm revenue | | |

Due to the reduction of income, farmers tend to find other source of income from not farming related activities. This results to unproductivity of the farm land. Because of the extreme climate events, farmers tend to do nothing and wait for the weather to become better and favorable to the kind of crop they are yielding. This often times leads to little to no income that makes the small farmers to get a loan to support their living while they cannot do anything about their farm. Respondents also perform early harvest of their crop when the extreme climate phenomena hit them to save what is still available to harvest (Hamilton, Henderson & Derocher, 2023).

Table 2 shows that the main coping strategies and adaptation practices against typhoon for smallholder farmers in Guimba, Nueva Ecija are replanting of crop (30%), do nothing and wait for better weather (35%), improve farm practices to avoid erosion (contour farming, installing ripraps, change to typhoon-resistant crops) (40%) and collect water or use water from the rivers (90%).

*Table 2. Smallholder farmer's coping strategies and adaptation practices to typhoons (n=50, multiple answers).*

| | Practice | % |
|---|---|---|
| **Crop yield** | 1. Replanting of crop. Repeat cultivation process | 30% |
| | 2. Do nothing and wait for better weather | 25% |
| | 3. Find alternative sources of income (off-farming, hired labor, livestock) | 10% |
| | 4. Early harvest of the crop | 30% |
| | 5. Improve farm practice: chance to climate resilient crops, installing make ship support for crops | 5% |
| **Farm income** | 1. Find alternative sources of income (off-farming, hired labor, livestock) | 20% |
| | 2. Apply for a loan | 20% |
| | 3. Do nothing and wait for better weather | 35% |
| | 4. Replanting crops after typhoon | 10% |
| | 5. Work on someone else's farm | 10% |
| **Other livelihood/ sources of income** | 1. Do nothing and wait for better weather | 25% |
| | 2. Work on someone else's farm | 35% |
| | 3. Improve farm practices to avoid erosion (contour farming, installing ripraps, change to typhoon-resistant crops | 40% |
| **Water Resources** | 1. Do nothing and wait for better weather | 10% |
| | 2. Collect water or use water from rivers | 90% |

*Table 3. Smallholder farmer's coping strategies and adaptation practices to drought (n=50, multiple answers)*

| | Practice | % |
|---|---|---|
| **Crop yield** | 1. Stop planting and look for another source of income | 10% |
| | 2. Do nothing and wait for rain | 10% |
| | 3. Replanting of crop. Repeat cultivation process | 15% |
| | 4. Improve farm practice: chance to drought resilient crops apply fertilizers/pesticides/weeding | 65% |
| **Farm income** | 1. Look for alternative source of income | 50% |
| | 2. Apply for a loan | 20% |
| | 3. Do nothing and wait for rain | 30% |
| **Other livelihood/ sources of income** | 1. Work on someone else's farm | 90% |
| | 2. Do nothing and wait for better weather | 10% |
| **Water Resources** | 1. Do nothing and wait for rain | 10% |
| | 2. Use/collect from a new source for irrigation and consumption (river, well, machine pumps) | 90% |

Table 3 displays that the coping strategies and adaptation practices against drought for smallholder farmers in Guimba, Nueva Ecija are improve farm practice: chance to drought resilient crops apply fertilizers/pesticides/weeding (65%), look for alternative source of income (50%), work on someone else's farm (90%) and use/collect from a new source for irrigation and consumption (river, well, machine pumps) (90%).

*Table 4. Smallholder farmer's coping strategies and adaptation practices to intense rains.*

| | Practice | % |
|---|---|---|
| **Crop yield** | 1. Replanting of crop. Repeat cultivation process | 30% |
| | 2. Do nothing and wait for better weather | 10% |
| | 3. Look for alternative source of income | 5% |
| | 4. Early harvest of crop | 25% |
| | 5. Build canals and embankments, control the water supply | 30% |
| **Farm income** | 1. Do nothing just wait for a good weather | 25% |
| | 2. Plant again | 20% |
| | 3. Apply for a loan | 55% |
| **Other livelihood/ sources of income** | 1. Work on someone else's farm | 90% |
| | 2. Do nothing just wait for a good weather | 10% |
| **Water Resources** | 1. Do nothing just wait for a good weather | 30% |
| | 2. Irrigation management (close/regulate irrigation; clean the irrigation system) | 40% |
| | 3. Collect water from the rain | 30% |

The impact of the lack of knowledge to cope up with extreme climate events make the farmer to improvise or perform what they knew is best thing to do like working in other farm, collecting excess water from typhoon and even just replanting and repeating the cultivation process when their crop is being damaged (Prabhakar, et al., 2019).

## IV. CONCLUSION AND RECOMMENDATIONS

Based on the study, farmers are often affected by different weather and the effects of weather phenomena such as typhoons, droughts, and heavy rain hit their farm output or their income from their crop. These types of weather phenomena cause a reduction in their crop yield and farm income. The common reason is that they need to be equipped with knowledge on how to deal with this weather when it comes to managing their crop during those climate events. Another reason is their bias toward old practices. Some of them need to be open to doing new things that might help them on their farm. They are mostly old-fashioned and keep doing what they are used to doing and often resort to doing nothing and waiting for good weather. As a result, ultimately their farm income suffers and they tend to look for other sources of income outside farming.

Farmers in Guimba, some of them. Already trying to plant some fruit-bearing trees on the side of their farms as a response to the changing weather. Although this helps but on a small amount only because they do not do it as their main source of income when their main crop is not available due to weather. The local government must conduct awareness and create program of actions and development (Subia, 2020) on how to deal with different weather and help the farmers be ready during those events. Also, other alternatives must be introduced to the farmers to be able to have continuous farm income all year round

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# Key Performance Indicators and Success Factors of Travel Agencies in Cabanatuan City Nueva Ecija— A Basis for Enhancing Operational Efficiency

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***Abstract***— *This study evaluates the key performance indicators (KPIs) and success factors of travel agencies in Cabanatuan City, based on insights from ten travel agencies, with respondents including owners, managers, or supervisors. Data was collected through questionnaires and analyzed using descriptive methods, frequency distribution, and weighted mean. The results, measured on a 4-point Likert scale, highlight significant differences when analyzed by the travel agencies' profiles. The study aims to address the following questions: (1) the profile of respondents regarding years in position, educational background, years in operation, starting capital, average monthly income, types of ownership, and legal requirements; (2) the key performance indicators and success factors of travel agencies concerning business operations, financial aspects, marketing, technology, and sustainability; and (3) the identification of factors consistently contributing to the success of travel agencies, including product, financial & economic support, service quality, planning & policy, facility & transportation, marketing, and human resources & security. The findings show that all these factors were rated "strongly agree" based on their highest mean scores.*

***Keywords***— ***KPIs, Success Factors, Travel Agency, Operational Efficiency***

## I. INTRODUCTION

A travel agency is a company or organization that offers a variety of travel-related services to clients, such as booking flights, accommodations, transportation, tours, and other activities. They may also provide travel insurance, visa assistance, and other related services. The primary goal of a travel agency is to simplify and facilitate travel planning and booking for their clients. With access to exclusive deals, packages, and insider knowledge about destinations, travel agencies are valuable resources for travelers. They can operate online, through a physical storefront, or a combination of both, and some may specialize in specific types of travel, such as luxury, adventure, or group travel (Rashid, 2023).

Travel agencies gather information about potential customers' trips, including departure and arrival dates, planned destination, flight times, type of accommodation, and whether the travel class is economy or business, as well as the number of passengers if traveling with a group (Ling et al., 2014).

According to Vochozka, Rowland, and Vrbka (2016), it is impossible to determine business performance growth with a single performance indicator. This study, therefore, aims to identify multiple KPIs that travel agencies use as indicators of success. Authors Kozena and Jelinkova (2014) support this by emphasizing that selecting the right performance measurement methods, considering company specifics, can quickly highlight key issues and shortcomings that need to be addressed for a business to reach its full potential. Tailoring performance measurement methods to the unique characteristics of travel agencies allows for timely identification of critical issues and deficiencies.

In the ever-evolving travel landscape, operational efficiency of travel agencies is crucial. Key performance indicators, such as booking volumes, customer satisfaction, and revenue generation, are essential in assessing their operational effectiveness. Travel agencies also play a vital role in facilitating visitor arrivals through effective booking systems and creating diverse and appealing travel packages, thereby enhancing KPIs like customer satisfaction by providing exceptional experiences for tourists.

The Department of Trade and Industry (DTI) acts as the primary coordinative, promotive, facilitative, and regulatory arm of the government for the country's trade, industry, and investment activities. The DTI aims to create a business environment that reduces the cost of doing business, facilitating trade and investments, enhancing global competitiveness, empowering consumers, and ensuring safety measures to protect the environment by providing excellent and safe products at reduced costs.

Cabanatuan City in Nueva Ecija, Philippines, is renowned for its natural beauty, cultural heritage, and economic potential. Tourism significantly impacts the city's economic vitality and shapes the trajectory of travel agencies in the area. Through revenue generation and strategic partnerships, travel agencies contribute to Cabanatuan City's economic vibrancy, with their impact measured through financial KPIs.

This study aims to provide a comprehensive understanding of the essential KPIs and success factors in the operational streamlining, financial management, marketing, and overall efficiency improvement of travel agencies. Given the increasing interest in travel and tourism, organizations must align their strategies with Cabanatuan City's unique characteristics. This study seeks to identify the specific factors that contribute to the success of travel agencies in Cabanatuan City, which is crucial for optimizing operations, improving service delivery, and fostering sustainable growth in the sector.

This exploration goes beyond academic research; it is a practical effort to enhance the operational efficiency of travel agencies in Cabanatuan City. By thoroughly examining key operational aspects, this study aims to provide a detailed analysis of KPIs and success factors across business operations, financial management, marketing strategies, technological integration, and sustainability practices. The research intends to offer practical recommendations and strategic guidelines to empower travel agencies in Cabanatuan City to thrive in an increasingly competitive market landscape.

## II. CONCEPTUAL FRAMEWORK

Figure 1 shows the conceptual framework of the study. The researcher aims to discover the Key Performance Indicators and Success Factors of Travel Agencies in Cabanatuan City Nueva Ecija—a basis for Enhancing Operational Efficiency during 2024.

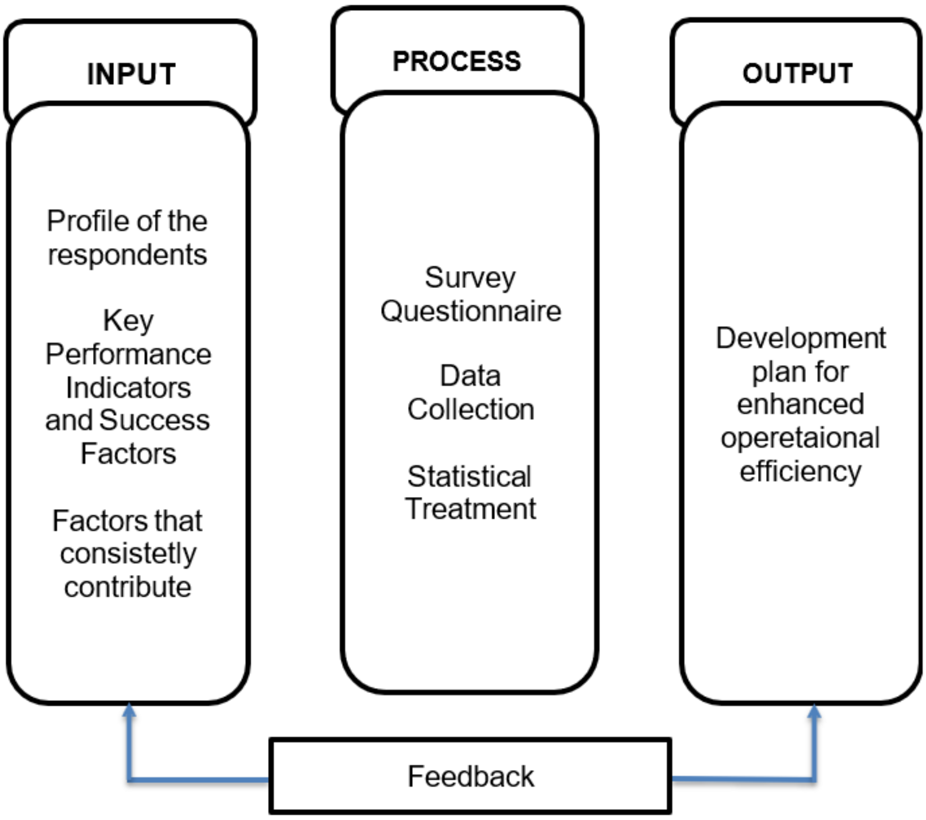


*Fig.1. Research Paradigm*

Figure 1 illustrates the research paradigm showing the systematic processing of inputs to produce desired outputs. The inputs comprise respondent profiles (e.g., years in services, educational attainment, years in operation, capitalization, average monthly income, ownership structure, and legal requirements), the Key Performance Indicators (KPIs) and success factors related to business operations, marketing strategies, planning and policy, financial support, and human resource management and the factors that consistently contribute to the success of travel agencies related to product, financial & economic support, service quality, planning & policy, facility & transportation, marketing, and human resources and security. Data collection will involve a Survey Questionnaire and Rating Scale to gather information on these inputs. The subsequent processing and analysis of data will employ statistical treatments, including Weighted Mean, Frequency Analysis, and Likert Scale assessments.

The output, however, shows what the researcher's goal is: to create a travel agency development plan for enhanced operational efficiency.

**Statement of the Problem**

This research determines the key performance indicators and success factors of travel agencies in Cabanatuan City, Nueva Ecija.

Specifically, this study seeks to answer the following questions:

1. How may the profile of the respondents and travel agency business be described in terms of:
    - 1.1 Years in Service;
    - 1.2 Educational Attainment;
    - 1.3 Number of Years in Operation;
    - 1.4 Capitalization;
    - 1.5 Average Monthly Income;
    - 1.6 Form of Ownership;
    - 1.7 Legal Requirement?
2. How may the key performance indicators and success of travel agencies be described in terms of:
    - 2.1 Business Operation;
    - 2.2 Financial;
    - 2.3 Marketing;
    - 2.4 Technology;
    - 2.5 Sustainability?
3. What are the identified factors that consistently contribute to the success of travel agencies in Cabanatuan City in terms of:
    - 3.1 Product;
    - 3.2 Financial & Economic Support;
    - 3.3 Service Quality;
    - 3.4 Planning & Policy;
    - 3.5 Facility & Transportation;
    - 3.6 Marketing;
    - 3.7 Human Resources & Security?
4. Proposed Business Development Plan to enhance the operational efficiency of a travel agency.

## III. RESEARCH METHODOLOGY

This chapter outlines the methods and procedures used in the research, covering the Research Design, Locale of the Study, Sample and Sampling Procedure, Respondents, Research Instrument, Data Gathering Procedure, Data Analysis Technique, and Ethical Considerations.

The study employs a descriptive research design to analyze the performance metrics of travel agencies in Cabanatuan City. Data was gathered via survey questionnaires from managers, owners, and supervisors. This design is used to identify key performance indicators (KPIs) and success factors, providing empirical evidence for improving operational efficiency. The study was conducted among selected travel agencies in Cabanatuan City, focusing on enhancing operational efficiency within this geographical area. Cabanatuan City, a hub of natural beauty, cultural heritage, and economic potential, supports a dynamic travel agency network.

The respondents consisted of ten individuals, including owners, managers, and supervisors from the city's travel agencies. Despite there being 29 registered agencies, a smaller sample size was chosen to gain in-depth insights. This purposive sampling ensured the selection of participants with the most relevant knowledge and experience. The survey questionnaire covered two parts: the profile of respondents and the key performance indicators and success factors of travel agencies. A four-point Likert scale was used to gauge responses.

The data collection process involved designing and validating the survey questionnaire, distributing it to respondents, and performing statistical treatments using frequency distribution and weighted mean. The data analysis utilized frequency, percentage, and Likert scale statistical tools to interpret the demographic profiles and perceptions of the respondents.

Ethical considerations included obtaining informed consent, ensuring confidentiality, fair representation, transparent reporting, and considering potential harms and community interests. These measures were implemented to maintain the integrity and credibility of the research, ensuring it benefits the participating travel agencies and contributes positively to the economic and social fabric of Cabanatuan City.

## IV. RESULTS AND DISCUSSION

### 1. The Profile of Respondents and Travel Agencies Business

The tables below describe the demographic profile of respondents using the parameters of years in service, educational attainment, years in operation, capitalization, average monthly income, form of ownership, and legal requirements of the selected travel agencies.

#### 1.1 Years in Service

| Year in Service | Frequency n=10 | Percentage % |
|---|---|---|
| 1 year and below | 1 | 10% |
| 2 years – 3 years | 1 | 10% |
| 6 years and above | 8 | 80% |
| **TOTAL** | **10** | **100%** |

Table 1.1 shows the frequency distribution of the respondents according to their years in service. The table shows that 80% or eight (8) respondents are six years or above. Additionally, the one-year and below and two years—three years each result in 10% or one (1) respondents. There are no respondents with four to five years of service, suggesting a gap in mid- term experience within the group.

The distribution shows that many travel agencies surveyed had experienced members, which may point to a steady workforce with significant knowledge and abilities. Such seasoned workers may favor customer satisfaction and service quality, particularly when combined with successful training and development programs meant to improve worker performance and skills. This highlights how crucial it is to provide ongoing training and assistance to preserve and enhance service quality in the travel sector.

#### 1.2 Educational Attainment

| Educational Attainment | Frequency n=10 | Percentage % |
|---|---|---|
| College Graduate | 8 | 80% |
| College Undergraduate | 2 | 20% |
| **TOTAL** | **10** | **100%** |

Table 1.2 presents the educational attainment of the respondents. It reveals that a majority of the respondents, 80% or eight individuals, are college graduates. In contrast, 20% or two individuals, are college undergraduates. This distribution indicates that most of the respondents possess a higher education level, which could positively influence the operational efficiency and management practices within the travel agencies. The high percentage of college graduates suggests that the travel agencies in Cabanatuan City benefit from a well-educated workforce, likely contributing to better decision-making, strategic planning, and overall business performance.

#### 1.3 Years in Operation

| Years in Operation | Frequency n=10 | Percentage % |
|---|---|---|
| 1 year and below | 1 | 10% |
| 4 years – 5 years | 1 | 10% |
| 6 years and above | 8 | 80% |
| **TOTAL** | **10** | **100%** |

Table 1.3 displays the frequency distribution of selected travel agencies in Cabanatuan City based on their years in operation. The years in operation are categorized into ranges as indicated in the table, established by researchers using available data. The table reveals that 80%, or eight (8) respondents, have been operating for six years and above, while 10%, or one (1) respondent, have been in business for 4-5 years, and another 10%, or one (1) respondent, have been operational for one year or less. At the same time, there are no respondents with two to three years of operation.

The high number of travel agencies with six or more years of operation suggests that these establishments possess extensive expertise and knowledge of destinations, travel trends, and customer preferences. They likely have established robust relationships with suppliers and built a reputation for delivering excellent service, contributing to customer trust and satisfaction. Furthermore, longevity signifies stability and adaptability, indicating that agencies capable of navigating industry changes and economic fluctuations are more likely to provide consistent and reliable service. While the duration of the operation is just one factor to consider when choosing a travel agency, it offers valuable insights into the agency's track record and ability to meet travelers' needs effectively.

The result supports the study by Dhliwayo (2021), which found that the operating periods were less than five years, 6-10 years, and 11-20 years. Results show that different dimensions of growth are prevalent in small businesses and differ according to the period a company has been operating. The longer the period of operating, the higher the chances of the business experiencing qualitative growth, which enhances the survival endeavors of the enterprise. Although several studies have examined firm growth, the focus has been more on the measures of development rather than "the aspect that is growing.

**1.4 Capitalization**

| Capitalization | Frequency n=10 | Percentage % |
|---|---|---|
| ₱ 400,000.00 – ₱ 500,000.00 | 7 | 70% |
| ₱ 600,000.000 – ₱ 700,000.00 | 1 | 10% |
| ₱ 1,000,000 – above | 2 | 20% |
| **TOTAL** | **10** | **100%** |

Table 1.4 shows the frequency distribution of selected travel agencies in Cabanatuan City based on capitalization. The researchers grouped the capital into specified ranges based on the available data. The table indicates that 70%, or seven (7) respondents, had a starting capital of ₱400,000 to ₱500,000. Meanwhile, 20%, or two (2) respondents, invested ₱1,000,000 and above, and 10%, or one (1) respondent, spent ₱600,000 to ₱700,000 to establish their travel agency. Notably, there are no respondents in the ₱800,000 to ₱900,000 range.

Securing funding for a travel agency requires careful planning and thought. Entrepreneurs need to assess different funding choices and choose the ones that align best with their business objectives. It is essential to create a strong business plan that outlines the travel agency's unique value, offerings, and potential for growth. This attracts potential investors and lenders who can provide the required capital.

The data suggests that most travel agencies in Cabanatuan City operate with a relatively modest initial capital investment, specifically within the ₱400,000 to ₱500,000 range. This indicates that these agencies may rely on efficient budget management and cost-effective strategies to establish and sustain their operations. The presence of agencies with capital investments of ₱1,000,000 and above suggests that some businesses are willing and able to make more substantial investments, potentially aiming for a higher market share and offering more comprehensive services.

According to Templonuevo (2024), starting a travel agency franchise in the Philippines involves expenses depending on factors in your business plan, like location, business size, office setup, staffing, and marketing efforts. Initial costs usually fall between ₱500,000 to ₱1,000,000 or more. Remember to budget for licenses, permits, office space, tech needs, and staff training to make this ballpark figure more accurate.

These findings highlight the importance of strategic financial planning for travel agencies. Entrepreneurs must carefully consider their funding options, ensuring they secure adequate capital to support their business objectives and growth plans. A well-crafted business plan, emphasizing the agency's unique value proposition and growth potential, can be instrumental in attracting investors and securing necessary funding.

**1.5 Average Monthly Income**

| Average Monthly Income | Frequency n=10 | Percentage % |
|---|---|---|
| ₱ 500,000 – ₱ 600,000 | 7 | 70% |
| ₱ 900,000 – ₱ 1,000,000 | 1 | 10% |
| ₱ 2,000,000 – above | 2 | 20% |
| **TOTAL** | **10** | **100%** |

Table 1.5 shows the frequency distribution of monthly income among the selected travel agencies in Cabanatuan City. The incomes were grouped into ranges indicated in the table, as deemed appropriate by the researchers based on the available data. The table reveals that 70%, or seven (7) respondents, reported an average monthly income ranging from ₱500,000 to ₱600,000. Meanwhile, 20%, or two (2) respondents, had an income of ₱2,000,000 and above, and 10%, or one (1) respondent, earned between ₱900,000 to ₱1,000,000. Notably, there are no respondents with an average monthly income in the ₱700,000 to ₱800,000 range, indicating a gap at this income level.

The majority of travel agencies fall within the ₱500,000 to ₱600,000 monthly income range, reflecting a stable yet modest earning bracket for most agencies. This range suggests that many agencies likely focus on cost-effective operations and mid-range travel packages to maintain a steady income stream. However, the presence of a smaller segment (20%) with significantly higher incomes exceeding ₱2,000,000 indicates that some agencies have managed to achieve substantial financial success.

Several factors can contribute to such high earnings, as identified by Morrison (2015). These include capitalizing on peak travel seasons, generating increased bookings through effective marketing, and catering to strong customer demand for travel experiences. Agencies that offer popular destinations, unique travel packages, or special promotions can significantly boost their income during specific periods.

Further research could explore the specific strategies employed by high-income agencies to gain a deeper understanding of successful revenue generation in the travel agency industry. Understanding the practices and business models that drive such high earnings could provide valuable insights for other agencies aiming to enhance their financial performance. This could involve examining their marketing strategies, customer service approaches, and the range of services and packages they offer. Such insights would be instrumental in helping other travel agencies develop and implement effective strategies to increase their monthly incomes and overall operational efficiency.

### 1.6 Form of Ownership

| Form of Ownership | Frequency n=10 | Percentage % |
|---|---|---|
| Sole proprietorship | 6 | 60% |
| Partnership | 1 | 10% |
| Corporation | 3 | 30% |
| **TOTAL** | **10** | **100%** |

Table 1.6 shows the frequency distribution of selected travel agencies in Cabanatuan City according to their form of ownership. The data reveals that 60%, or six (6) respondents, operate as sole proprietorships, 30%, or three (3) respondents, are corporations, and 10%, or one (1) respondent, are partnerships. This indicates that the majority of travel agencies in Cabanatuan City are sole proprietorships, where individuals own the businesses without the need for partners.

The preference for sole proprietorships aligns with findings from the American Speech-Language-Hearing Association (ASHA), which notes that many business owners favor sole proprietorships due to their simplicity and ease of management. Sole proprietorships are the most common type of business in the United States because they are the simplest and least expensive to establish.

Moreover, sole proprietorships are often the preferred choice for entrepreneurial firms because they allow for quick decision-making and involve lower monitoring costs among investors (Baik et al., 2015). Lorenciana (2015) also noted a rise in sole proprietorships in Cebu, according to the Department of Trade and Industry Cebu, reflecting a similar trend.

The predominance of sole proprietorships among travel agencies in Cabanatuan City suggests a preference for streamlined operations and straightforward business management, enabling owners to make rapid decisions and maintain control over their enterprises. This business structure may be particularly advantageous for small to medium-sized travel agencies looking to minimize administrative complexities and operational costs.

### 1.7 Legal Requirements

| Legal Requirements | Frequency n=10 | Percentage % |
|---|---|---|
| **Department of Tourism (DOT)** | | |
| Accreditation | 9 | 90% |
| Business Registration | 8 | 80% |
| Insurance | 3 | 30% |
| Documentation and Record-Keeping | 4 | 40% |
| **Department of Trade and Industry (DTI)** | | |
| Business Name Registration | 8 | 80% |
| Business Permits and Licenses | 7 | 70% |
| Compliance with Consumer Protection Laws | 4 | 40% |
| **Securities and Exchange Commission (SEC)** | | |
| Incorporation or Registration For corporation or partnership | 3 | 30% |
| Articles of Incorporation or Partnership | 2 | 20% |
| By-Laws | 2 | 20% |
| **International Air Transport Association (IATA) & Bureau of Internal Revenue (BIR) Registration** | | |
| Registration with the BIR (TIN) | 8 | 80% |
| Business Permits and Licenses | 8 | 80% |
| Books of Accounts and Records | 6 | 60% |
| Issuance of Official Receipts/Invoices | 5 | 50% |
| **Business Permit** | | |

| | | |
|---|---|---|
| Mayor's Permit or Business Permit | 10 | 10% |
| Barangay Clearance | 9 | 90% |
| Zoning Clearance | 5 | 50% |
| Fire Safety Inspection Certificate: | 10 | 100% |
| Sanitary Permit | 5 | 50% |
| Professional License (if applicable) | 3 | 30% |

*** *multiple answers*

Table 1.7 provides valuable insights into the legal requirements for the selected travel agencies in this study. The data indicates that DOT (Department of Tourism) accreditation appears to be the most prevalent requirement, with a high adoption rate of 90% among the surveyed agencies. This highlights the importance of agencies securing DOT approval to operate legally. Business registration and permits are also crucial, as evidenced by the high compliance rates with DTI (Department of Trade and Industry) and BIR (Bureau of Internal Revenue) registration (80%). Only 30% of the agencies reported SEC (Securities and Exchange Commission) incorporation, which aligns with findings from Jones et al. (2021), suggesting this may be less common for smaller travel agencies. Compliance with IATA (International Air Transport Association) membership and record-keeping (60%) appears less widespread but still relevant for a portion of the agencies. Finally, local business permits seem mandatory, with 100% of agencies possessing mayor's permits and fire safety certificates. These findings underscore the need for travel agencies to navigate a complex web of regulations to ensure legal compliance. Further research could explore the specific challenges faced by agencies, particularly regarding less commonly adopted requirements like SEC incorporation.

Jones et al.'s study (2021) investigates the relationship between regulatory compliance and small businesses' performance. They likely employed a meta-analysis approach, which involves statistically combining data from multiple research studies on the topic. This suggests that adhering to regulations can benefit small businesses by fostering trust with customers, ensuring operational efficiency, and reducing legal risks.

**2. The key performance indicators and success of travel agencies.**

2.1 **Business Operation**

| Indicators | Mean | Verbal Description |
|---|---|---|
| 1. The agency uses the Global Distribution System (GDS) to efficiently assist clients with itinerary changes, cancellations, and other travel-related inquiries. | 3.70 | Strongly Agree |
| 2. The agency directly resolved the customer complaints, concerns, or inquiries. | 3.60 | Strongly Agree |
| 3. The agency actively seeks out technological advancements and adopts relevant tools to enhance operational efficiency. | 3.80 | Strongly Agree |
| 4. The agency regularly communicates with suppliers (e.g., via email, online portals, and social media platforms) to ensure we can offer up-to-date information about destinations and services. | 4.00 | Strongly Agree |
| 5. Employees are provided with enough training and seminars. | 3.70 | Strongly Agree |
| **Weighted Mean** | **3.76** | Strongly Agree |

*Legend: 3.26 – 4.00 Strongly Agree; 2.51 – 3.25 Agree; 1.76– 2.50 Disagree; 1.00 – 1.75 Strongly Disagree*

Table 2.1 shows that respondents strongly agree that key performance indicators and success in travel agencies can be described in terms of business operations. The survey results indicate that all business operation factors received a "Strongly Agree" rating, as reflected by the weighted mean scores. The highest mean score of 4.00 highlights the agencies' active pursuit of technological advancements to enhance operational efficiency. Additionally, the agencies effectively use the Global Distribution System (GDS) to manage itinerary changes and provide travel-related assistance, with a mean of 3.80. Training and seminars for employees received a mean score of 3.70, while customer complaints and inquiries were directly resolved, with the lowest mean of 3.60.

Technological advancements significantly impact travel agencies, offering benefits such as increased communication and efficiency through GDS systems like Amadeus, Galileo, Sabre, and Worldspan, as noted by

Budiasa et al. (2018). The adoption of digital media and online travel agencies (OTAs) like booking.com and Trivago has further enhanced the immediacy and accessibility of travel information (Nuenen et al., 2021). Schegg & Havila (2015) also emphasize the role of IT in streamlining tasks and improving processes within travel agencies. Overall, technology is a crucial factor in the success and efficiency of travel agencies, as supported by various studies.

**2.2 Financial**

| Indicators | Mean | Verbal Description |
|---|---|---|
| 1. The agency implements cost- saving measures without compromising the quality of services provided. | 3.70 | Strongly Agree |
| 2. The cost fluctuations are closely monitored, and appropriate actions are taken to lessen any negative impacts on financial performance. | 3.60 | Strongly Agree |
| 3. The agency regularly reviews and renegotiates contracts with suppliers to secure favorable terms and pricing. | 3.70 | Strongly Agree |
| 4. The agency effectively manages cash flow to ensure liquidity and financial stability. | 3.60 | Strongly Agree |
| 5.The agency develops comprehensive financial plans and budgets to guide decision-making and resource allocation. | 3.70 | Strongly Agree |
| **Weighted Mean** | **3.66** | Strongly Agree |

Table 2.2 indicates that all respondents strongly agree that key performance indicators and success factors related to financial aspects are crucial for travel agencies. The survey results show that all financial factors received a "Strongly Agree" rating, as reflected by their weighted mean scores. The agency's implementation of cost-saving measures without compromising service quality, regular review and renegotiation of supplier contracts for favorable terms and pricing, and development of comprehensive financial plans and budgets to guide decision-making and resource allocation all received a mean score of 3.70 (Strongly Agree). Furthermore, the monitoring of cost fluctuations and proactive actions to mitigate negative financial impacts received a mean score of 3.60 (Strongly Agree).

Managing the finances of a travel agency is essential and challenging, as highlighted by Dajani (2023). Effective financial management involves balancing expenses with revenue generation, controlling overhead costs, optimizing marketing efforts, and diversifying revenue streams to ensure profitability while delivering valuable client services. Li et al. (2019) also emphasize the importance of cost control strategies in maintaining profitability within the competitive travel agency industry. These strategies underscore the critical role of financial acumen in sustaining operational success and stability in travel agencies.

**2.3 Marketing**

| Indicators | Mean | Verbal Description |
|---|---|---|
| 1. The promotional offers and discounts align with long-term business goals rather than short-term gains. | 3.30 | Strongly Agree |
| 2. Digital marketing strategies (e.g., social media, email campaigns) significantly contribute to the visibility of the travel agency. | 3.40 | Strongly Agree |
| 3. Traditional marketing methods (e.g., print ads, flyers) effectively promote the travel agency. | 3.10 | Agree |
| 4. The agency uses customer loyalty strategies to encourage repeat bookings and build customer trust. | 3.80 | Strongly Agree |
| 5. The customer feedback and satisfaction surveys of the agency help identify areas for improvement and strengthen relationships with existing customers. | 3.50 | Strongly Agree |
| **Weighted Mean** | **3.42** | Strongly Agree |

*Legend: 3.26 – 4.00 Strongly Agree; 2.51 – 3.25 Agree; 1.76– 2.50 Disagree; 1.00 – 1.75 Strongly Disagree*

Table 2.3 shows that all respondents agree on the key performance indicators and success factors in marketing. This table indicates that all business marketing factors have verbal interpretation "Strongly Agree" and one "Agree" as shown by the weighted mean. The agencies use customer loyalty strategies to encourage repeat bookings and build customer trust, having the highest mean of 3.80 (Strongly Agree). The agencies also use customer feedback and satisfaction surveys to help identify areas for improvement and strengthen relationships with existing customers, with a mean of 3.50 (Strongly Agree). Digital marketing strategies (e.g., social media and email campaigns) also significantly contribute to the visibility of travel agencies, with a mean of 3.40 (Strongly Agree). The promotions that the agencies have offers and discounts align with long-term business goals rather than short-term gains, with a mean of 3.30 (Strongly Agree). Traditional marketing methods (e.g., print ads, flyers) effectively promote the travel agencies, having the lowest mean of 3.10 (Agree).

Relationship quality is crucial to enhancing a tourist's loyalty. Little empirical research has been conducted to link service quality, perceived value, and relationship quality to customer loyalty in the travel agency sector. This study investigates the role of service quality, perceived value, and relationship quality on customer loyalty among tourists. Relationship quality consists of three components: customer satisfaction, customer trust, and customer commitment. Structural equation modelling is used to test the linkages between the six variables that have been identified. Findings reveal that service quality and perceived value of a travel package are antecedent factors to the relationship quality with a travel agency; three relationship quality components significantly influence a customer's loyalty to a travel agency (Lai, 2014),

In this study, Bunghez (2020) analyzed how travel agencies utilize sales promotion techniques. They found that grouped sales, early booking, and last- minute techniques are essential practices in the respondents' perceptions, that associating accommodation with eating services is a very important aspect for the consumer, that including recreation services is preferred but not demanded, and that including transportation services represents additional motivation in the purchasing decision.

### 2.4 Technology

| **Indicators** | **Mean** | **Verbal Description** |
|---|---|---|
| 1. The effect of the GDS on travel agency booking processes is accuracy and speed. | 3.50 | Strongly Agree |
| 2. The agency offers a user-friendly online booking platform for customers to easily browse and book travel services. | 3.20 | Agree |
| 3. The online booking system has inventory management to ensure accurate availability and pricing information. | 3.30 | Strongly Agree |
| 4. The online booking system provides convenient access to booking history and itinerary details for customers. | 3.40 | Strongly Agree |
| 5. The travel agency collects and analyzes data from various sources (e.g., website traffic, booking trends) to gain insights into customer behavior and market trends. | 3.50 | Strongly Agree |
| **Weighted Mean** | **3.38** | Strongly Agree |

*Legend: 3.26 – 4.00 Strongly Agree; 2.51 – 3.25 Agree; 1.76– 2.50 Disagree; 1.00 – 1.75 Strongly Disagree*

Table 2.4 illustrates that all respondents agree on the significance of technology as a key performance indicator and success factor for travel agencies. According to the study, all technology-related factors received a "Strongly Agree" verbal interpretation, with one factor categorized as "Agree" based on their weighted mean scores. The Global Distribution System (GDS) significantly impacts travel agencies' booking processes by ensuring accuracy and speed, as indicated by a mean score of 3.50 (Strongly Agree). Travel agencies also utilize data analytics to gather insights from sources like website traffic and booking trends, highlighting customer behavior and market dynamics with a mean score of 3.40 (Strongly Agree). Moreover, the online booking system provides convenient access to booking history and itinerary details, maintaining inventory management for accurate availability and pricing information with a mean score of 3.30 (Strongly Agree). Lastly, agencies offer a user-friendly online booking platform for customers, facilitating easy browsing and booking of travel services, supported by a mean score of 3.20 (Agree).

Emmanuel et al. (2018) underscore the pivotal role of Global Distribution Systems (GDS) such as Amadeus and Galileo in the development of travel agencies. These systems enhance reservation processes, expand staff knowledge in reservation and hotel bookings, and foster overall agency growth by facilitating efficient information exchange within global tourism networks. La Siesta (2023) emphasizes the convenience and accessibility offered by online travel agencies, enabling travelers to plan and book trips anytime and anywhere. This accessibility has revolutionized the travel booking experience, shifting preferences towards digital platforms over traditional brick-and-mortar agencies.

These insights highlight how technological advancements, particularly through GDS and online booking systems, are integral to enhancing operational efficiency and customer satisfaction in the competitive travel industry.

### 2.5 Sustainability

| **Indicators** | **Mean** | **Verbal Description** |
|---|---|---|
| 1. The agency actively promotes environmentally friendly practices, such as reducing carbon emissions and waste generation (e.g., paperless transactions, public transportation, carpooling). | 3.40 | Strongly Agree |
| 2. The agency collaborates with local communities and stakeholders to support conservation efforts and sustainable tourism initiatives. | 3.20 | Agree |
| 3. The agency supports social responsibility initiatives that benefit local communities and contribute to their well-being. | 3.20 | Agree |
| 4. The agency strives to maximize the economic benefits of tourism for local communities by promoting responsible travel practices. | 3.50 | Strongly Agree |
| 5. Economic indicators, such as job creation and income generation, reflect the positive contribution of the agency to local development. | 3.40 | Strongly Agree |
| **Weighted Mean** | **3.34** | Strongly Agree |

*Legend: 3.26 – 4.00 Strongly Agree; 2.51 – 3.25 Agree; 1.76– 2.50 Disagree; 1.00 – 1.75 Strongly Disagree*

Table 2.5 underscores the unanimous agreement among respondents regarding sustainability as a critical key performance indicator and success factor for travel agencies. All sustainability-related factors received a "Strongly Agree" verbal interpretation, with two factors categorized as "Agree" based on their weighted mean scores. The table illustrates that agencies are committed to maximizing the economic benefits of tourism for local communities through responsible travel practices, achieving the highest mean score of 3.50 (Strongly Agree). This commitment includes promoting environmentally friendly practices such as reducing carbon emissions and waste generation (e.g., paperless transactions, public transportation, carpooling). Economic indicators such as job creation and income generation also reflect the positive contribution of agencies to local development, with a mean score of 3.40 (Strongly Agree). Furthermore, agencies collaborate with local communities and stakeholders to support conservation efforts, sustainable tourism initiatives, and social responsibility initiatives that enhance local well-being, receiving a mean score of 3.20 (Agree).

Booyens et al. (2016) emphasize that responsible tourism integrates economic, environmental, and social dimensions, highlighting the innovation of tourism entities in adopting ecological and socially responsible practices. Their study proposes a framework for fostering tourism innovation based on sustainability, advocating for local policy initiatives to strengthen responsible business practices in tourism for broader environmental and social impacts.

Lee et al. (2017) stress the importance of communication policies to raise awareness among tourism agents and tourists about the impacts of their behaviors, advocating for mitigation strategies to reduce negative environmental, economic, socio-economic, and cultural consequences of tourism activities. Del Chiappa et al. (2017) argue for the necessity of ethical actions and increased awareness among tourists and tourism agents to promote responsible tourism practices.

Recent research by Pérez et al. (2024) highlights the growing significance of sustainable practices in protected areas, underscoring the evolving expectations of tourists for sustainable travel options. Font et al. (2020) further support this trend, noting increasing pressure on travel agencies to adapt their practices in response to rising consumer demand for sustainability.

Together, these findings underscore the pivotal role of sustainability in shaping the strategic direction of travel agencies, emphasizing environmental stewardship, community engagement, and long-term economic viability as core components of their operational success.

**3. The identified factors that consistently contribute to the success of travel agencies.**

**3.1 Product**

| Indicators | Mean | Verbal Description |
|---|---|---|
| 1. The variety of travel products offered by our agency meets diverse customer needs. | 3.60 | Strongly Agree |
| 2. Maintaining high service quality is a consistent contributor to the success of our travel agency. | 3.70 | Strongly Agree |
| 3. Evaluates the competitiveness of the travel agency's pricing strategy in relation to similar services offered by competitors in Cabanatuan City. | 3.40 | Strongly Agree |
| 4. Assesses the variety and diversity of travel products and services offered by the agency, including tour packages, transportation options, accommodation choices, and other travel-related services. | 3.60 | Strongly Agree |
| 5. The agency offered the relevance of travel packages to the target market. | 3.70 | Strongly Agree |
| Weighted Mean | 3.60 | Strongly Agree |

*Legend: 3.26 – 4.00 Strongly Agree; 2.51 – 3.25 Agree; 1.76– 2.50 Disagree; 1.00 – 1.75 Strongly Disagree*

Table 3.1 underscores the unanimous agreement among respondents regarding product-related factors as crucial contributors to the success of travel agencies. All factors related to the product received a "Strongly Agree" verbal interpretation, as indicated by the weighted mean scores. The table highlights that maintaining consistently high service quality is paramount to the success of travel agencies, with a mean score of 3.70 (Strongly Agree). Additionally, offering relevant travel packages tailored to the target market garnered a mean score of 3.70 (Strongly Agree), emphasizing the importance of aligning offerings with customer preferences.

The diversity and variety of travel products and services provided by agencies, including tour packages, transportation options, accommodation choices, and other related services, received a mean score of 3.60 (Strongly Agree). This indicates the agencies' capability to meet diverse customer needs effectively, enhancing their competitive edge in the market.

Furthermore, evaluating the competitiveness of pricing strategies relative to competitors in Cabanatuan City also received strong affirmation, with a mean score of 3.40 (Strongly Agree). This underscores the importance of strategic pricing in attracting and retaining customers in a competitive market environment.

Ahmad et al. (2014) emphasize the critical dimensions of service quality in the hospitality industry, stressing responsiveness and the ability to address customer needs promptly as essential factors in enhancing customer satisfaction and loyalty. Anwar & Qadir (2017) further elaborate on the importance of responsiveness in service delivery, highlighting its role in customer retention and satisfaction.

Toivonen (2015) underscores the significance of customer experience and satisfaction in determining the longevity and success of businesses, emphasizing the need for agencies to understand and meet customer expectations effectively to foster loyalty and repeat business. Morrison (2019) reinforces these principles by advocating for a robust product portfolio that resonates with diverse customer needs, thereby enhancing overall customer satisfaction and agency success.

Together, these insights underscore the pivotal role of product-related factors, including service quality, relevance of offerings, diversity in product range, and competitive pricing, in shaping the success trajectory of travel agencies in Cabanatuan City's competitive market landscape.

**3.2 Financial & Economic Support**

| Indicators | Mean | Verbal Description |
|---|---|---|
| 1. Collaboration with other local businesses has led to increased revenue opportunities for my agency. | 3.20 | Agree |
| 2. The availability of government grants and subsidies has significantly impacted my agency's financial performance. | 2.80 | Agree |

| | | |
|---|---|---|
| 3. Participating in trade fairs and events organized by the city government has contributed to an increase in the customer base. | 3.10 | Agree |
| 4. Partnerships with hotels and resorts within the region have enhanced my agency's service offerings and improved customer satisfaction. | 3.50 | Strongly Agree |
| 5. Agency access to financial resources (loans, grants, etc.) to support business operations. | 3.10 | Agree |
| Weighted Mean | 3.26 | Agree |

*Legend: 3.26 – 4.00 Strongly Agree; 2.51 – 3.25 Agree; 1.76– 2.50 Disagree; 1.00 – 1.75 Strongly Disagree*

Table 3.2 highlights the unanimous agreement among respondents regarding the significant role of financial and economic support factors in contributing to the success of travel agencies. All factors related to financial and economic support received a "Strongly Agree" verbal interpretation, as indicated by the weighted mean scores. The table underscores various strategies and resources that agencies utilize to bolster their financial standing and operational capabilities.

The highest mean score of 3.50 (Strongly Agree) was attributed to partnerships forged with hotels and resorts within the region, which have enhanced service offerings and significantly improved customer satisfaction. This underscores the strategic importance of collaborations in enhancing service quality and customer experience.

Collaboration with other local businesses also received affirmation, with a mean score of 3.20 (Agree), indicating that such partnerships contribute positively to revenue generation opportunities for agencies. Participating in trade fairs and events organized by the city government was noted to increase the customer base, reflecting proactive marketing and promotional strategies employed by agencies to expand their market reach.

Access to financial resources, including loans and grants, to support business operations received a mean score of 3.10 (Agree), highlighting the importance of financial stability and access to capital in sustaining agency operations and growth initiatives.

Government grants and subsidies, while impactful, received a relatively lower mean score of 2.80 (Agree), indicating a perceived but less significant contribution compared to other financial support mechanisms.

Tao (2014) underscores the criticality of prioritizing factors that enhance customer satisfaction and loyalty in business operations. This aligns with the strategies outlined in the table, where agencies focus on enhancing service quality through partnerships, collaborations, and financial prudence to meet customer needs effectively and foster long-term loyalty and satisfaction.

Table 3.2 emphasizes the pivotal role of financial and economic support strategies in underpinning the success of travel agencies in Cabanatuan City, highlighting the importance of strategic partnerships, access to capital, and proactive market engagement in enhancing operational effectiveness and customer satisfaction.

### 3.3 Service Quality

| **Indicators** | **Mean** | **Verbal Description** |
|---|---|---|
| 1. We evaluate the efficiency and effectiveness of the booking and reservation systems utilized by the travel agency. | 3.70 | Strongly Agree |
| 2. We examine the travel agency's ability to customize and personalize services according to the specific needs and preferences of individual customers. It includes factors such as offering tailored travel itineraries, personalized recommendations, and attentive customer care. | 3.70 | Strongly Agree |
| 3. The travel agency ensures that all information provided to our customers, including itineraries, pricing, and travel details, is accurate and reliable. | 3.80 | Strongly Agree |
| 4. The agency has been transparent about pricing, fees, and any terms and conditions associated with bookings to build trust and avoid misunderstandings. | 3.80 | Strongly Agree |
| 5. The agency offers a user-friendly and efficient booking system, whether online or offline, to make the booking process smooth and hassle-free for customers. | 3.40 | Strongly Agree |
| **Weighted Mean** | **3.68** | Strongly Agree |

*Legend: 3.26 – 4.00 Strongly Agree; 2.51 – 3.25 Agree; 1.76– 2.50 Disagree; 1.00 – 1.75 Strongly Disagree*

Table 3.3 underscores the unanimous agreement among respondents regarding the critical role of service quality factors in contributing to the success of travel agencies. All factors related to service quality received a "Strongly Agree" verbal interpretation, as indicated by the weighted mean scores. The table emphasizes various strategies and practices that agencies implement to ensure high standards of service delivery and customer satisfaction.

The highest mean score of 3.80 (Strongly Agree) was attributed to the agency's commitment to providing accurate and reliable information to customers. This includes transparent communication about itineraries, pricing, fees, and booking terms to build trust and prevent misunderstandings, highlighting the importance of transparency in customer relations.

Customization and personalization of services received an equivalent mean score of 3.70 (Strongly Agree). This aspect underscores the agency's ability to cater to individual customer preferences by offering tailored travel itineraries, personalized recommendations, and attentive customer care, thereby enhancing customer satisfaction and loyalty.

The provision of a user-friendly and efficient booking system, both online and offline, garnered a mean score of 3.40 (Strongly Agree). This reflects the agency's commitment to streamlining the booking process to ensure a smooth and hassle-free experience for customers, aligning with modern expectations of convenience and efficiency in service delivery.

Anwar & Louis (2017) emphasize the importance of trustworthiness in service industries like hotels, where consumers expect security and reliability in their transactions. This parallels the emphasis in Table 3.3 on transparency and accurate information provision by travel agencies to instill confidence and satisfaction among customers.

Ng's (2019) study highlights crucial considerations for travel agencies, emphasizing the need for clarity and responsibility in service delivery, including visa arrangements and travel insurance. This aligns with the service quality principles discussed in Table 3.3, emphasizing thoroughness and attention to detail in customer service practices.

Table 3.3 underscores the pivotal role of service quality in driving the success of travel agencies, emphasizing transparency, customization, and efficiency in service delivery as key factors contributing to customer satisfaction and loyalty.

### 3.4 Planning & Policy

| **Indicators** | **Mean** | **Verbal Description** |
|---|---|---|
| 1. The planning approach within the travel agency is adaptable and responsive to changes in the market. | 3.20 | Agree |
| 2. Evaluate the travel agency's regulatory policies and standards governing the travel industry, including licensing requirements, consumer protection laws, and health and safety regulations. | 3.50 | Strongly Agree |
| 3. The travel agency has clear and transparent policies and procedures for booking, cancellation, and refunds. | 3.60 | Strongly Agree |
| 4. The agency believes that employee training and development contribute to the successful execution of planning and policy initiatives in our travel agency. | 3.60 | Strongly Agree |
| 5. The agency believes that clear communication of company goals and objectives contributes to the successful planning and policy implementation of our travel agency. | 3.70 | Strongly Agree |
| **Weighted Mean** | **3.52** | Strongly Agree |

*Legend: 3.26 – 4.00 Strongly Agree; 2.51 – 3.25 Agree; 1.76– 2.50 Disagree; 1.00 – 1.75 Strongly Disagree*

Table 3.4 underscores unanimous agreement among respondents regarding the critical role of planning and policy factors in contributing to the success of travel agencies. All factors related to planning and policy received a "Strongly Agree" verbal interpretation, as indicated by the weighted mean scores. This table highlights key strategies and practices that agencies implement to ensure effective planning, policy implementation, and regulatory compliance.

The highest mean score of 3.70 (Strongly Agree) was attributed to the agency's emphasis on clear communication of company goals and objectives. This practice is seen as instrumental in successful planning and policy implementation within travel agencies, fostering alignment and direction among staff and stakeholders.

The establishment of clear and transparent policies and procedures for booking, cancellations, and refunds also received strong endorsement, with a mean score of 3.60 (Strongly Agree). This aspect underscores the importance of clarity and fairness in customer interactions, enhancing trust and satisfaction.

Investment in employee training and development was another highly rated factor, with a mean score of 3.50 (Strongly Agree). This reflects the agency's recognition of the pivotal role played by knowledgeable and skilled staff in executing policies effectively and delivering high-quality service to customers.

Evaluation of regulatory policies and standards governing the travel industry, including licensing requirements and consumer protection laws, received a mean score of 3.50 (Strongly Agree). This highlights the agency's commitment to compliance with legal and regulatory frameworks, ensuring ethical conduct and customer protection.

Adaptability and responsiveness to changes in the market were also acknowledged, albeit with a slightly lower mean score of 3.20 (Agree). This indicates recognition of the importance of agility in policy adjustment and strategic planning to maintain competitiveness in a dynamic industry landscape.

The studies referenced by Jiang & Alexakis (2017), Walker (2017), Smith et al. (2015), and Braun et al. (2022) underscore various aspects of policy and regulatory adherence, customer communication, and training that are crucial for operational success and customer satisfaction in the travel industry. These findings align with the principles discussed in Table 3.4, emphasizing the importance of clear communication, transparent policies, regulatory compliance, and workforce development in ensuring effective planning and policy implementation within travel agencies.

### 3.5 Facility & Transportation

| Indicators | Mean | Verbal Description |
|---|---|---|
| 1. The agency offers a variety of convenient transportation options for customers. | 3.60 | Strongly Agree |
| 2. The travel agency assesses the availability and condition of transportation options like shuttle services, rental vehicles, or partnerships, considering factors like reliability, comfort, and safety. | 3.50 | Strongly Agree |
| 3. Evaluates the agency's accessibility and clarity of information regarding transportation options, routes, schedules, fees, and restrictions. | 3.60 | Strongly Agree |
| 4. The facilities provided by travel agencies are well-maintained and favorable to customer satisfaction. | 3.70 | Strongly Agree |
| 5. The overall quality of transportation services offered by the travel agency contributes significantly to customer satisfaction and loyalty. | 3.80 | Strongly Agree |
| **Weighted Mean** | **3.64** | Strongly Agree |

*Legend: 3.26 – 4.00 Strongly Agree; 2.51 – 3.25 Agree; 1.76– 2.50 Disagree; 1.00 – 1.75 Strongly Disagree*

Table 3.5 illustrates unanimous agreement among respondents regarding the significant factors contributing to the success of travel agencies in terms of facility and transportation services. All factors related to facility and transportation received a "Strongly Agree" verbal interpretation, as indicated by the weighted mean scores. This table highlights key practices and strategies that agencies implement to enhance customer satisfaction and operational efficiency in these areas.

The highest mean score of 3.80 (Strongly Agree) was attributed to the overall quality of transportation services provided by the travel agency. This factor underscores the critical role that reliable, comfortable, and safe transportation options play in ensuring customer satisfaction and loyalty.

Following closely with a mean score of 3.70 (Strongly Agree) is the maintenance and quality of facilities provided by travel agencies. This includes ensuring that facilities such as offices, booking counters, waiting areas, and amenities are well-maintained and conducive to a positive customer experience.

The agency's provision of a variety of convenient transportation options for customers received an equivalent mean score of 3.60 (Strongly Agree). This reflects the agency's commitment to offering flexibility and choice in transportation modes, accommodating diverse customer preferences and needs.

The accessibility and clarity of information regarding transportation options, routes, schedules, fees, and restrictions also received strong endorsement with a mean score of 3.60 (Strongly Agree). Clear and transparent communication in this regard enhances customer confidence and facilitates informed decision-making.

Lastly, the assessment of the availability and condition of transportation options, such as shuttle services, rental vehicles, or partnerships, received a mean score of 3.40 (Strongly Agree). This indicates the agency's proactive approach in ensuring the reliability, comfort, and safety of transportation services offered to customers.

The studies referenced by De Oña et al. (2015), Machado-León et al. (2017), and Isikli et al. (2017) underscore various aspects of service quality in transportation, including safety, cleanliness, comfort, information availability, and reliability. These findings align with the principles discussed in Table 3.5, emphasizing the importance of maintaining high standards in facility management and transportation services to enhance overall customer satisfaction and operational effectiveness in the travel agency sector.

### 3.6 Marketing

| **Indicators** | **Mean** | **Verbal Description** |
|---|---|---|
| 1. The travel agency uses polls and surveys to engage with followers on social media. | 2.90 | Agree |
| 2. The travel agency uses traditional advertising to promote our services. We use print advertising (newspapers, magazines, postcards, and brochures) to promote our services. | 3.30 | Strongly Agree |
| 3. The agency posts photos of destinations, live streams or stories, videos showcasing travel experiences, and customer testimonials on social media to promote our services. | 3.70 | Strongly Agree |
| 4. The travel agency uses outdoor advertising such as billboards, bus stops, or other public spaces to promote the services. | 3.00 | Agree |
| 5. The platforms that travel agencies use to promote our services are Facebook, Instagram, X (formerly Twitter), TikTok, and YouTube. | 3.70 | Strongly Agree |
| **Weighted Mean** | **3.32** | Strongly Agree |

*Legend: 3.26 – 4.00 Strongly Agree; 2.51 – 3.25 Agree; 1.76– 2.50 Disagree; 1.00 – 1.75 Strongly Disagree*

Table 3.6 highlights the unanimous agreement among respondents regarding the factors that consistently contribute to the success of travel agencies in terms of marketing. All factors related to marketing received a "Strongly Agree" verbal interpretation, with two additional factors receiving an "Agree," as indicated by the weighted mean scores. This table underscores crucial marketing strategies and platforms that travel agencies employ to promote their services effectively.

The highest mean score of 3.70 (Strongly Agree) was assigned to the use of social media platforms such as Facebook, Instagram, X (formerly Twitter), TikTok, and YouTube to promote agency services. This strategy involves posting photos of destinations, live streams or stories, videos showcasing travel experiences, and customer testimonials. Leveraging these platforms allows agencies to reach a wide audience and engage potential customers effectively.

Following closely with a mean score of 3.30 (Strongly Agree) is the use of traditional advertising methods. This includes print advertising in newspapers, magazines, postcards, and brochures, which remains a valuable channel for reaching specific target demographics and reinforcing brand visibility among potential customers.

Additionally, the use of outdoor advertising such as billboards, bus stops, or other public spaces received an agreeable mean score of 3.00 (Agree). While less dominant than digital and traditional methods, outdoor advertising can still play a role in enhancing local visibility and attracting potential customers.

The use of polls and surveys to engage followers on social media received a mean score of 2.90 (Agree). This interactive approach not only fosters community engagement but also provides valuable insights into customer preferences and behaviors, helping agencies tailor their marketing strategies more effectively.

Albattat (2020) emphasizes the increasing importance of online marketing in travel agencies, highlighting its positive impact on sales and customer engagement. The shift towards online platforms reflects changing consumer behaviors, where instant communication and real-time information about products and services are crucial. By adopting robust online marketing strategies, travel agencies can effectively compete in the dynamic travel industry landscape.

Table 3.6 underscores the diverse and integrated approach that successful travel agencies take in marketing their services, utilizing both digital and traditional channels to maximize reach, engagement, and customer satisfaction.

### 3.7 Human Resources & Security

| Indicators | Mean | Verbal Description |
|---|---|---|
| 1. The agency staff undergoes comprehensive training to deliver exceptional customer service. | 3.50 | Strongly Agree |
| 2. Our staff maintains effective relationships with suppliers and partners, enabling us to deliver superior services. | 3.60 | Strongly Agree |
| 3. The agency has clear policies and procedures in place to address potential threats to employee safety and wellbeing. | 3.50 | Strongly Agree |
| 4. Examines the travel agency's security protocols, including facility security, data protection, and emergency response plans, to ensure the safety and security of employees and customers. | 3.50 | Strongly Agree |
| 5. The travel agency is looking for qualities and skills when hiring new employees. | 3.80 | Strongly Agree |
| **Weighted Mean** | **3.58** | Strongly Agree |

*Legend: 3.26 – 4.00 Strongly Agree; 2.51 – 3.25 Agree; 1.76– 2.50 Disagree; 1.00 – 1.75 Strongly Disagree*

Table 3.7 indicates unanimous agreement among respondents regarding the factors contributing to the success of travel agencies in Human Resources & Security, all of which are rated "Strongly Agree" based on weighted mean scores. Key aspects highlighted include the agency's emphasis on hiring employees with specific qualities and skills, maintaining effective relationships with suppliers and partners to enhance service delivery, and providing comprehensive training to staff for exceptional customer service. The agency also maintains clear policies and procedures to address employee safety concerns and ensures robust security protocols across facilities, data protection, and emergency response plans. These measures collectively contribute to fostering a secure and supportive environment for both employees and customers.

### 4. Development Plan for Operational Efficiency

The table below shows the proposed KPI's development plan for improving the operational efficiency of travel agencies around Cabanatuan City. It also shows the key areas needed to enhance a travel agency's operational efficiency.

| Key Areas | Strategy | Objectives | Estimated Time Frame | Persons Involved | Budget Proposal | Success Indicators |
|---|---|---|---|---|---|---|
| Marketing | Optimize traditional marketing methods (print ads, flyers) and implement comprehensive social media campaigns | Increase brand visibility, attract new customers, foster customer loyalty | Implement within next 6 months | Marketing team, graphic designer | Printing Costs; Estimated 5,000 a month<br><br>Graphic Design Fees: estimated 5,000-12,000 | Track website traffic, conversion rates, ROI, brand recognition, positive customer feedback on promotional offers |

| | | | | | | |
|---|---|---|---|---|---|---|
| Technology | Enhance online booking platform for user-friendliness | Modernize technological infrastructure to streamline operations and enhance customer experience | Initial improvements within 6 months | IT department | Allocate resources as needed | Monitor booking conversion rates, website performance, mobile compatibility, cybersecurity measures |
| Sustainability | Foster collaboration with local communities and stakeholders for sustainable tourism practices | Minimize environmental impact, support local communities, promote responsible tourism | Begin collaborations within 3 months | Management team | Allocate budget for community projects | Measure environmental impact reduction, supplier sustainability, community engagement, employee well-being |
| Financial & Economic Support | Collaborate with local businesses, seek government grants for financial stability | Increase revenue opportunities, secure financial resources for operations | Ongoing participation in trade fairs | Sales and marketing team, finance department | Budget for trade fair participation | Track profitability, cost management, debt management, market expansion |
| Human Resources & Security | Hire based on skills, maintain supplier relationships, provide comprehensive training, ensure security protocols | Enhance customer service, ensure employee safety and well-being | Ongoing training and security updates | HR department, management team | Allocate resources for training | Monitor employee satisfaction, customer feedback on service quality, security incident reports |
| Planning & Policy | Develop adaptive planning approaches aligned with regulations and strategic objectives | Enhance policy frameworks, optimize planning processes | Implement changes within next quarter | Strategic planning team, department heads | Budget for planning tools/software | Assess market analysis, regulatory compliance, risk management effectiveness, integration of sustainability practices |

Table 4 outlines a proposed development plan for a travel agency. The plan focuses on improving operational efficiency across five key areas: marketing, Technology, Sustainability, Financial and economic Support, and Planning and policy.

The table details a strategic approach with specific objectives for each area. It then lays out a timeframe for implementation, identifies the people involved, proposes a budget, and defines success indicators to measure the plan's effectiveness.

The key points of every part of the development plan for operational efficiency. In marketing, the plan aims to improve traditional marketing methods while developing comprehensive online strategies to boost brand awareness, attract new customers, and retain existing ones. This includes social media engagement, targeted content creation, and potentially implementing outdoor advertising. In technology, the focus here is on modernizing the online booking platform to be more user-friendly. This involves collaboration between the IT department and the marketing team to ensure the platform is not only functional but also aligns with marketing goals. The sustainability section emphasizes responsible tourism practices. The plan proposes establishing partnerships with local conservation organizations and implementing sustainable practices within the agency itself to minimize environmental impact. The financial & economic support section acknowledges the importance of financial stability and explores ways to achieve it. Strategies include participating in trade shows and events, continuously seeking financial resources like grants, and collaborating with other local businesses for mutual benefits. In the final section, the planning & policy highlights the importance of adaptable planning that responds to market changes. It proposes revising planning processes and developing robust policy frameworks to ensure compliance with regulations and best practices.

By implementing this plan across these five key areas, the travel agency aims to streamline operations, enhance customer experience, and achieve sustainable business growth. The table provides a clear roadmap with defined timelines, roles, budgets, and success metrics to track progress and ensure the plan's effectiveness.

## V. CONCLUSION

**Based on the findings of the study, the following conclusions were drawn:**

1. The travel agency sector in Cabanatuan City comprises a significant number of experienced and educated individuals, the majority of whom have been in service for six years or more, indicating a stable and seasoned workforce. Cabanatuan City's travel agencies are relatively stable, with most operating for six years and above. They have capitalization investments of ₱ 400,000.00 – ₱ 500,000.00 and varied monthly incomes of ₱ 500,000 - ₱ 600,000. The forms of ownership are sole proprietorships. The surveyed agencies primarily adhere to compliance with legal requirements, Department of Tourism (DOT) accreditation, Department of Trade and Industry (DTI) registration, and Mayor's permits.
2. Travel agencies do not exhibit strong performance across key performance indicators (KPIs). The agency's traditional marketing methods, such as print ads and flyers, do not effectively promote the travel agencies. Also, the agencies do not provide a user-friendly online booking platform. Lastly, travel agencies do not support conservation and sustainable tourism projects or social responsibility programs that benefit local communities; the agencies do not adequately interact with stakeholders and local communities.
3. The study concludes that for travel agencies in Cabanatuan City to succeed, their development plan should focus on providing diverse and relevant travel packages. Build partnerships with local hotels and resorts. Ensure accurate, reliable, and transparent information. Clearly communicate company goals and objectives. Offer high-quality transportation services. Utilize social media platforms for effective promotion. Maintain strong supplier relationships and hire skilled employees.
4. The study proposed a comprehensive development plan for the travel agency, targeting operational efficiency across various crucial aspects. By implementing this development plan, the travel agency strives to achieve streamlined operations, a more captivating customer experience, and, ultimately, sustainable business growth. The defined timelines, roles, budgets, and success metrics ensure the plan's effectiveness and facilitate ongoing monitoring and adjustments for optimal outcomes.

## VI. RECOMMENDATION

Based on the results of the study and the conclusions drawn, these recommendations are offered:

1. Enhance Online Presence and Booking Systems: Develop and implement a user-friendly online booking platform to improve customer convenience and expand market reach. Invest in digital marketing strategies, such as social media campaigns and search engine optimization (SEO), to effectively promote services and attract a broader audience.
2. Diversify Travel Packages: Create diverse and relevant travel packages that cater to different customer preferences and needs. Collaborate with local hotels, resorts, and attractions to offer unique and appealing travel experiences that can differentiate the agencies from competitors.
3. Promote Sustainable Tourism: Integrate conservation and sustainable tourism practices into the business model. Participate in and support local conservation projects and social responsibility programs that benefit the community, fostering a positive reputation and contributing to environmental sustainability.
4. Strengthen Stakeholder and Community Engagement: Establish regular communication and interaction with stakeholders and local communities. Engage in partnerships and initiatives that support local development and enhance the agency’s reputation as a community-oriented business.
5. Invest in Employee Development: Provide ongoing training and development opportunities for employees to enhance their skills and knowledge. Focus on

customer service excellence, industry best practices, and emerging trends to ensure the workforce remains competitive and capable of delivering high-quality services.

6. Improve Marketing Strategies: Shift from traditional marketing methods to more effective digital marketing strategies. Utilize social media platforms, email marketing, and content marketing to reach and engage with potential customers. Regularly update marketing materials and ensure they accurately reflect the agency's offerings and value propositions.

7. **Enhance** Operational Efficiency: Implement the comprehensive development plan targeting operational efficiency. Define clear timelines, roles, budgets, and success metrics to ensure effective implementation and ongoing monitoring. Regularly review and adjust the plan to optimize outcomes and achieve sustainable business growth.

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# Employability Status of Bachelor of Science in Business Administration Major in Marketing Management A.Y. 2022 Graduates – NEUST-MGT Talavera Off-Campus

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***Abstract***— *The Nueva Ecija University of Science and Technology (NEUST) has evolved through various names and forms throughout different campuses, consistently producing competent professionals. This study assesses the employability status of Bachelor of Science in Business Administration (BSBA) Major in Marketing Management graduates from the Talavera Off-Campus for the academic year 2022. The university aims to be a locally responsive and internationally relevant institution of science and technology, transforming human resources into productive citizens. A comprehensive Employability Tracer Study was conducted to gain insights beneficial to both the institution and its graduates, examining how well the university prepares its graduates for the competitive job market. This descriptive study used surveys and interviews to gather data from 120 graduates via Google Forms and Facebook Messenger. Key findings include a female-dominated BSBA program, a high proportion of single graduates, significant employment within Region III, and a majority employed in the private sector. However, a notable portion remains unemployed. The study's results informed the development of an intervention plan focused on career services workshops, career counseling, soft skills training, industry projects, startup incubators, and partnerships with local businesses. The study underscores NEUST's commitment to supporting graduate employability and adapting its programs to meet evolving labor market demands, thus contributing to its vision-mission of fostering career success and societal development.*

***Keywords***— ***Business Administration, Employability, Graduates, Interventions, Marketing Management, NEUST-MGT Talavera Academic Off-Campus, Tracer Study.***

## I. INTRODUCTION

Since its inception as the Wright Institute in 1908 and later known as Nueva Ecija School of Arts and Trade (NESAT), Central Luzon Polytechnic College (CLPC), and Nueva Ecija University of Science and Technology (NEUST), the university has consistently produced competent public servants and professionals. The name changes aimed to serve the community better and provide more opportunities for professional training. [1] As part of the commitment to realizing the vision of Nueva Ecija University of Science and Technology, it is imperative to assess the current employability status of the graduates. "The University envisions to be a locally responsive and internationally relevant and recognized University of Science and Technology. Its mission is to develop new knowledge and technologies and transform human resources into productive citizenry to bring about development impact to local and international communities. The Nueva Ecija University of Science and Technology is actively engaged in conducting a comprehensive Employability Tracer Study focusing on the Academic Year 2022 Graduates. This study aims to yield valuable insights that will be mutually advantageous for the institution and its graduates. By delving into the outcomes of this study, the university seeks to underscore its efficacy in nurturing exceptionally skilled graduates who are fully equipped to thrive in today's increasingly competitive technological landscape. Furthermore, the study endeavors to assure students that the university remains committed to supporting their career success beyond graduation, ensuring they are positioned for promising job opportunities. Recognized for its unwavering dedication to delivering excellence and upholding the highest standards of education, the NEUST-MGT Talavera Off-Campus is steadfast in its commitment to shaping the academic landscape. In alignment with this guiding principle, the graduate tracer study aspires to make meaningful contributions toward advancing NEUST's overarching academic vision, centered on providing top-notch education that resonates with societal needs and aligns harmoniously with the dynamic requirements of the prevailing labor market. [2]

This employability tracer study focused on the 120 BSBA Major in Marketing Management of Talavera Off-Campus AY 2022 graduates. Skills possessed and used by the College were not covered in this study as well as the list of the awards or recognitions received by the graduates. Their licensure and eligibility examination performances were not also dealt with in this study. The data being considered were only those from the survey and interview from March to June 2024.

The main objective of this study is to determine the Employability Status of Bachelor of Science in Business Administration Major in Marketing Management A.Y. 2022 Graduates– NEUST-MGT Talavera Academic Off-Campus. Specifically, it seeks to determine the (1) Profile of the respondents to be described in terms of Sex and Civil Status; (2) Describe the employment status of the 2022 BSBA graduates in terms of Status of Employment, Present Employment Location, Occupational Classifications, and Nature of Employment; and (3) The proposed intervention plans to improve employability status among graduates based on the findings of the study.

## II. METHODOLOGY

This research used a descriptive method of research specifically a tracer study which intends to track the employability of the alumni. Through Google Forms and Facebook Messenger, the graduates were traced and interviewed.

The researcher secured a copy from the University Planning Department of the list of the graduates from the College during the Academic Year 2022. Through the use of social media like Facebook and Messenger, the graduates were being reached thus the link to the Google Form was sent to them. In cases where there were graduates who were unresponsive or whose names were not the ones being used in their social media accounts, the researcher asked for the help of their former teachers, classmates, and personal records from the registrar. Old Messenger group chats were also used to trace the other graduates. Quarterly, the researcher goes back to the graduates who did not respond or those who were not yet employed. The data were updated based on the responses of the graduates including those for the follow-up questions asked by the researcher.Descriptive statistical analysis was used in this study. Specifically, the researcher got the frequency and computed the percentages of the responses of the graduates accordingly. Both tabular and textual presentations of data were used for better understanding and analysis of the gathered data.

## III. RESULTS AND DISCUSSION

### 3.1 Sex distribution of the graduates

Table 1 below shows the distribution of the surveyed graduates based on their sex.

*Table 1. Sex of the Graduates*

| Sex | Frequency | Percentage (%) |
|---|---|---|
| Male | 35 | 29.17 |
| Female | 85 | 70.83 |
| **Total** | **120** | **100.00** |

As to the sex distribution of the graduates, the dominance of females over males in taking Business administration course is observable. More than the majority or 70.83% (85) of the respondents are females while the remaining 29.17% (35) are males.

The dominance of females in taking the Business Administration course, as observed in the data, aligns with trends reported in related literature. Studies have consistently shown a higher enrollment of females in business-related programs, reflecting shifting societal norms and increased opportunities for women in the business sector (Ramos & Robles, 2019 [3]; Smith & Johnson, 2020). This trend is often attributed to factors such as increased awareness of gender equality, changing career aspirations among women, and the perceived value of business education in diverse fields. [4]

### 3.2 Civil Status of the graduates

Table 2 below shows the distribution of the surveyed graduates based on their civil status.

*Table 2. Civil Status of the Graduates*

| Sex | Frequency | Percentage (%) |
|---|---|---|
| Single | 98 | 81.67 |
| Married | 22 | 18.33 |
| **Total** | **120** | **100.00** |

Out of the 120 graduates surveyed, 98 (81.67%) are single, while 22 (18.33%) are married. Graduates often seek financial stability and career progression before considering marriage. This trend is evident in the higher proportion of single graduates (McGoldrick, 2013). [5]

According to Arnett (2000), the period of emerging adulthood (ages 18-25) is marked by exploration and self-focus, with many individuals choosing to delay marriage, particularly among those who have recently graduated. [6]

### 3.3 Distribution of Status of Employment of the graduates

Table 3 below shows the distribution of the surveyed graduates based on their Status of Employment.

*Table 3. Status of Employment of the Graduates*

| Sex | Frequency | Percentage (%) |
|---|---|---|
| Employed | 78 | 65.00 |
| Unemployed | 42 | 35.00 |
| Not Tracked | 0 | 0.00 |
| **Total** | **120** | **100.00** |

Out of 120 graduates surveyed, 78 are employed, representing 65% of the total graduates while 42 graduates are unemployed, which accounts for 35% of the total graduates.

The 65% employment rate is consistent with findings by Smith et al. (2019), who noted that the majority of graduates tend to secure employment within the first few years of post-graduation. Factors contributing to this include the relevance of the curriculum to industry needs and the presence of strong career services within educational institutions. [7] On the other hand, the 35% unemployment rate can be influenced by various factors including economic downturns, mismatch between graduate skills and job requirements, and regional employment opportunities. According to Jones (2018), economic recessions significantly impact graduate unemployment rates as entry-level positions are often the first to be affected. [8]

### 3.4 Distribution of BSBA graduates in terms of their present employment location

Table 4 summarizes the distribution of the surveyed BSBA graduates based on their present location.

*Table 4. Present Employment Location of the Graduates*

| Present Employment Location | Frequency | Percentage (%) |
|---|---|---|
| Within the Region III | 110 | 91.66 |
| National Capital Region | 5 | 4.17 |
| International | 5 | 4.17 |
| **Total** | **120** | **100.00** |

It displays data on the present employment locations of graduates. A major portion of graduates, 91.66% are employed within Region III while fewer graduates, both 4.17% are employed in the NCR and International.

Research by Smith et al. (2020) found that graduates often choose employment locations based on factors such as proximity to family, cost of living, and career growth prospects. This aligns with the high percentage of graduates choosing employment within Region III, which may be due to familiarity with the area, established networks, and job availability within the region. [9]

Furthermore, the relatively low percentage of graduates employed in the NCR may be attributed to factors such as competition for jobs, higher living costs, and the preference for a better work-life balance, as suggested by studies by Jones (2018) [10] and Lee (2019) [11]. The presence of graduates in international locations could be influenced by global market trends, international job opportunities in specific industries, or individual aspirations for an international career, as discussed in the research by Johnson and Smith (2021). [12]

Overall, the distribution of employment locations among graduates reflects a combination of personal choices, economic factors, and global market dynamics shaping the career trajectories of individuals within the studied region.

### 3.5 Occupational Classification of the graduates

Table 5 shows the distribution of the surveyed graduates based on their Occupational Classification.

*Table 5. Occupational Classification of the graduates of the Graduates*

| Sex | Frequency | Percentage |
|---|---|---|
| Entrepreneur | 9 | 7.50 |
| Government Employee | 4 | 3.33 |
| Private Employee | 65 | 54.17 |
| Unemployment | 42 | 35.00 |
| **Total** | **120** | **100.00** |

The data shows that 65 graduates (54.17%) are working in the private sector, making this the largest group. Nine (9) graduates (7.50%) have started their businesses, indicating a small but notable portion of graduates pursuing entrepreneurial ventures. Few or Four (4) graduates (3.33%) are employed in the government sector while 42 graduates (35.00%) are currently unemployed, representing a significant portion of the surveyed graduates. This suggests that the majority of graduates find employment in private companies.

According to a study by Smith et al. (2019), the private sector remains the largest employer for graduates due to the diversity of roles, opportunities for career growth, and higher salary prospects. The 54.17% of graduates working in the private sector support this trend, highlighting the sector's capacity to absorb a large number of graduates. [13]

### 3.6 Nature of Employment of the graduates

Table 6 deals with the distribution of the surveyed graduates based on their Nature of Employment.

*Table 6. Nature of Employment of the Graduates*

| Sex | Frequency | Percentage |
|---|---|---|
| Contractual/Temporary | 25 | 20.83 |
| Regular/Permanent | 44 | 36.67 |
| Self-Employed | 9 | 7.50 |
| Unemployed | 42 | 35.00 |
| **Total** | **120** | **100.00** |

The data reveals that 25 graduates (20.83%) are employed in contractual or temporary positions, 44 graduates (36.67%) have secured regular or permanent employment, representing the largest category, nine (9) graduates (7.50%) are self-employed, indicating a small but notable entrepreneurial inclination among the graduates, and 42 graduates (35.00%) are unemployed, highlighting a significant unemployment rate among the surveyed graduates.

A study by Brown (2018) emphasizes the importance of regular or permanent employment for financial stability and career development. Graduates securing permanent roles may benefit from better job security, benefits, and career progression opportunities. The 36.67% of graduates in this category aligns with findings that suggest many employers offer permanent positions to graduates who demonstrate the required skills and competencies during initial employment. [14]

### 3.7. Interventions to be offered to improve employability status among graduates based on the findings of the study

The researcher proposed the following Intervention Plan based on the study findings:

| INTERVENTION PLAN | |
|---|---|
| **AREA OF INTEREST** | **STRATEGIES** |
| Career Services Workshops | Conduct workshops on resume writing, cover letter preparation, and interview skills to equip students with the tools they need to successfully navigate the job application process. |
| Career Counseling | Offer regular career counseling sessions to help students understand their career options, set goals, and develop a clear career path. Provide personalized guidance based on individual interests and strengths. |
| Soft Skills Training | Integrate soft skills training into the curriculum, focusing on communication, teamwork, problem-solving, and leadership skills, which are crucial for employability. |
| Industry Projects | Include industry-sponsored projects as part of the coursework, allowing students to work on real-world problems and present solutions to industry representatives. |

| | |
|---|---|
| Startup Incubators | Create a startup incubator on campus to support students interested in launching their own businesses. Provide access to resources, mentorship, and networking opportunities with investors. |
| Partnerships with Local Businesses | Establish partnerships with local businesses to create more employment opportunities for graduates. Encourage businesses to offer internships, apprenticeships, and entry-level positions to recent graduates. |
| Private Sector Collaboration | Collaborate with private sector employers to understand their hiring needs and adjust the curriculum and training programs accordingly. Encourage companies to participate in job fairs, offer internships, and provide feedback on graduate performance. |
| Alumni Affairs and Placement Office Support for Contract Workers | Provide support services for graduates in contractual or temporary positions, such as career counseling, skill enhancement programs, and networking opportunities to help them transition to permanent roles. |
| Alumni Networking Events | Organize networking events that connect recent graduates with alumni who can offer job opportunities, mentorship, and career advice. |
| Promotion and Awareness Campaigns | Launch awareness campaigns to inform graduates about the available support programs and resources. Use social media, university websites, and alumni networks to reach a wider audience. |

## IV. CONCLUSIONS

Based on the significant findings of this study, the researcher was able to infer that:

1) The BSBA programs of the Talavera Off-Campus are dominated by females rather than males.
2) There is a higher proportion of single graduates among those who graduated in the A.Y. 2022.
3) There is a considerable number of BSBA graduates who tend to secure employment within the first few years of post-graduation.
4) There is a strong regional employment retention among BSBA graduates.
5) The primary employers of the BSBA graduates in the A.Y. 2022 are the private sector. On the other hand, a significant portion of graduates are currently unemployed, pointing to potential challenges in the job market or other factors influencing employment rates.
6) The nature of employment distribution among the BSBA graduates highlights both a strong presence in stable employment and a considerable unemployment rate among the graduates, along with a modest level of long-term job security and entrepreneurial activity.
7) The researcher formulates an intervention plan on the identified areas of concern based on the findings of the study.

## V. RECOMMENDATIONS

The findings identified the need to further update the curriculum to include courses that are in high demand in the job market, such as digital marketing, data analytics, and financial technology; Hold regular information sessions to keep students updated on job market trends, skill requirements, and upcoming career-related events; Foster stronger connections between the university and industry to ensure that the curriculum remains relevant and graduates possess the skills that employers seek; Encourage graduates to engage in lifelong learning by offering access to online courses, certifications, and continuing education programs to keep their skills up-to-date and competitive in the job market; and Implement a tracking system to monitor the career progression of graduates. Use this data to identify trends, assess the impact of intervention programs, and make informed decisions about future initiatives.

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# Energy Evaluation and Comparative Analysis of Eco-designed Charcoal Stove and Kerosene Stove

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***Abstract***— *Energy sources such as; fuel wood, charcoal, kerosene and others play vital role in meeting local energy demand in many Sub-Saharan Africa (SSA) countries.Their usage is closely linked with economic development, poverty reduction and the provision of vital services. Until recently, kerosene was popularly used as domestic fuel which is greatly due to its availability, low cost, ease of handling and relatively safe but these are not the same anymore due to high cost of procurement and scarcity. Hence, this study of energy evaluation and comparative analysis of improved charcoal stove and kerosene stove aims to compare their energy efficiency and environmental impact. The charcoal stove casing was fabricated from 5 kg old gas cylinder that was condemned for leakage. Red clay and cement were carefully sieved and mixed with water to form the mold. An already fabricated grate was placed at the middle of the cylinder and the concrete was fed between the space. Three cooking tests; Water Boiling Test (WBT), Controlled Cooking Test (CCT) and Frying Test (FT) were conducted with the charcoal stove and the results obtained were compared with the results obtained from an existing kerosene stove. The three experiments revealed that the eco-friendly charcoal stove is better in fuel consumption, heat generation, duration of cooking and cost of procurement. In conclusion, the developed charcoal stove will suitably replace the kerosene stove for low-income earner and rural dweller.*

***Keywords*— Stove, Charcoal, kerosene, Fuel Efficiency, Cooking Duration.**

## I. INTRODUCTION

Charcoal and kerosene were preferred cooking fuel for most urban and Peril-urban dwellers (Sander *et al.,* 2011). Basic Charcoal or lump charcoal is usually produced by a process known as slow pyrolysis, by heating wood or other biomass inside relatively air tight enclosure, like an earth covered pit in the ground (earth mound kiln). About half of the world's population has continued to depend on bio-fuels, fuel wood, charcoal, crop residue and dung to provide energy requirement for cooking. This is contrary to what is being obtained in industrialized countries where households have shifted to petroleum fuel and electricity but these are not likely to be available to the rural dwellers. As of 2011, about 1.26 billion people do not have access to electricity and 2.64 billion people rely on traditional biomass (fuel wood, charcoal, dung and agricultural residues) for cooking mainly in rural areas in developing countries. Under a baseline scenario, the numbers of people without clean cooking facilities could remain almost unchanged in 2030 (*IEA et al*., 2013). Household cooking consumes more energy than any other end-use services in low-income developing countries (*IEA et al*., 2013) Kerosene is also a widespread fuel for lighting at the household level and its lamp (also known as hurricane lamp) is a very common feature in most rural households, meanwhile, kerosene as a cooking fuel is still very limited. The case study overleaf, which is fairly representative of many families in rural and peril-urban Sub-Sahara Africa, gives a good illustration of the pattern of energy consumption, the low level of consumption of kerosene as cooking fuel and its importance as an energy source for lighting. Several methods and devices of burning fuel such as electric cooker or stoves, gas and kerosene stoves have since been employed all over the world including developing country like Nigeria. In addition, the down turn in Nigeria economy coupled with nonchalant attitude of leaders, has made some of cooking fuels unreachable to most people of this country. Erratic power supply, breakdown of petroleum refineries and high cost of getting fuels have called for alternative means of cooking and heating purpose that can meet up with both urban and rural requirement. The program for increasing cooking efficiency will require a number of activities including the design and development of improved stoves, adopting the designed stove to the local cooking needs and cultural conditions, ensuring that the stoves are being used properly and finally, promotion of the stoves (Fapetu and Oke, 2003). Biomass is a renewable energy source obtainable from organic matters, while kerosene is non-renewable energy from crude oil. Although, the two stoves have advantages and disadvantages in terms of energy efficiency, indoor air pollution, and environmental impact.

Chica and Pérez (2019) designed and evaluated a biomass improved cooking stove for developing countries where water boiling tests were conducted. The result obtained revealed an average energy efficiency of 20.9% with a boiling time of 31.6 minutes. In another investigation, the thermal and emission performance of biomass stoves was investigated where water boiling tests (WBT) and food cooking tests (rice and beans) were used. The results indicate that of the 15 charcoal stove samples tested, 62% met the minimum Tier 2 standard, while 51% of the 10 firewood stove samples tested met the minimum Tier 2 standard. The star rating of a biomass stove is determined by the value of the stove's thermal efficiency level. Stoves available in local markets in Nigeria do not have a star rating (Okafor, 2019). Otto (2018) also conducted water boiling tests on aluminum stoves and the result revealed that the thermal efficiency of the stove compared to the traditional stove is much improved. A comparative study of traditional improved clay stoves and Malagasy stoves was conducted by Segbefia *et al*. (2018) and the study revealed that the clay stove performs better than the Malagasy stove.

## II. MATERIALS AND METHOD

### 2.1 Materials

The following materials presented in Table 2.1 were carefully selected to produce a viable stove at a reasonable cost. The fabricated briquettes stove has the following components; Grate, vent door, soil insulation, supports and metallic casing.

*Table 2.1: List of Components, Materials and Reason for Selection*

| S/N | Components | Material | Reason for the selection of material |
|---|---|---|---|
| **1** | Grate | Mild steel | It has high rust resistance (due to the galvanizing of the steel) and thereby elongates its life span. |
| **2** | Vent door | Galvanized plate | This material has low thermal conductivity and thus will prevent heat loss by conduction. |
| **3** | Soil-insulation | Red clay | its resistance to spontaneous change in heat and high insulation capacity |
| **4** | Pot Support | Aluminum | It has high corrosion, high strength and low cost |
| **5** | Stove Casing | Galvanized plate | It has a high heat tolerance. |
| **6** | Hinges | Butt hinges | It allows the door to swing smoothly |
| **7** | Rivet pin | Stainless steel | It acts as a pivot point allowing the hinge to rotate smoothly |
| **8** | Ash Tray | Galvanized sheet | It is at the bottom of charcoal stove used to catch the ashes and helps with cleaning. |

### 2.2 Design considerations

The following considerations were taken into account which ensured effectiveness, efficiency, and safety of the design.

a. **Materials**: The materials were carefully selected to ensure affordability, durability, heat-resistant, and non-hazardous (Mehta and Goyal, 2015).

b. **Geometry**: The size and shape of the stove was carefully considered to optimize heat distribution and cooking efficiency. The stove grate is large enough to hold a sufficient quantity of briquettes or charcoal to maintain the desired heat level. The shape is also designed to ensure proper airflow and heat distribution (ISO, 2016).

c. **Airflow Control**: Proper airflow is essential for maintaining a consistent and efficient burn. The stove has openings to allow for proper airflow, and to control the amount of oxygen that entering the pot. The size and location of the air vents is designed to optimize heat distribution.

d. **Insulation**: Adequate insulation was included to prevent the stove from becoming too hot to handle and to maintain heat for an extended period (Morgan,2013). The stove has a layer of insulation between the briquettes and the exterior of the stove to prevent excessive heat transfer. The insulation materials include red clay and cement.

e. **Safety**: To prevent accidents and ensure user safety, the briquettes stove is designed to be stable and not easily tipped over. It is also designed to prevent accidental contact with the hot briquettes.

f. **Cost**: Briquettes stoves are often used in low-income and developing areas, so cost is an essential consideration. The design is simple and efficient to keep the cost low and make it accessible to those who need it. The stove is designed to be easily maintained (Mehta and Goyal, 2015).

g. **Environmental Impact**: The production and use of briquettes stoves can have a significant environmental impact, so the design also considers the use of sustainable materials and methods, as well as the reduction of pollutants and emissions.

**2.3 Method**

The charcoal fire stove was fabricated through the following processes;

A. **Fabrication process**

1 Marking out: Various components used such as door, stand, support, grate are measured and marked before cutting to ensure that the charcoal pot is properly shaped and functional.

2 Cutting: Excess materials are removed based on the marked out dimensions to enable us get the desired shape.

3 Joining: All the different parts of the charcoal stove are joined through the welding and riveting which gives us a cohesive and functional structure.

4 Filing: A file is used to shape and smooth the sharp edges or imperfections left after cutting and joining process, which ensures that we have clean and finished appearance making it safe to handle and use.

5 Coating:- Protective layers are applied to the surfaces of the charcoal pot, such as paint, this helps prevent rust and corrosion and enhance the durability of the charcoal pot.

6 Finishing touches: This is the final step which includes enhancement and additional details to improve the charcoal stove appearance such as polishing and inspection to ensure it is ready for use.

7 Soil insulation: Red clay was used to insulate the stove so as to ensure steady firing and heat generation of the stove.The chose of this material was based on its refractiveness

These are shown on Plate 2.1 – Plate 2.6.

*Plate 2.1: Grate*

*Plate 2.2: Red Clay*

*Plate 2.3: Vent Door*

*Plate 2.4: Pot Support*

*Plate 2.5: Metallic Casing*

*Plate 2.6: Ash Tray*

### 2.4 Test Analysis

#### 2.4.1. Water Boiling Test (WBT)

0.915 kg of water was poured into 0.400 kg aluminum pots. The stove combustion chamber already loaded with 0.300 kg of charcoal was ignited and the combustion was allowed to stabilize before mounting the aluminum pot. With the aid of thermocouple wires immersed into the water and connected to a digital thermometer, the initial temperature of the water was recorded. The subsequent change in temperature of water up to boiling point was also recorded at 5 minutes intervals. The pot was later removed from the stoves and the fire was immediately turned out off. This is as shown on Plate 2.7 and the procedure was repeated for the kerosene stove with 0.21 kg kerosene and at the end of the two experiments, the un-burnt charcoal and kerosene were weighed. Three trials of the experiments were conducted and the average as discussed in the result.

#### 2.4.2 Controlled Cooking Test

0.175 kg of rice was measured and placed in a small standard pot. Sufficient quantity of water about 1.1 kg was weighed and added to the rice in the pot. The mass of the pot plus its lid together with the rice and water was measured to be approximately 1.9 kg. Charcoal with a weight of 0.3 kg at the sum of fifty naira (₦50.00) was charged into the stove and ignited. Meanwhile, the mass of stove plus fuel was recorded as 1.4 kg andthe timer started immediately the pot holding the rice and water was placed on the burning charcoal. The cooking was monitored intermittently and the timer was stopped immediately the rice was completely cooked (Plate 2.8). The cooking time was recorded and the un-burned fuels were measured after the fire was extinguished. The final masses of pot plus cooked food were also measured. Finally, the specific time and energy consumed were calculated. Three trials were conducted and the average as discussed in the result.

#### 2.4.3 Frying Test

Three spoons of cooking oil were added into an already weighed frying pan and the initial temperature of the cooking oil in the frying pans was recorded.Charcoal of 0.200 kg was charged into the combustion chamber, ignited and the whisked egg was added. The final cooking temperature was taken after the egg has fried to the desired appearance (Plate 2.9). Stopwatch was used to take the time during the experiment and a repeated experiment was carried out using 0.10 kg of kerosene**.** At the end of it all, **t**he un-burnt charcoal and kerosene were weighed to determine the amount of fuel consumed. Three trials were also conducted and the average as discussed in the result.



*Plate 2.7: Water Boiling Test* *Plate 2.8: Controlled Cooking Test (Rice)* *Plate 2.9: Frying Test*

## III. RESULTS AND DISCUSSION

The experimental results were as shown on Table 3.1, 3.2 and 3.3 indicating water boiling, controlled cooking and frying test respectively.

### 3.1 Water Boiling Test (WBT)

The result of the comparative studies conducted show that the charcoal stove and kerosene stove have different thermal efficiency for the similar water boiling test. The WBT revealed that the charcoal stove has better cooking efficiency in terms of fuel consumption, heat liberation and duration of cooking (Table 3.1). As obtained, 0.165 kg of charcoal was used to raise the water temperature from 26.6 ℃ to 66.8 ℃ in 302 seconds while, 0.24 kg of kerosene was used to raise the same initial temperature of water to 67.6 ℃ in 366 seconds. Invariably, more heat energy was liberated by the charcoal stove which resulted to a better cooking efficiency. This shows that the charcoal stove gives more heat to the cooking pot than the kerosene stove because it takes less time to raise water temperature by 40.2 ℃ when compared to the kerosene stove that takes much time to raise water temperature from the same level by 41 ℃.

*Table 3.1 Water Boiling Test*

| S/N | Test Data | Charcoal stove | Kerosene stove |
|---|---|---|---|
| **1** | Weight of Aluminumpot used $w_1$(kg) | 0.400 | 0.400 |
| **2** | Initial weight of water in pot $w_2$(kg) | 1.0 | 1.0 |
| 3 | Final weight of water in pot, $w_3$ (kg) | 0.95 | 0.90 |
| 4 | Weight of water evaporated, $w_4$ (kg) | 0.05 | 0.10 |
| 5 | Initial temperature of water in pot, $T_1$(℃) | 26.6 | 26.6 |
| 6 | Final temperature of water in pot, $T_1$ (℃) | 66.8 | 67.6 |
| 7 | Weight of fuel to be used $\boldsymbol{w_5}$ (kg) | 0.300 | 0.21 |
| 8 | Weight of Unburnt fuel $\boldsymbol{w_6}$ (kg) | 0.142 | 0.08 |
| 9 | Weight of fuel consumed $\boldsymbol{w_7}$ (kg) | 0.158 | 0.13 |
| 10 | Time taken to boil water, $t_1$ (sec) | 302 | 366 |
| 11 | Specific heat capacity of Aluminum pot (kJ/kg℃) | 0.92 | 0.92 |
| 12 | Specific Heat capacity of water (kJ/kg℃) | 4200 | 4200 |
| 13 | Heat of combustion of fuel i.e. calorific (kJ/kg) | 29000 | 43000 |
| 14 | Latent heat of vaporization of water (kJ/kg) | 2260 | 2260 |
| 15 | Cost of fuel (₦) | 50.00 | 1500.00 |

### 3.2 Controlled Cooking

It was observed that the kerosene stove consumed more energy to cook the same quantity of rice and it also took a longer time for the operation (Table 3.2). This is similar to what was obtained from WBT.

*Table 3.2: Controlled Cooking*

| S/N | Test Data | Charcoal Stove | Kerosene Stove |
|---|---|---|---|
| 1 | Weight of aluminum pot used for cooking test, $w_8$ (kg) | 0.400 | 0.400 |
| 2 | Initial weight of water for cooking test, $w_9$ (kg) | 0.915 | 0.915 |
| 3 | Initial Temperature for pot + Water + Rice, $T_3$ (℃) | 26.6 | 26.6 |
| 4 | Final temperature of pot + water + Rice, $T_4$ (℃) | 57.5 | 55.3 |
| 5 | Weight of fuel consumed, $w_{10}$ (kg) | 0.350 | 0.26 |
| 6 | Final temperature of water in pot $T_2$ (℃) | 26.6 | 0.26 |
| 7 | Time taken for cooking $t_2$ (sec) | 1,145 | 1,022 |
| 8 | Weight of un-burnt fuel after cooking, $w_{11}$ (kg) | 0.147 | 0.08 |
| 9 | Calorific value of charcoal (kJ/kg) | 29,000 | 43,000 |
| 10 | Specific Fuel consumption of the stoves (kJ/kg) | 0.20 | 0.20 |

### 3.3 Frying Test (FT)

The FT revealed that the kerosene stove consumed more energy and more time was also expended to fry the same quantity of egg (Table 3.3).

*Table 3.3 Frying Test*

| S/N | Test Data | Charcoal Stove | Kerosene Stove |
|---|---|---|---|
| 1 | Weight of aluminum frying pan used for frying test, $w_1$ (kg) | 0.400 | 0.400 |
| 2 | Initial weight of cooking oil for frying test, $w_{12}$ (kg) | 0.04 | 0.04 |
| 3 | Initial Temperature for frying pan + Oil $T_3$ (℃) | 25.4 | 25.4 |
| 4 | Final temperature of frying pan + cooking oil $T_4$ (℃) | 76.4 | 76.4 |
| 5 | Weight of fuel consumed, $w_{13}$ (kg) | 0.250 | 0.15 |
| 6 | Time taken for frying $t_3$ (sec) | 92 | 124 |
| 7 | Weight of un-burnt Charcoal after frying $w_{14}$ (kg) | 0.235 | 0.12 |
| 8 | Calorific value of charcoal (kJ/kg) | 29,000 | 43,000 |
| 9 | Specific Fuel consumption of the stoves (kJ/kg) | 0.200 | 0.20 |

## IV. CONCLUSION

Studies revealed that kerosene stove produced more harmful pollutants from the flame during its combustion which include; carbon monoxide, nitrogen dioxide and some particulate matters. This also resulted to darkening of the pot. Effort is however needed on how the rate of kerosene usage (as fuel for domestic cooking) can be reduced. The results obtained in this present study revealed that charcoal stove has higher performance efficiency with low fuel consumption as compared with the kerosene stove from the three-cooking experiments. Since charcoal is produced from wood, adoption of improved charcoal stove that is tested (that will consume less fuel) for domestic cooking in our rural areas will certainly be a step in the right direction to reduce drastically the rate of using Kerosene for cooking. Therefore, the newly developed charcoal stove will conveniently replace the kerosene stove and also provides a suitable channel for the combustion of other biomasses and briquettes for lower income earners and rural dwellers.

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# Digital Procurement Transformation: Case Study in Central Java

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***Abstract***— *This paper aims to examine the impact of digital procurement transformation in accelerating provincial economic growth. This research adopts a literature review and case study approach to procurement implementation in Central Java. This study recommends the implementing digital procurement transformation through 1) Digital Infrastructure Development, 2) Human Resource Capability Development, 3) SME Facilitation, 4) Development of Procurement Management Information Systems, 5) Development of Electronic Catalogs and Online Stores, 6) Monitoring and Evaluation, 7) Improved Governance and Budget allocation. This is a research niche, and it is expected to provide opportunities for future research.*

***Keywords*— Technology, transformation, digitalization, procurement, economy, literature review.**

## I. INTRODUCTION

Public procurement has been transformed into the digital era and the era of society 5.0. The need for digital procurement transformation has become a main priority. Presidential regulation of the Republic of Indonesia number 17, 2023 regulates the acceleration of digital transformation to increase the use of domestic products, and Small and Medium-size Enterprises (SME) in procurement of government goods/services (Perpres RI, 2023). The opportunity to digitize the electronic procurement system and its supporting systems is a pathway to system maturity (Seyedghorban et al., 2020).

Digital transformation has moved forward at a rapid and dynamic pace, changing the paradigm of the global economy and society. digital transformation makes a big momentum in Indonesia in realizing the Golden Indonesia 2045, helping to realize social challenges (Virgiawan Ramadhan, 2024; Wesseling & Edquist, 2018). The values of Indonesia's digital industry has grown significantly from 41 billion dollars in 2019 to 77 billion dollars in 2022 and is expected to increase to 130 billion dollars by 2025 (Ministry of Finance, 2023). In Central Java, General Procurement Plan (RUP) commitments through e-purchasing shows significant growth from IDR 1,485,039,967,001 in 2022 to IDR 2,257,669,213,636 in 2023 and increased to IDR 2,433,331,342,800 in 2024 (APBJ, 2021).

Digital transformation in public procurement will have an impact on increased efficiency and transparency, further perspective, sportif competition, growth of innovation and collaboration, as well as the realization of economic recovery and growth of domestic industries.

The Provincial Government together with related stakeholders continue to encourage the strengthening of the regional economic foundation by setting the SMEs digital transformation agenda as one of the priorities. By using digital technology optimally, SMEs can obtain several benefits, including having a wider and larger consumer base, increasing revenue, reducing costs and facilitating monitoring of business activities (Chan et al., 2019; Liu & Yang, 2019).

Economic growth has become one of the benchmarks of government success in implementing development programs. It is regard, the dynamic ability to plan and support programs with the concept of people's economy, which makes SMEs the main basis in realizing an inclusive and sustainable economy, is a major challenge (Teece et al., 2016).

Public procurement has an important role in the implementation of regional development to improve public services and the development of the national and regional economy. For this reason, it needs to be regulated in its implementation in accordance with the vision of the Public Procurement Policy Agency, which is to become a credible reformer to realize procurement that produce value for money to improve public welfare and regional competitiveness.

Digital procurement transformation has become a key in spurring economic growth in many regions (Alabdali & Salam, 2022). By utilizing the adoption of digital technology, the procurement process becomes more efficient, effective, transparent, accountable, and supports the growth of business sector (Luo et al., 2023). This article will discuss how digital procurement transformation would accelerate the economic growth of Central Java Province.

## II. RESEARCH METHOD

This research uses a literature review and descriptive approach. Descriptive analysis method according to Sugiyono (2016:15) is to analyze, expose, summarize various conditions, situations from various data regarding the problem under study or observed. Research based on literature review or secondary data research to understand the digital procurement transformation encourages acceleration of economic growth in Central Java Province.

## III. RESULTS AND DISCUSSION

1. Analysis of the implementation of digital procurement transformation in Central Java Province.

1.1. Human resources management of procurement information systems.

Based on article 74 of Presidential Regulation number 12 of 2021 concerning Amendments to Presidential Regulation number 12 of 2018 concerning Procurement of Government Goods/Services, that the function of Goods/Services Procurement within Ministry/Institution/Local Government is carried out by the Function Management Resources of Procurement. Ministry/Institution/Local Government are required to have a Procurement Personnel, compile and manage an Action Plan for fulfillment of Goods/Services Procurement Personnel in accordance with the Regulation of Head of the Government Procurement Policy Agency of the Republic of Indonesia number 6 of 2021 concerning Guidelines for the Compilation and Management of Action Plans for Fulfillment of Goods/Services Procurement Personnel (LKPP RI, 2021). In the literature, procurement effectiveness is closely related to the competence of human resources involved in the procurement process (Jaffu & Changalima, 2023; Kiage, 2013).

In the management of the goods/services procurement information system under the coordination of one personnel as Head Division of Procurement Information System Management, two personnels of specialty functional and seven personnels of general staff. The Goods/Services Procurement Administration Bureau of the Regional Secretariat of Central Java Province is led by one personnel as Head of the Goods/Services Procurement Administration Bureau, two personnels as Head of Divisions, 4 personnels as Head of Sub-Divisions, 48 personnels as Technical Functional (JFT) and 25 personnels as General Functional (JFU), as shown in the attached table.

*Table 1. Human resources for goods/services procurement management in 2024*

| | Echelon II | Echelon III | Echelon IV | JFT | JFU | Total |
|---|---|---|---|---|---|---|
| Head of Bureau | 1 | 0 | 0 | 0 | 0 | **1** |
| Division of Procurement | 0 | 1 | 3 | 40 | 12 | **56** |
| Division of Procurement Information System | 0 | 1 | 0 | 2 | 7 | **10** |
| Division of Development and Advocacy | 0 | 0 | 1 | 6 | 6 | **13** |
| **Total** | **1** | **2** | **4** | **48** | **25** | **80** |

Source: Central Java Employee System (Employee Bureau)

1.2. Transaction value

The value of goods/services procurement transactions in Central Java Province showed a positive trend during fiscal year 2022-2024 period. The General Procurement Plan Commitment (RUP) for e-purchasing amounted to Rp1,485,039,967,001 in 2022, increased to Rp2,257,669,213,636 in 2023, and amounted to Rp2,433,331,342,800 in 2024. Meanwhile, the Transaction

Value (Catalog and Local Catalog, which is famous for Blangkon Jateng) amounted to Rp1,043,047,094,707 in 2022, increased to Rp1,979,695,825,906 in 2023, and has reached Rp1,599,870,113,351 as of April 30, 2024. The percentage of completed transaction status continues to show a significant increase from 43.56% in 2022, rising to 77.57% in 2023. Details are shown in the attached table.

This means that the digital procurement transformation has driven an increase in the value of transactions, the percentage of transaction value and the completion status of complete transactions (Zhao et al., 2022).

*Table 2. Central Java e-Purchasing Value in 2022-2024*

| | 2022 | 2023 | 2024 (April) |
|---|---|---|---|
| RUP Commitment e-Purchasing | 1.485.039.967.001 | 2.257.669.213.636 | 2.433.331.342.800 |
| Transaction value (eCatalog+Blangkon) | 1.043.047.094.707 | 1.979.695.825.906 | 1.599.870.113.351 |
| Transaction status is complete | 646.904.405.944 | 1.751.206.841.061 | 192.314.844.193 |
| % transaction value | 70,24% | 87,69% | 65,75% |
| % complete status | 43,56% | 77,57% | 7,90% |

Source: Central Java, Procurement Management Information System

1.3. Number of packages, e-catalog providers and marketplace.

The number of goods/services procurement packages, e-catalog and Marketplace providers in Central Java Province continues to show an increase during the 2022-2024 period. The total number of e-Catalog packages was 3,934 packages in 2022, increased to 7,512 packages in 2023, and until April 2024 a total of 3,481. The number of SME providers from 1,247 providers in 2023, increased to 1,684 providers in 2024 (April). Marketplaces that cooperate with the Central Java Provincial Government through the Blangkon Program Technical Agreement increased from 1 marketplace in 2022, to 4 marketplaces in 2023, and 5 marketplaces in 2024. Details are shown in the attached table.

This shows that ease, speed, accessibility through digital procurement transformation increases the involvement of SME in goods/services procurement (Priyono et al., 2020; Ulas, 2019) and business process performance in economic turnover (Bag et al., 2020).

*Table 3. Central Java e-Catalog Provider and Marketplace Year 2022-2024*

| | 2022 | 2023 | 2024 (April) |
|---|---|---|---|
| Total e-Catalog Package | 3.934 | 7.512 | 3.481 |
| E-Catalog Provider: | | | |
| - Micro Business | N/A | 300 | 412 |
| - Small Business | N/A | 637 | 888 |
| - Medium Business | N/A | 84 | 115 |
| - Non-SME | N/A | 226 | 269 |
| Number of Marketplaces | 1 | 4 | 5 |

Source: Central Java, Procurement Management Information System.

1.4. Use of digital platforms

Since 2021, the Central Java Province has launched Blangkon Jateng Program, which is famous for Central Java Online Shopping. Blangkon Jateng is an internalization of changes in work culture towards digitalization of goods/services procurement, with the aim of providing convenience and business expansion to small, micro and enterprise business in the government procurement market, encouraging SMEs to Go Digital, making procurement more inclusive, increasing the use of domestic products, utilizing marketplaces in procurement, and last but least increasing transparency and accountability of procurement.

In conjunction with the needs and developments, the Public Procurement Policy Agency on March 28, 2024, launched the e-Catalog Version 6, which is built to improve the performance of e-Purchasing System by cooperating with Telecommunication Indonesia (Telkom). The advantages of these features are the ease of finding products, making payments, and monitoring the ongoing transaction process. Users will be able to quickly find the information they need, thus speeding up the procurement process. The Central Java Province is one of the Ministry/Local Government appointed as a pilot project.

This shows that electronic procurement service in Central Java Province is running appropriately, and it is piloting for further exercise in the development of electronic procurement systems.

1.5. Help desk's electronic procurement services (LPSE)

In an effort to implement LPSE management, optimization of roles and responsibilities in the implementation of service management has been carried out, which aims to: 1) ensure that each LPSE person takes the role of carrying out their duties and responsibilities properly, 2) synergize processes in all LPSE areas in order to realize good, effective and efficient IT Services Management, 3) facilitate monitoring and evaluation as material for improvement, 4) support and realize the integrity of reliable LPSE, 5) provide improvements and implementation of ITSM in accordance with service standardization (Deputi II LKPP, 2022).

Based on above analysis of the implementation of digital procurement transformation of goods/services in Central Java Province, the challenges in the digital procurement transformation include:

- Integration and Migration: integration is closely related to Application Programming Interface (API) services, which is a set of rules, protocols, and tools that allow various software and applications to interact and communicate with each other. Integration of National Procurement Plan Information System (SIRUP) with Regional Government Information System, Ministry of Home Affairs (SIPD), Local SIRUP with National SIRUP, SIPD with e-planning and e-budgeting are becoming challenges. Database migration, application migration, and server migration from LKPP to Telkom servers that require system adjustments, error/bugs, system downs and other technical problems require coordination and collaboration among stakeholders across Ministry/Institutions/Local Governments.
- Data security and privacy: as the procurement process becomes increasingly digitized, concerns about network security, and data privacy become priority and important issues.
- Improve LPSE governance in the digitalization of goods/services procurement.
- Change management: the shift to digital requires changes in work culture and organizational processes, which are resistant to change.
- Human Resource Capacity: strengthening the capacity, skills and knowledge of electronic procurement service managers periodically as needed and continuously.

2. Analysis of the impact of digital transformation of public procurement on economic growth in Central Java Province.

2.1. Improve efficiency and effectiveness

Digital transformation encourages faster and cheaper procurement processes, saving time and cost for government and business. This is shown in the percentage of e-purchasing transaction value until April 2024 has reached 65.75%. digitalization of procurement processes and by-system transaction minimize the risk of budget misuse and prevent corruption. Furthermore, increased access for business actors, especially SMEs to participate in procurement of government goods/services, as indicated by e-catalog provider from 1,247 providers in 2023 to 1,684 providers in April 2024 (APBJ, 2021).

2.2. Increased transparency and accountability

All information related to the procurement process is available online through the electronic procurement system (SPSE) and can be widely accessed by the public. The procurement process is well-documented and can be audited by both internal (inspectorate) and external parties (Government Audit Board or Law Enforcement Officials). Furthermore, the digital transformation of public procurement has increased public trust in government and the procurement process.

2.3. Increasing competitiveness and innovation

The digitalization procurement transformation has made it easier for business to obtain information and participate in tenders. In addition, it opens opportunities for new business actors to participate in the procurement of goods/services. As well as encouraging innovation in product and service development, especially for Small, Micro and cooperative Enterprises (Bag et al., 2020; Harju et al., 2023; Zhao et al., 2022).

2.4. Achievement of regional key performance indicators by 2024

Digital procurement transformation has contributed to the achievement or fulfillment of the regional target of the main performance indicators (IKUPD) of the Procurement Bureau, Central Java Province. With the target of increasing the effectiveness and accountability of local government administration, and target indicators: effectiveness of procurement services. From 90% target in 2023 IKUPD Bureau APBJ, a realization of 92.5% has been achieved, this is obtained from the average value of tenders (212 packages=100%), e-purchasing (9,933 packages=100%), and recording (17,385 packages=77.58%) (APBJ, 2021).

2.5. Appreciation and awards

An awards and appreciation for innovation in e-procurement services and procurement management information system, the Government of Central Java Province has received the Bronze Champion Innovation for

SMEs Empowerment – Direct Shopping for Central Java Online Stores (Blangkon Jateng)" Award. This shows that the digital procurement transformation realizes maturity (Seyedghorban et al., 2020).

2.6. Collaboration and integration drive economic growth

Blangkon Program in Central Java has a memorandum of understanding with five marketplaces. They are: 1) GratisOngkir, which is homebased in Klaten, 2) Toko Gramedia in Ungaran, Semarang Regency, 3) Tiga Serangkai in Surakarta Municipality, 4) Indotrading with headquarter in Jakarta, and 5) Toko Ladang in Surabaya, East Java. This shows that digital procurement transformation indirectly accelerates economic growth (Dwi Aprilia et al., 2021; Virgiawan Ramadhan, 2024), collaboration provides both opportunities and challenges for sustainability (Aksin-Sivrikaya & Bhattacharya, 2017).

3. Analysis of factors affecting the successful implementation of digital procurement transformation in Central Java Province.

3.1. System capability in supporting data analysis

The APBJ Bureau, Central Java Province since 2022 has developed Procurement Monitoring Information System (known as SIMONBAJA) and Procurement Report Information System (known as SILALAPBAJA), which is integrated with the National SIRUP and LKPP. This is so important in delivering data analysis, which is submitted regularly for policy making. Procurement digitization increases information processing capacity, data analysis and reduces uncertainty, improve efficiency and effectiveness of procurement processes (Hallikas et al., 2021; Harju et al., 2023).

3.2. Internet infrastructure availability

The APBJ Bureau, Central Java in-term managing e-procurement services has prepared a stable and high-speed internet network. Technically, it has capability to provide dedicated 100Mbps connection services, fiber optic network with service level guarantees up to 99%, symmetric 1:1 Quality of Services (QoS), and availability to provide Multi Router Traffic Graper quarterly. The literature shows that information communication technology (ITC) infrastructure has an important role as one of the success factors in procurement's adoption (Afolabi et al., 2019; Chiang et al., 2021).

3.3. Human resource capacity of LPSE personnel.

The availability of human resources has a very important role in successful and sustainability management of procurement information systems. The Division of Procurements Information System Management has 10 personnels, which is consist of: 5 personnels with Diploma Degree, 4 personnels with bachelor's degree, and 1 personnel with Doctorated Degree, thus further strengthening the capacity and capability in managing the Procurement Management Information System (LKPP RI, 2021).

*Table 4. Human resources for procurement information system 2024*

| | **Doctoral** | **Master** | **Bachelor** | **Diploma** | **Total** |
|---|---|---|---|---|---|
| Division of Procurement Information System | 1 | 0 | 4 | 5 | **10** |
| **Total** | **1** | **0** | **4** | **5** | **10** |

Source: Central Java Employee System (Employee Bureau)

3.4. Socialization and education for business actors.

Stakeholders' collaboration among government, private sector, academia, and the media encourage economic growth in Central Java. Various activities such as Marketplace Socialization and Business Matching brings together between SMEs, policy maker and procurement workers, those encourage participation and purchase (Hoekman & Taş, 2022).

3.5. Standard operating procedures (SOP)

The implementation of standardization refers to 17 LPSE standards year 2017 is one of the factors that encourage the successful implementation of the digital procurement transformation. Standardization is update or adjusted based on changes and regulations set by the Indonesian Government for Procurement Policy Agency (Deputi II LKPP, 2022).

3.6. Data security and privacy.

Data security and data privacy cannot be separated from the support and guarantee of the information technology technical team under LKPP and Central Java Provincial Communication and Information Officer as Provincial Data Center's Manager. The centralized e-procurement system application is updated and changelog by LKPP Central Information Technology Team and is currently managed by Telecommunication Indonesia. In addition, to ensure data security, it is backed up by Electronic Certification center (BSrE) which is a technical unit at the Cyber and Crypto Agency (BSSN). Empirical research shows that private security, public procurement security has become an important issue and concern in various parts of the World (Ruohonen, 2020).

3.7. Budgeting

The successful implementation of digitalization procurement transformation cannot be separated from the budget element in carrying out the main tasks and functions of managing procurement information system. Budget allocation according to program needs adjusts to priorities and financial bases.

This is also inseparable from the support of leadership in determining policy directions, strategies and priorities in the management of public procurement information systems. Initiation of budgeting process and being one of the success factors of the impact of digital implementation (Derbeneva & Starodubets, 2021; Muminov & Zakhirova, n.d.).

3.8. Monitoring evaluation and helpdesk

Monitoring evaluation and helpdesk for e-procurement services management are carried out every working day according to a schedule and teamwork with designated personnel. In addition, a person in charge (PIC) has been established as a contact person for each working group and intersectoral among organization in Central Java Province.

## IV. CONCLUSION

Based on the research results, it can be concluded that the implementation of digital procurement implementation has had a positive impact on economic maturity and growth (Seyedghorban et al., 2020).

Digital procurement transformation plays an important role in accelerating economic growth in Central java Province. By utilizing digital technology, efficiency, transparency, and inclusion of SME's growth. Steps towards successful digital transformation need to be implemented comprehensively to ensure maximum benefits from the adoption of procurement's digital technology (Luo et al., 2023; Nandankar & Sachan, 2020).

To encourage accelerated economic growth in Central Java Province, recommendations for digital procurement transformation policies can be conveyed as follows:

1) Digital infrastructure development: can improve digital infrastructure, such as expanding the reach of internet penetration, improving the quality of digital infrastructure, and facilitating access for business, especially SMEs.
2) Human resources capacity development; increasing the capacity and knowledge of human resources on regulations, training, best practices, helpdesk in the management of procurement services (LPSE), as well as building a digital culture within Provincial officer and Business Actors.
3) Facilitation of SMEs: strengthening the facilitation of SMEs with marketplaces through activities such as Business-Matching, Joint Workshop with Government and Business Actors, technical guidance, socialization and education on update to e-procurement system and management of procurement information system.
4) Development of procurement information system: integrated with LKPP system, to utilize data and technology to improve efficiency and transparency in public procurement, as well as the development of data analytics as the backbone of decision making.
5) Development of e-catalog and online store: as needed and collaborating through technical agreements with marketplace incorporated in the Blangkon Program and upgrading the Provider Performance Information System (SIKAP) to a Vendor Management System (VMS) to manage products and contracts.
6) Monitoring and evaluation: periodically monitoring and evaluation towards the performance of digital procurement transformation, and adjusting policies and strategies based on the results of monitoring and evaluation.
7) Improved governance and budget allocation for the management of procurement information system to realize quality service, availability of adequate capacity, privacy and information security are maintained.

## AUTHORS CONTRIBUTION

All authors contributed toward preparing data, methodology, analysis, drafting and revising the paper, and agree to be accountable for all aspects of the work.

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# Operation of Radio Frequency Identification Technology to Control Cattle Movements

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***Abstract***— *Cattle theft is a critical social problem in Madagascar. Tools for traceability management are still not effective up to the present time. This research aims to contribute in the fight against this scourge. It is based on the implementation of a mobile identification system and the development of a software called "Omby" which purpose is to make systematic controls of cattle movements. RFID and ICTs technology is adopted for the traceability system. The application is written in C++ language and is developed with the programming and interface creation tool QTcreator 1.2.1. An Arduino Mega 2560 card is used to make mobile control system. This application allows to scan and generate the cattle ID number by referring to an existing database. The system created by this new technology facilitates the fight against cattle theft as a result of real-time availability of the oxen localization as well as information regarding them. It could be also used to improve animal health.*

***Keywords***— ***radio frequency, Security, tags, animal, Arduino***

## I. INTRODUCTION

Since the dawn of time, it has always been a concern for the human to identify, locate and track objects by using first visual identification then electronic equipment. Several practical systems have been used over the years, unique marks have been placed on objects, and recognition devices could identify these codes and by the same way the object on which they are glued. From there was born the barcode system which, for several years, has allowed the dream for objects identification. However, barcodes present several shortcomings, including the lack of data storage, the need to scan, etc. These deficits have continually pushed man to look for a better solution to overcome this lack, and that's why was born very recently RFID technology which apparently solved the problems of identification, location, tracking and data analysis.

In this work, the exploitation of RFID technology will be addressed to control the herds movement. A number of questions related to issues that cross industries, science and everyday life will be answered, including:

- The emergence of new technology as part of automatic identification systems based on radio frequency calls to its exploration to see its potential, its limits and its analysis in order to assess how it could apply to applications in the domain of identification, health, logistics, equipment maintenance and security;
- Available information on RFID technology remains poorly consistent, complex and sometimes difficult to understand to people to date, making it difficult to make decision for its use;
- Given the exponential growth in the number of items in all domains, there are problems related to identification, tracking, traceability and location. These concerns require a new way of doing, a new technology that will be able to meet these requirements;
- Solving problems related to security and access control for different facilities in high risk areas by the way of traceability, intervention improvement, history tracking and maintenance of equipment;
- Establishing a personal link with the product to control the source and the manufacturing for safety reasons or to integrate it more intimately in individual everyday life by creating a greater interaction between the chain and the product.

Regarding these problems, the objective of this work is to produce a reference document on radio frequency identification RFID technology, analyze its potential and propose an implementation strategy, mostly in the domain of equipment maintenance and safety through application of traceability systems.

## II. METHODOLOGY

Beef industry in Madagascar.

Livestock is the second activity after farming (Fig.1). Cattle farming occupies a prominent place in the animal production sector. Estimated at 7.4 million head in 2000, the cattle herd represents a fixed capital of about 200 million US$ [1].

*Fig.1. The cattle in Madagascar*

This section first highlights the problems of the beef industry in Madagascar

To identify the animal in Madagascar, we use:

the bokin' omby which is identified each year and is issued to each breeders.

the traceability of cattle that is done with marking with red-hot iron since the past or by markings on the ears. This principle was practiced almost in the entire island.

the cattle individual form (FIB) which is issued by the community of provenance before the movement of the animal.

the earring is a codified system of identification set on the cattle left ear to ensure its traceability throughout his life, his displacement and slaughter.

For the movement of cattle, there are " cattle pathways " set by regional order, especially for the bovine in trade (Fig. 2), [2]. The marketing of bovine request professional card valid on the national territory.

*Fig.2. Bovine in trade*

Any standing beef to be exported must be accompanied each of his FIB and also set with earring [2].

Despite all that, problems related to insecurity are stated in rural areas that often occur as bovine theft especially in the provinces of Mahajanga, Toliara and Fianarantsoa.

On average, environ 1.500 oxen heads for every 100,000 inhabitants are stolen each year and among them, one third (323.2 heads) stolen oxen found returned to their owner, [3].

Figure 3 shows the problem of insecurity on the theft of bovine in Madagascar.

https://www.YouTube.com/watch?v=jZhnMFbAu3Y

*Fig. 3. Insecurity problem*

The lack of infrastructure and the nonexistence of an export perspective are key marketing issues. For some time, the annual quota of Madagascar of meat for export to the European market was canceled due to lack of slaughterhouses coping with international standards and non-traceability of animals. Table I shows the evolution in quantity in tons of meat.

*Table II. Evolution in quantity in tons of meat from the year 1996 to 2001*

| Année | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|
| Quantité (tonnes) | 1760 | 620 | 74 ,7 | 10,9 | 0 ,04 | 0 ,01 |

Source: [5]

Thus, despite the identification principle that the Ministry of livestock had done historically, the traceability of livestock is still obsolete.

To address this, the use of radio frequency identification (RFID) technology has been proposed, to facilitate the task of controllers and to fight against any records falsification.

*A. RFID technology*

RFID technology allows to identify an object, follow the path and know features remotely due to a transponder emitting radio waves, attached or incorporated into the object. It also allows reading the labels even without direct line of sight and can cross thin layers of materials (paint, snow, etc.).

Below is the history of this technology and some typical applications.

The origin of RFID technology is obsolete and varied according to the sources. RFID technology according to the approach based on the operation principle, has emerged by the 1920s, then in 1945 a Russian engineer L.Theremin developed a device, [6].

Around the 1940s, the System RFID technology had been used for aircraft recognition. The radars were the reading system which was designed to send a signal questioning transponders placed on the aircraft labels to distinguish allies from enemies. And we can consider that the *System Identity Friend or Foe* (IFF) was the first form of RFID technology use.

Over the years, technology has taken the magnitude, and especially in the 1970s when it was a protected technology and mainly reserved to military use. Developed countries were using this technology for the safety and protection of strategic and sensitive sites (heavy weaponry and nuclear sectors). However, towards the end of the 1970s this technology was used by the private sector, and the first commercial application was the (identification) traceability of cattle in the European continent.

During the 1980s, technological evolution with the invention of Microsystems using integrated circuits led to the use of passive tags or passive transponder. At that time a wide variety of types of transponders, was born.

The beginning of the 1990s was the time of issues related to standardization and normalization of the RFID equipment (transponders and readers).

Since then, RFID technology is used in several s domains of application, passing by the identification, the traceability and the data analysis, [6], [7].

The RFID operating principle is determined by the function of its various components including the base station as main component (Fig. 4) and the transponder (Fig. 5).

*a) base Station :* RFID base station is a main component of the radio frequency part. This module is comprised of encoding and decoding tools to convert binary data into Radio frequency signals, and vice versa, as well as modulation and demodulation tools to transmit the message through a Radio frequency carrier

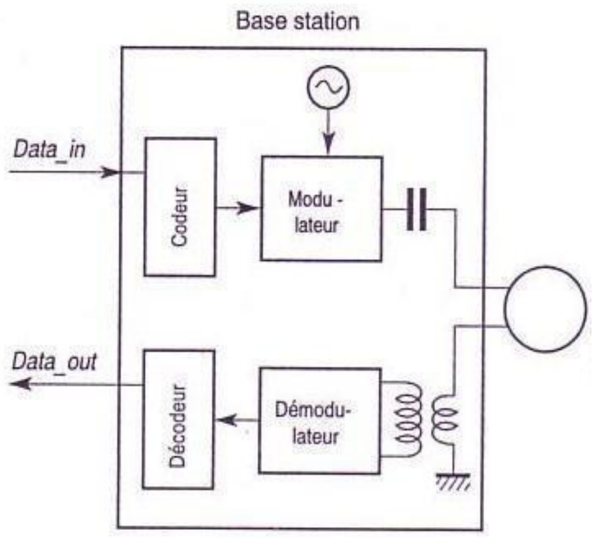
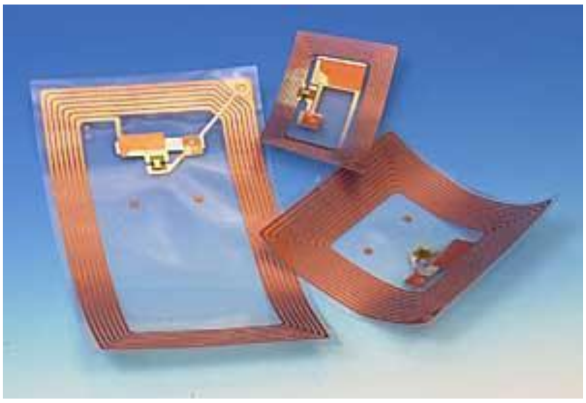



*Fig. 4. Base station*

*b) transponder RFID:* as we see below the example of these transponders (Fig.5).



(a)

(b)

*Fig. 5. Transponder*

Following are some examples of these transponders and the figure beside their architecture, [8].

The first category of transponder is the most classic. It consists of simple tags, which the copper antenna is placed in "square" and flat (Fig.5.a). The inner part is the chip that is the heart of the transponder. (In this example, the transponders are contained in transparent plastic films but this is obviously not always the case).

The second type of transponder presented is a range that is a little more expensive and intended for specific uses, (Fig. 5.b). They are here composed of a cylindrical copper coil antenna and are locked in glass capsules. This category of labels is for animal implantation.

The term radio frequency (R.F) refers to the radio wave which spectrum is located between 3 kHz and 300 GHz. This includes the frequencies used by different means of radio communication, including mobile telephony, Wi-Fi or broadcasting, as well as signals intended for other uses such as radar or microwaves. Table II shows the ranges of frequencies for RFID technology.

*Table II. Ranges of Frequency of RFID Technology*

| Fréquence | Distance de lecture | Applications |
|---|---|---|
| Systèmes RFID en champ proche | | |
| 9 – 135 KHz | quelques cm jusqu'au 50 cm | Les cartes de paiement et passeports électroniques |
| 6.78 MHz | quelques cm jusqu'au 50 cm | Pas beaucoup d'application |
| 13.56 MHz | quelques cm jusqu'au 50 cm | Les cartes intelligentes sans Contact |
| Systèmes RFID en champ lointain | | |
| 433.92 MHz | 1 m jusqu'au 30 m dépendant des applications | Les systèmes RFID actifs aux fréquences UHF |
| 860 MHz ~ 960 MHz | ≈ 5 m jusqu'au 10 m | Les systèmes RFID passifs aux fréquences UHF |
| 2.45 GHz | 1 m jusqu'au 6 m | Les systèmes de pesage, Actifs |
| 5.8 GHz | Inférieur à 1 m | Pas encore beaucoup d'exploitation |

The transmission of signals in this technology is based on the principle of modulation and demodulation of amplitude and frequency, [8].

## III. RESULTS

Because this technology is used to identify a bovine, so related information need to be stored at any location.

### A- Information storage

Here is the animal identity (Fig. 6.). This number is a coding for the information to store.

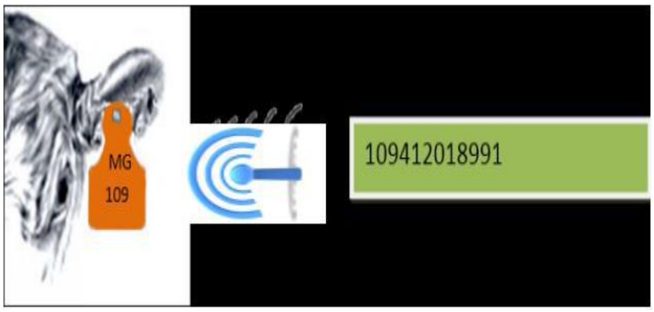



*Fig. 6. Information Storage*

The code is stored on the RFID chip from its conception if the chip is used in read-only mode which is the most interesting and simple manner.

But for the chip that exists in Madagascar, the user can add on additional information, (fig. 7).

*Fig. 7. RFID chip*

If the identification is done in a control system at the slaughterhouse, the information storage is in the software "Omby" that matches both the FIB and he "bokin' omby '.

Figure 8 represents the interface of this software. When pressing the button ENTER, the data recording interface appears. Once the boxes of this interface are met the GENERATE clicked to generate and save the information in a text file. The SCAN button allow to scan the identification number, CHECK to compare the recorded data and the scanned data and then the screen 3. Press EXIT to exit this software.

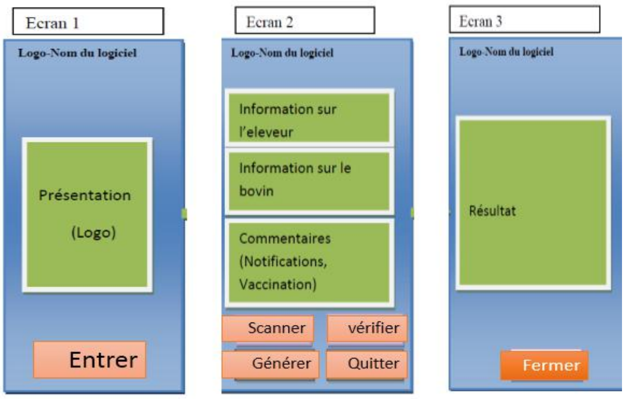



*Fig.8. Omby software Interface.*

*B- Choice of devices to use*

A drive is needed to extract the identification code. The Philips MRC522 RFID reader module is used in this work, (Fig.9).

*Fig.9. Philips MRC522 RFID reader.*

There are two categories of readers: fixed drives and portable players.

The fixe drive is installed on a slaughter chain. In this work, mobile player is formed and model of this drive is the following (Fig.10).


*Fig.10. model of the portable player.*

Then the verification component is also needed. For fixed device, verification is done by a computer. Cattle data are saved in a microcontroller and is transferred to a software that will ensure the veracity of the data.

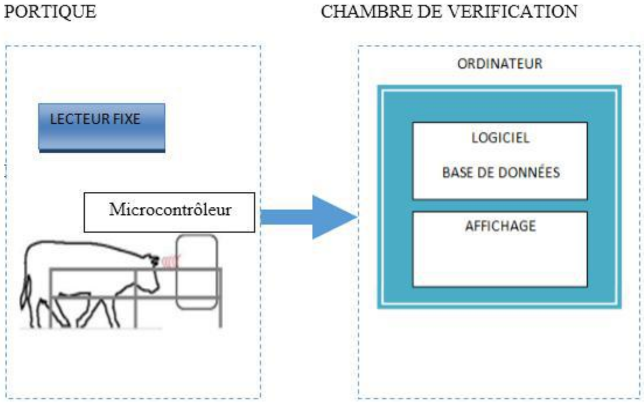



*Fig.11. Checking for a fixed reader.*

For the mobile device, the checking is made by a microcontroller. The result is displayed on an LCD or TFT screen.

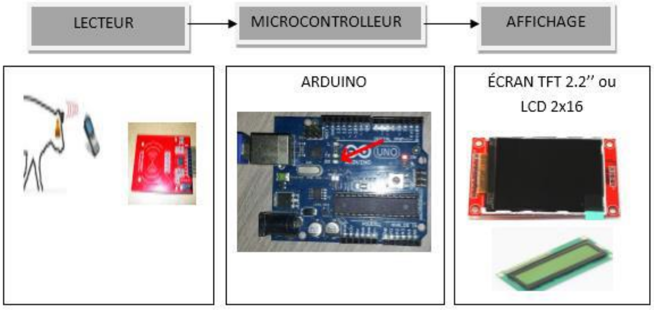



*Fig.12. checking for a portable player.*

*C- Presentation of the mobile identification system*

The realization of this system is based on a microcontroller, Arduino driving a RFID chip reader and a 2 x 16 screen LCD. The flowchart in figure 14 shows the general operation of the mobile device. Figure 13 represents the mobile identification system made

*Fig.13. portable identification reader.*

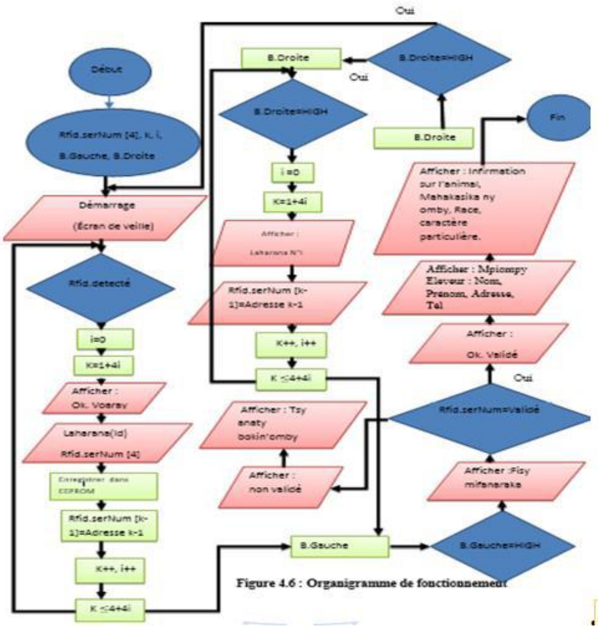



*Fig.14. Operation flowchart.*

*D- Presentation of the software "Omby".*

The implementation of the software interface uses the Qt Creator environment and programming language C++, [9], [10].

Figure 15 shows the "Omby software " for information storage and verification that is used in the slaughter station. for the information storage all cages must be completed before generating and saving the information.


*Fig.15. verification software and information storage.*

## IV. DISCUSSION

This technique of animals identification is already used in Europe and America, [11]. Appeared in the early 1990s on the ear loops and cattle passports, the bar code is the first support of traceability. Today, the flash code and RFID solutions are at the forefront in applications. The solutions developed by the company Arsoe of Britain include all of the treatments that make up the livestock custody chain until the national identification database under the Ministry of Agriculture, [12].

To better trace meat and dairy products, and limit the health crises, the European Union now requires an electronic chip for farmed animals. The 'RFID' chip will be mandatory for the goats and sheep by July 2013, [13]. Today electronic identification is used on a daily basis. In animal production, the generalization of RFID has the advantage of avoiding the re-identification and the risk of errors. Other applications are possible in automated weighing, direct notifications of outgoing/incoming animals, operations of contention and selection of lots driven by RFID barriers.

Beyond the animal identification, this work allows to solve specifically some traceability problematic related to bar codes printing, labels edition, the flow management, the containers and logistics management.

Since they can buy earring in which RFID chips are socketed, breeders like to escape tasks that their appear still tedious even if they themselves are significantly reduced in recent years: the entry and registration of animal identification.

### A- *Mobile identification system*

This unit with two buttons allows an easy verification, brings comfort of work of a bovine identification and improve current working methods.

This new device fully meets the expectations of farmers involved in the projects.

*(a) benefits:*

Immediate verification : data is immediately recoverable.

Automation of the identification verification (commercial operators): this device allows to perform an automatic consistency between the loops and the passport check. Thus, we can reduce tax evasion and theft of bovine.

Time saving: time to raise the numbers of a batch of 10 weanlings was estimated at more than 20 minutes.

Security: it is more necessary to catch the ear of the animal to read the issue in its entirety.

Reliability: readings, no error of seizure to the statement of the numbers.

*(b) disadvantages:*

Reading rate: reading rates, although very good, fixed playback on animals in motion does not yet consistently 100% reading. For flocks, the unread management may be necessary.

The identification by drone system asks a student frequency field

### B- *fixed iIdentification system*

Electronic identification with the fixed drive (software development) helps to enhance the internal traceability of the market by automating the cross-check between the ear loops and passports of the animals presented for sale.

At the arrival on the market, animals are saved thanks to the scan of the passports submitted by the breeders. The lots are then set for sale. Software on the market realizes a self-test to check the number of animals of the lot and the well agreement between animal numbers and passports.

Condition of use is that fixed playback requires a contention that is adapted to individual reading of the animals.

*(a) Strengths:*

As all kind of devices, the RFID reader has specific strengths:

Reliability of control on passport / loops coherence : allow to guarantee the traceability of batches submitted for sale

Security : it is no more necessary to catch loop to read the number.

Working comfort : automation of the coherence control and alerts management

It is no longer necessary to search for a number in a list on a form or in a set of passport photocopies

Reliability : eliminates entry errors

*(b) general interest:*

Interest on the part of the market Manager. "Omby" is a complete interface of information system which fully responded to the expectations of involved slaughterhouses.

*(c) weak Points and limits:*

The control station cannot scan two animals simultaneously. The installation of the drive requires special attention (limited drive choice, need to use a loop to pass arms through to intervene on the animal).

### C- Condition of use

For the mobile control: only one controller Manager can hold the camera. And only the first leader on animal traceability or the designer is authorized to make data update.

For the fixed control: the data must be completed to avoid error, and the computer must be connected to the fixed drive.

### D- System perfection

To perfect the system, using a drone is an option especially to combat the "dahalo. In this case, the mobile identification device must be embedded in the drone. The drone then scans the area that is supposed to be the Lair of the dahalo, to verify the presence of the stolen cattle before starting any operation.

### E- the disturbance by the physical environment

As said in previous chapter, reading of radio frequency labels is disturbed by the presence of metals in their immediate environment. The use of plastic or wood material is a solution to minimize these disturbances.

### F- Health impact

The questions on the impact of radio frequency on health is debated in recent years, particularly for anti-theft porticos and mobile phones.

Passive tags, themselves, present no risk regardless of their number since they are active only when they are in the field of a player. The studies focus on readers and are intended to define the control criteria for their transmitting power, in order to avoid them to create disturbances on health equipment such as pacemakers or on the human body.

## V. CONCLUSION

Traceability of livestock in Madagascar remains obsolete despite the presence of marking, the Ministry of livestock had done historically. Inadequate slaughterhouse standards and the problem to the marketing of cattle are the main reasons for poor performance. Overall, these experiments in the area of the beef industry showed that electronic identification (RFID) allows to simplify work, make information more reliable, enhance the traceability.

Electronic identification is valuable in the Treaty, in relation to automata and herd management software. Mobile identification device manages a lot of information very quickly. Electronic identification allows obvious gains in terms of reliability, safety (tax fraud, fake passport, etc.).

"Omby" is an application on Windows of the still, or more exactly fixed, identification system. It was designed to demonstrate task and there is a possibility to add other functionality.

This study informs on the development of a RFID cattle ear loop module and also implemented the microcontroller to the APR Arduino, LCD 2 x 16 screen. This material is used thanks to its memory capacity, the number of entry / exit ports, its simplicity, its low price and its availability on the local market. The TFT screen manufactured by Adafruit American society can also be used.

This work also allows to deepen knowledge on electronic devices as well as on computer software development.

Today, the progress of technology is irreversible. For electronic identification, the success is currently reaching the perfection especially in livestock as form of control.

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# Remote Monitoring and Control of Photovoltaic Energy Production by Arduino-Gsm Sim900

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***Abstract*— *The monitoring system is a key element in any energy production installation, making it possible to monitor operating parameters in real time and optimize production. In this article, we present a model of a monitoring system based on the Arduino microcontroller and the GSM module, compatible with any type of solar installation. Our monitoring system uses current, voltage and temperature sensors to measure the operating parameters of a photovoltaic system. We simulated the operation of this system using Proteus software, and the simulation results demonstrated the correct operation of our model. Based on these results, we created a prototype of our monitoring system. The latter is capable of sending measured operating parameters as SMS notifications to a smartphone, thus enabling real-time remote monitoring.*

***Keywords*— *Renewable energies, photovoltaics, microcontroller, Arduino, GSM, monitoring, surveillance, optimization***

## I. INTRODUCTION

Renewable energy production has become a global priority to reduce greenhouse gas emissions and combat climate change. Among the different sources of renewable energy, photovoltaic solar energy is one of the most promising, thanks to its modularity, reliability and low maintenance cost.

However, to optimize solar energy production and guarantee the reliability of installations, it is essential to set up an effective monitoring system, making it possible to monitor operating parameters in real time and quickly detect possible malfunctions.

In this context, our research aims to present a model of a monitoring system based on the Arduino microcontroller and the GSM module, compatible with any type of autonomous solar installation. This system makes it possible to remotely monitor the operation of the installation, to identify possible beginnings of problems, and to receive alerts by SMS in the event of a critical situation or sudden breakdown. Indeed, for a large photovoltaic installation, one day without production can generate a huge loss of turnover. It is therefore important to be informed without any delay.

The proposed system is linked to a GSM/GPRS network, which allows real-time remote communication. As an option, numerous sensors can be added to better identify the beginnings of a drop in performance of a component or to diagnose a problem: wind direction and intensity, air temperature, panel temperature, solar irradiation, etc.

In this article, we present the Arduino-GSM SIM900 monitoring system model, then we describe the steps of its simulation with the Proteus software. Finally, we present a prototype that we created to demonstrate how our system works. The results obtained show that our monitoring system offers a simple, economical and effective solution for monitoring and optimizing autonomous solar energy production. We hope that this contribution will contribute to the global energy transition towards cleaner and more sustainable energy sources.

## II. METHODOLOGY

### 2.1. Harnessing solar energy

Photovoltaic energy has become an increasingly promising solution among energy options, thanks to its advantages such as abundance, lack of pollution and availability in large quantities worldwide. This is all the more important given the increase in the cost of conventional energies and the limitation of their resources.

**2.1. 1. Photovoltaic solar cell**

The photovoltaic cell is the basic element of photovoltaic solar panels. It is a silicon-based semiconductor device which delivers a voltage of around 0.5 to 0.6 V.

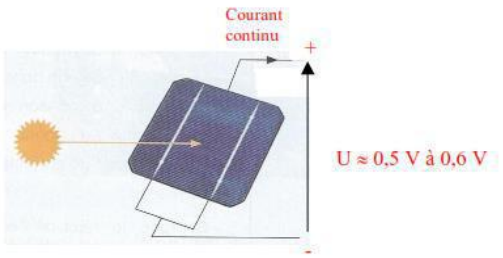


Figure 1: Photovoltaic cell

**2.1.2 . Solar or photovoltaic module**

The solar module or photovoltaic panel is the series and parallel association of numerous cells to obtain greater current and voltage. In order to obtain the voltage necessary for the inverter, the panels are connected in series and then form a chain of modules or "string". The chains are then combined in parallel and form a photovoltaic field. It is also necessary to install diodes or fuses in series on each string of modules to prevent damage in the event of a shadow on one string.

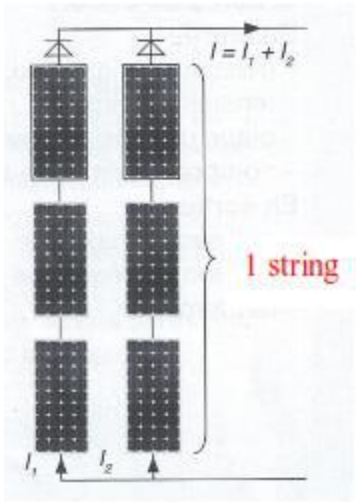


Figure 2: Photovoltaic field

**2.1.3 . Photovoltaic solar power plant**

A photovoltaic solar power plant can be autonomous or connected to a network. Solar power plants connected to the grid have an installed power of more than 100 MWp in 2012, unlike stand-alone photovoltaic solar systems whose power rarely exceeds 100 kWp .

For autonomous photovoltaic solar systems intended to supply electricity to buildings or isolated installations, it is necessary to install charge accumulators or batteries to store the energy supplied by the solar modules and meet all of the needs. This type of installation is suitable for sites that cannot be connected to the network.

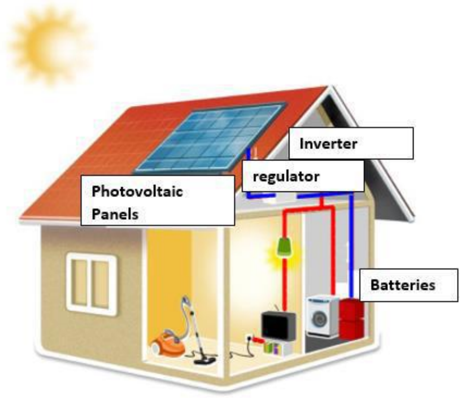


Figure 3: Standalone installation example

In this installation:

- photovoltaic panels produce direct electric current;
- the regulator optimizes the charging and discharging of the battery according to its capacity and ensures its protection;
- the inverter transforms direct current into alternating current to power the AC receivers;
- the batteries are charged during the day to be able to power at night or on bad weather days;
- specific DC receptors can also be used; these devices are particularly economical.

For installations connected to the public distribution network, there are two options: total injection and surplus injection.

- In the case of total injection, all the electrical energy produced by the photovoltaic sensors is sent to the distribution network to be resold. This solution is achieved with two connections to the public network: one for the consumer and one for the injection of the energy produced.
- In the case of surplus injection, the user consumes the energy he produces with the solar system and the surplus is injected into the network. When photovoltaic production is insufficient, the network provides the necessary energy. This solution is achieved with a single connection to the public network and an additional meter to measure the injected energy.

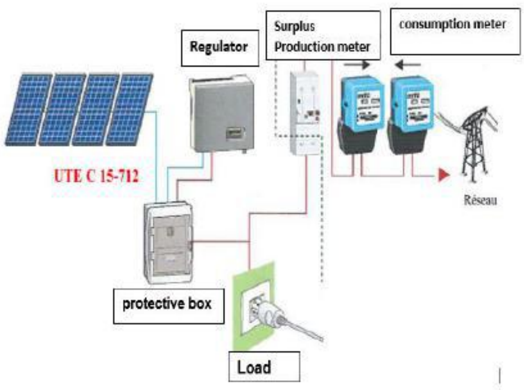


*Fig.4: Facilities connected to the public distribution network with surplus injection*

In a large photovoltaic power plant, there is a control room equipped with electronic and computer equipment to process instantaneous data from the plant on site.

### 2.1.4. Control and monitoring devices

To ensure the proper functioning of a photovoltaic power plant, it is necessary to install control and monitoring devices.

#### 2.1.4.1. Plant status management device

In a photovoltaic power plant, the system state management device makes it possible to give the instantaneous production of electrical energy (kW), the production of electrical energy (kWh/day), the estimate of the reduction in emissions of $CO_2$ and the operating position of the solar photovoltaic system (failed, in service, waiting and stopped).

#### 2.1.4.2. Environmental measurement system

Environmental measuring devices, including solar radiation measuring instruments and temperature sensors, are installed within the solar power plant. These instruments make it possible to record the climatic conditions in the area where the photovoltaic modules are installed. The collected data is saved in a computer.

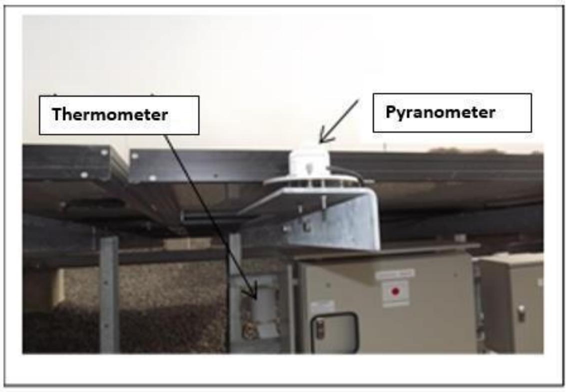


*Fig.5: Environmental measurement system*

#### II.1.4.3. Data acquisition equipment in a solar power plant

A computer allowing the acquisition and processing of data from the various equipment of the photovoltaic solar power plant is often installed. This data is composed of:

- the amount of solar radiation received by the panels;
- the outside air temperature;
- energy production from DC panels and AC inverters;
- the voltage in DC and AC;
- the current in DC and AC;
- the frequency of the inverters;
- reducing $CO_2$ emissions .

The computer allows this data to be observed in real time using software. Data is recorded in log form by minute, hour, day, week, month and year.

### 2.1.5. Upkeep and maintenance operation in a photovoltaic solar power plant

To ensure the proper functioning and lifespan of a photovoltaic solar power plant, it is necessary to carry out regular upkeep and maintenance operations.

*Fig.1: Mops to use for cleaning*

#### 2.1.5.1. Connection control

Connection control consists of the visual inspection of the various installations of the solar power plant to ensure production. The sections to check are:

- the rows of photovoltaic modules;
- junction boxes;
- cabinets in the control room;
- the load switch;
- billboards.

 

This type of check is carried out regularly or irregularly, for example after rain or strong wind which could cause damage.

**2.1.5.2. Component control**

It is a control which consists of periodically carrying out a visual and electrical inspection of the various components of the photovoltaic solar power plant.

**2.1.5.3. Cleaning**

To ensure the performance of installed modules, it is necessary to protect them against dust and shade. Monthly cleaning is therefore very useful to remove dust and possible debris.

**2.2. Microcontrollers**

Microcontrollers are microprocessor-type information processing units to which internal peripherals are added, allowing their components to perform assembly without requiring the addition of additional components. They are today widely used in many public or professional applications, depending on their needs.

Among the most common microcontrollers, we can cite:

- CMOS microcontrollers, such as Microchip PICs ;
- Motorola's 16HC11, which features numerous peripherals such as counters, pulse width modulation (PWM), analog-to-digital converters (ADC), digital I/O, and serial links;
- microcontrollers based on Intel's 8051 architecture (like those from ST, Atmel or Philips), which offer advanced computing capabilities. This family of 8-bit microcontrollers is an industrial standard in its own right;
- Raspberry Pi microcontrollers , which are advanced platforms.

**2.2.1. Arduino microcontroller**

Arduino is an open-source programmable electronics platform, which consists of a microcontroller board (from the AVR family) and software which constitutes an integrated development environment (IDE). This allows you to write, compile and transfer the program to the microcontroller card.

Arduino can be used to build independent interactive objects (rapid prototyping) or be connected to a computer to communicate with its software.

**2.2.1.1. Hardware part**

An Arduino board is generally built around an Atmel AVR microcontroller (like the ATmega328 or ATmega2560 for recent versions, or the ATmega168 or ATmega8 for older versions), as well as complementary components that facilitate the programming and interfacing with other circuits. Each card has at least a 5V linear regulator and a 16 MHz crystal oscillator (or a ceramic resonator in some models). The microcontroller is pre-programmed with a “boot loader” which eliminates the need for a dedicated programmer.

There are thirteen versions of Arduino boards to date. Among the most used in the fields of training and research, we can cite the Arduino Uno and the Arduino Mega 2560. The following table summarizes their main characteristics.

Table 1: Arduino UNO vs Mega 2560 Comparison Chart

| | Arduino Mega 2560 | Arduino Uno |
|---|---|---|
| **Microcontroller** | ATmega2560 | ATmega328 |
| **Dimension** | 101mm*53mm | 69mm*54mm |
| **Operating voltage** | 5V | 5V |
| **Supply voltage (recommended)** | 7-12V | 7-12V |
| **Supply voltage (limits)** | 6-20V | 6-20V |
| **Digital I/O Pins** | 54 (14 of which have a PWM output) | 14 (6 of which have a PWM output) |
| **Analog Input Pins** | 16 (usable as digital I/O pins) | 6 (usable as digital I/O pins) |
| **Maximum current available per I/O pin (5V)** | 40 mA (WARNING: 200mA cumulative for all I/O pins) | 40 mA (WARNING: 200mA cumulative for all I/O pins) |
| **Maximum intensity available for 3.3V output** | 50 mA | 50 mA |

| | | |
|---|---|---|
| **Maximum intensity available for 5V output** | Power supply function used – 500 mA max if USB port used alone | Power supply function used – 500 mA max if USB port used alone |
| **Flash Program Memory** | 256 KB of which 8 KB are used by the boot loader | 32 KB (ATmega328) of which 0.5 KB is used by the boot loader |
| **SRAM (volatile memory)** | 8 KB | 2 KB (ATmega328) |
| **EEPROM (non-volatile memory) memory** | 4 KB | 1 KB (ATmega328) |
| **Clock speed** | 16 MHz | 16 MHz |
| **SPI/I2C** | AVAILABL | AVAILABLE |

### 2.2.1.2. Software part

The Arduino programming environment is actually an IDE dedicated to the Arduino language. This software allows you to write programs (or "sketches"), compile them and transfer them to the Arduino card via a USB connection. It also includes a serial port monitor.

The advantage of Arduino language is that it is based on C/C++ languages, which means that it supports all standard C language syntaxes and some C++ tools. Many libraries are also available free of charge to communicate with the hardware connected to the card (LCD displays, 7-segment displays, sensors, servomotors, etc.).

To write a program with the Arduino language, it is important to respect certain rules. First of all, the execution of an Arduino program is sequential, which means that the instructions are executed one after the other. Then, the compiler checks for the existence of two mandatory structures:

- the initialization and input/output configuration part;
- the main part which runs in a loop and contains the loop () function.

The variable declaration part is optional.

Figure 6 shows the graphical interface of the Arduino IDE, as well as the structure of a program created with the Arduino language.

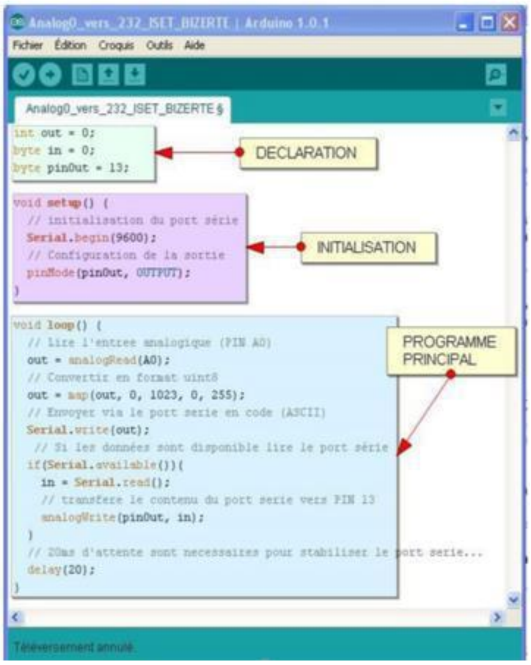


*Fig.6: Program structure on the Arduino IDE*

### 2.2.2. Arduino Mega 2560 board

The Arduino Mega 2560 board is based on an ATmega2560 microcontroller and features:

- 54 digital input/output pins, 14 of which can be used as PWM output;
- 16 analog inputs, which can also be used as digital I/O pins;
- 4 hardware serial ports (UART);
- 1 crystal 16 MHz;
- 1 USB connection;
- 1 jack power connector;
- 1 ICSP connector ("in-circuit" programming);
- 1 reset button.

This board contains everything a microcontroller needs to function. It is also compatible with printed circuits designed for Arduino Uno, Duemilanove or Diecimila cards .

Figure 7 shows the Arduino Mega 2560 microcontroller board.

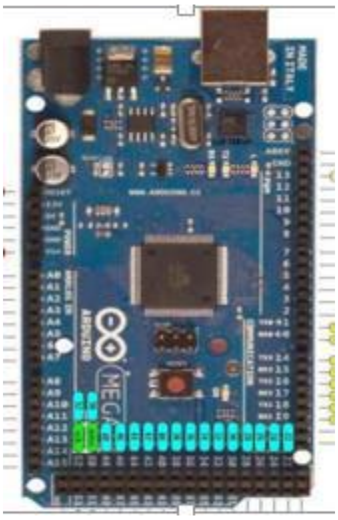

*Fig.7: Arduino MEGA2560 board*

### 2.2.3. GSM/ GPRS module

The GSM/GPRS module is an interface board compatible with Arduino. It allows you to send and receive SMS, data or voice communications from the mobile network. This module is based on the SIM900 circuit and is controlled via AT commands from an Arduino board.

*Fig.8: Sim900*

The module has a remote patch antenna and communication between the module and the Arduino board is carried out via an asynchronous serial link (UART) or a software serial link.

Here are the main characteristics of the SIM900 module:

- Quad-band: 850/900/1800/1900 MHz;
- GPRS data rate: up to 85.6 kbps;
- Serial interface: UART, with TTL or RS-232 voltage level;
- Power supply: 3.4 to 4.4 V;
- Power consumption: 1.5 mA in standby and 2 A in communication;
- Operating temperature: -20°C to +70°C;
- Dimensions: 57 x 55 x 11 mm.

### 2.2.4. Sensor

A sensor is a technical component which detects a physical event linked to the operation of a system (presence of a room, temperature, etc.) and translates it into a signal usable by the system (generally electrical, in the form of a low voltage signal ).

The information detected by a sensor can be very varied, which implies a wide variety of sensor needs. Among the most common and frequent are position, presence, speed, temperature and level sensors.

### 2.2.5. Mounting the control system on Proteus

The proposed system consists of communication module circuit, battery level indicator circuit, ammeter module, temperature sensor, photo resistor and microcontroller module.

The battery level indicator circuit measures voltages across the solar panel batteries and across the solar panels themselves.

The ammeter module allows you to measure the current used by the load and the current supplied by the PV modules.

The temperature sensor allows you to know the temperature inside the inverter.

The photoresistor mounted on the surface of the solar modules makes it possible to monitor the solar irradiation received by the module.

The current (p1, p2) and voltage (V1, V2) communication buses are connected to the photovoltaic installation (figure 10).

For the simulation, we propose an installation of 4 12V/100W solar collectors in parallel and two 12V/150Ah batteries also in parallel. A 300W load is connected to the batteries.

Figure 10 shows the data processing circuit diagram.

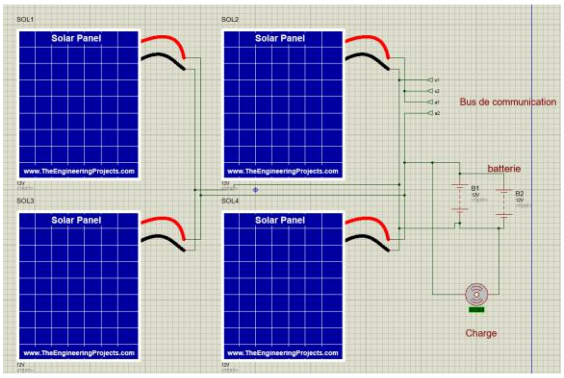


*Fig.10: Solar installation on Proteus ISIS*

## III. RESULTS

We simulated a solar collector with a nominal voltage of 12V on ISIS by connecting it to a 12V/10W lamp (Figure 11). The illumination of the lamp and the intensity increase as the voltage across the solar panel rises from 12 to 18V (Figure 12).

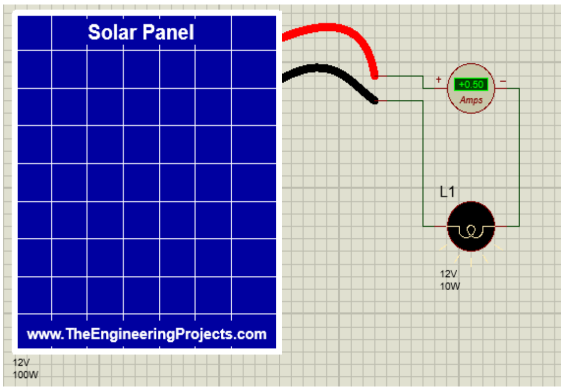


*Fig.11: 12V solar collector with load*

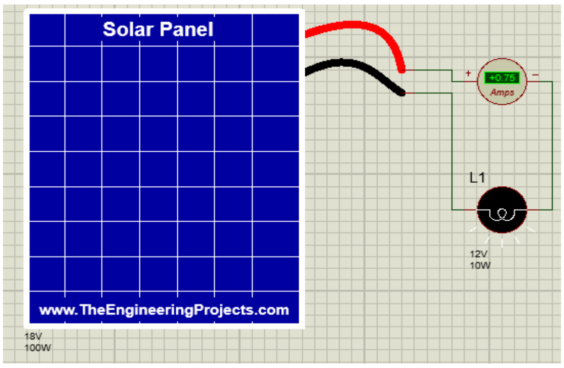


*Fig.12: 18V solar collector with load*

### 3.1. Simulation of the GSM module with the Arduino

To simulate the GSM SIM 900 module with the Arduino Uno, we used the "GSM Arduino-PROTEUS" library on the PROTEUS software. To visualize the process and the SMS, we used a virtual Rx / Tx interface from Arduino (Figure 13).

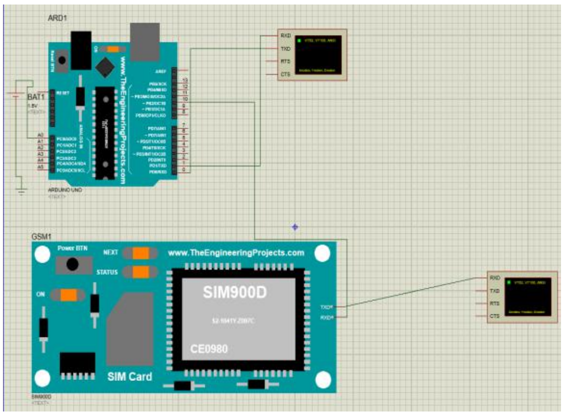


*Fig.13: Simulation of the SIM900 GSM module*

We verified the SMS transmission of the GSM/Arduino system by uploading the program in Appendix 1 to the microcontroller. Proteus virtual interfaces show the SMS sent by the system to a recipient (Figure 14).

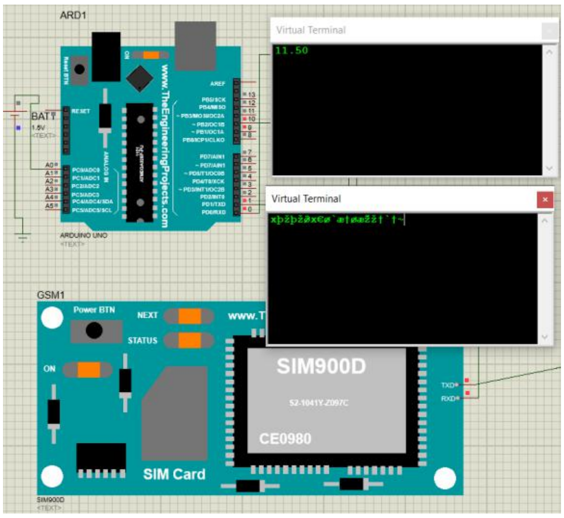


*Fig.14: Observation of the sent SMS*

### 3.2. Temperature sensor simulation

Arduino UNO has a built-in UART for serial communication. The Rx and TX pins (0 and 1 respectively) can be used to communicate serial data with any device (like Bluetooth, GSM, GPS, etc.). We connected the output of the LM 35 temperature sensor to the analog channel A0 of the Arduino (Figure 15).

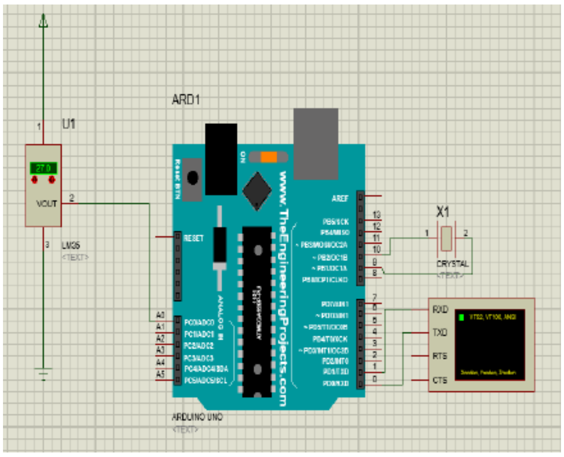


*Fig.15: Arduino-temperature sensor on Proteus ISIS*

By programming the Arduino, the digital output of the temperature sensor is displayed on the Proteus virtual terminal every 1 second (Figure 16).

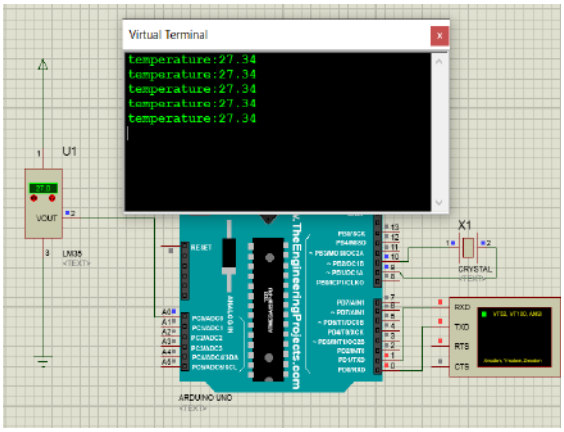


*Fig.16: Temperature sensor simulation on ISIS*

### 3.3. Current/voltage module simulation

The ACS712 current sensor interfaces with the Arduino for measuring AC and DC current. The ACS712 is a cost-effective solution for current sensing in industrial, energy and communications applications.

To calculate the current from the output voltage of the ACS712 current sensor, we performed the following calculations:

- When there is no current flowing through the sensor, the output voltage will be Vcc/2. Where Vcc is the supply voltage supplied to the ACS712.
- If Vcc = 5 volts, then the current sensor output voltage will be 2.5 when there is no current passing through a sensor.
- 2.5 volts is the offset voltage or base voltage of the sensor which must be subtracted from the measured voltage.
- The output voltage decreases as current begins to flow through the sensor.

So we calculated the direct current using the following commands:

Adcvalue = analogRead (A0);

Voltage = ( Adcvalue / 1024.0) * 1000;

Current = ((Voltage - voltage_offset ) / mVperAmp );

The measured numerical value is stored in the variable " Adcvalue ". In the second line, we convert the digital value of voltage to analog voltage in milliamps by multiplying it by the resolution factor and dividing by 1000 to convert it to voltage in milliamps. In the third row, the measured voltage is subtracted from the offset voltage voltage_offset and divided by the sensitivity factor mVperAmp to obtain the measured voltage current.

As shown in Figure 18, the voltage shows the voltage across the ACS 712 and the current shows the measurement which is exactly the same current that we measured with a virtual ammeter in Proteus.

*Fig.17: ACS712 ACS Module*

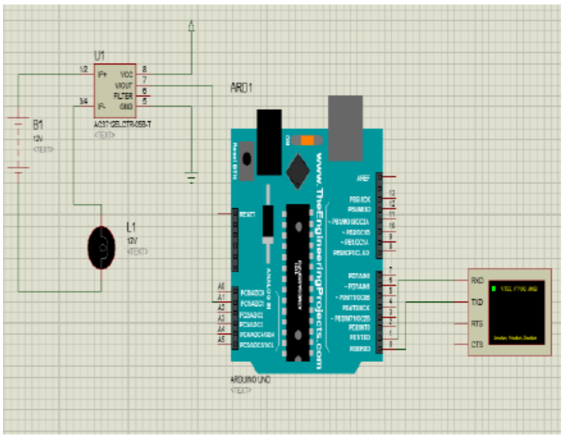


*Fig.18: Arduino and ACS 712 on Proteus*

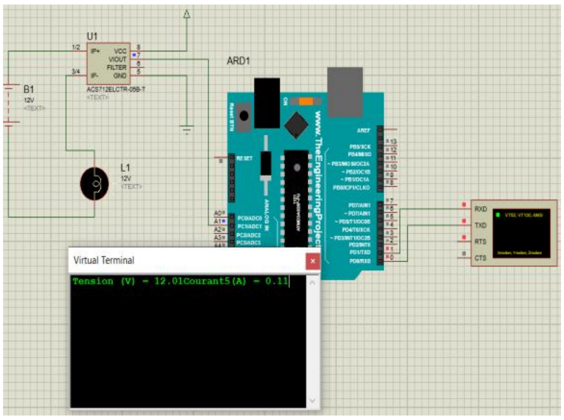


*Fig.19: ACS712 simulation on Proteus*

### 3.4. Creation of a prototype

We created a prototype to test the operation of the system experimentally. Figure 20 shows the completed prototype of the control system of a photovoltaic installation as a whole. In this prototype, we used a 12V/5W solar panel, a 12V/4Ah battery, an Arduino Uno board, a SIM900 GSM module, an ACS 712 module for current measurement and a voltmeter module for voltage measurement .

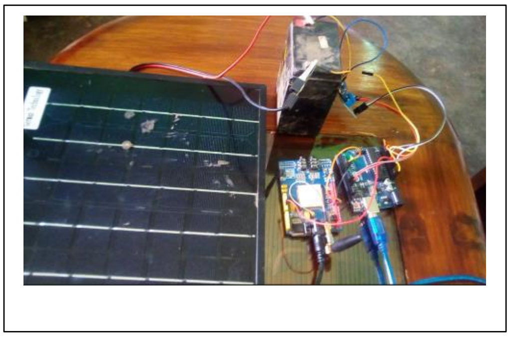

*Fig.20: Prototype*

The system automatically sends an SMS notification in the event of a sudden outage or wiring anomaly between the photovoltaic sensor and the energy storage system (Figure 21). The system also indicates the state of charge (charged or discharged) of the battery (Figure 22).

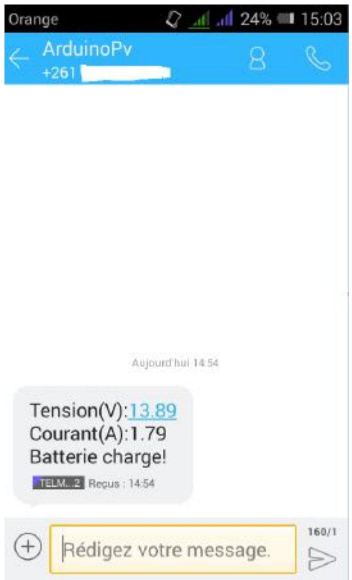


*Fig.21: Cutoff status*

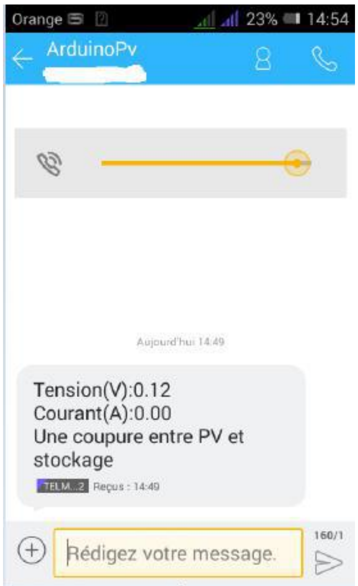


*Fig.22: Loaded state*

## IV. DISCUSSION

The results obtained during the simulation and creation of the prototype showed that the control system of a photovoltaic installation, based on the Arduino platform and the SIM900 GSM module, is functional and meets the remote monitoring needs of the status of the power plant.

The system is able to detect technical failures and transmit SMS notifications to predefined recipients, allowing rapid and efficient intervention by maintenance technicians. In addition, the system makes it possible to monitor the state of charge of the batteries, which is essential to guarantee the continuity of the electrical supply in the event of a power outage.

The Arduino platform and the SIM900 GSM module are reliable and proven components, which guarantee the sustainability of the system over time. However, it is important to note that the lifespan of each component used in the electrical installation can have an impact on the overall reliability of the system.

The target groups that can use this remote control platform are numerous. Firstly, technicians in a photovoltaic plant can benefit from this system to monitor and maintain the installation remotely, reducing costs and travel time. Additionally, home users can also use this platform to monitor and control their own PV installation, allowing them to maximize their solar energy production and reduce their electricity bill.

## V. CONCLUSION

As part of this project, we carried out photovoltaic system control system simulations with the use of Arduino and SIM 900 on Proteus software. We also designed a prototype to test how the system works.

The main objective of this project is the automatic management of a photovoltaic system using an electronic command and control platform. Thanks to this system, we can remotely monitor energy production, be informed in the event of an anomaly or malfunction, and know the available energy storage capacity.

The system is based on the use of Arduino for data collection and processing, as well as the use of SIM 900 for remote communication via SMS. The simulations carried out on Proteus made it possible to validate the operation of the system and to correct any bugs or errors.

In terms of improvement prospects, we can consider the use of another electronic system such as Raspberry Pi instead of Arduino, which would allow broader and more complex management of the photovoltaic system. We could also consider presenting the different parameters (current, voltage, energy, temperature, etc.) in the form of curves or graphs for more intuitive visualization and deeper analysis of the data.

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