

INFORMATION TECHNOLOGY INTERVENTION FOR MSMEs IN LEGAZPI CITY

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ABSTRACT

Micro-Small and Medium Enterprises (MSMEs) are crucial to economic growth and employment, making up 95% of all businesses and employing two thirds of all formal jobs worldwide. This study examined the adoption of Information Technology (IT) by MSMEs in Legazpi City, using a mixed-methods approach to gather both qualitative and quantitative data with the following objectives: (1) Determine the profile of MSMEs in Legazpi City (2) Identify the information technologies used by MSMEs (3) Determine the extent of IT adoption in functional areas (4) Correlate the profile and extent of IT adoption of MSMEs (5) Describe challenges encountered in adopting IT (6) Recommend an IT intervention program for MSMEs in Legazpi City. Results showed that the majority of MSMEs in Legazpi City were sole proprietorships, owned by college graduates in the food service industry, and in business for 5 years or less. Social media was the most popular software used by these businesses. There was no correlation between type of business ownership and IT adoption in production, finance, and marketing functions, but there was a significant relationship in operation and human resources management. The highest level of Educational Attainment of the business owner is also relevant with IT adoption in production, financial, marketing, operation, and human resources functions. The challenges to IT adoption reported by MSMEs included cost and financial constraints, availability, cost of outsourced service providers, and specifications not meeting their needs. In summary, the study found that MSMEs in Legazpi City have adopted IT at an average level.

Key Words: MSME IT Adoption, MSME IT Intervention, MSME IT Enhancement Program, MSME Legazpi City

INTRODUCTION

The Micro, Small and Medium Enterprises or more popularly termed as MSMEs are considered as the primary instrument in spurring economic escalation in the locality as they create local jobs and opportunities using communities' economic resources. MSMEs are considered very important component drivers of development of every economy and of societies according to Houlin Zhao (2016), Secretary-General of United Nations International Telecommunication Union (NU-ITU). World statistics estimates about 600 million jobs will be required by this sector in 2030, a significant figure along issue on the growing global workforce, which makes MSME development a high priority program for many governments worldwide. In most emerging markets, it is documented that MSMEs formal jobs generation were set at a ratio of 7 out of 10 jobs in the market (SMEs FINANCE; Improving SMEs' Access to Finance and Innovative Solutions to Unlock Sources of Capital, 2019). During the last few decades, phenomenal explosion in Information Technology (IT) and in Information and Communication Technologies (ICT) has been witnessed throughout the world. IT/ICT had transformed many economies on a global scale and business become more information intensive, with ICTs virtually affecting every aspect of economic activities.

The United Nation Sustainable Development Goals (SDGs) have included achieving universal affordable access to the Internet as part of its targets as a way to encourage governments, companies, local and international organizations, and members of civil society to continue working to get more people online. Countries around the world responded by having it in their top priority to provide affordable access to Internet and high-quality ICT and building a dynamic digital-ecosystem that enhances the creation and development of local technology driven MSMEs. The Coronavirus Disease 2019 (Covid-19) a disruptive pandemic, demonstrated the importance of IT and ICT as it became very useful by providing platform for online transactions due to restrictions and limited face to face interaction. Small businesses in the food and beverages, medical, and even some service sector are able to reach and serve their clients through online and messaging (The Manila Times, December 2020). In the Philippines, MSMEs have taken a very important part in economic development. The reduced poverty incidence by generating local jobs to absorb ever rising labor force statistics that eventually stimulated economic development. In 2016, Information and Communications Technology (ICT) Innovation Forum was held at the city of Legazpi, Albay, through the effort of the city government and Albay ICT Association. The forum's intention was to promote information technology and business-process management (IT-BPM)

practices and careers. Further, the city government promotes information-technology hub and industrial parkland establishment.

FRAMEWORK OF THE STUDY

This study that looked into IT adoption for MSMEs is anchored on the premise that even MSMEs that operate locally should adopt appropriate innovative IT technologies for them to improve their external network, internal operation and market reach and be competitively sustainable in the *Volatility, Uncertainty, Complexity & Ambiguity* (VUCA) world in business as well as the economy. To support that concept, the study is being anchored on the *Theory of Constraint*, the *Grand Unified Theory of Business Development* and its sub-theory known as *Unified Theory of Acceptance and Use of Technology (UTAUT)* to guide the activities of the study. The study looked into the current condition of MSMEs along technology adoption by establishing relevant demographic profile of these MSMEs because it could have bearing as to the decision of the enterprise to use or adopt IT in their operation or not. Demographics such as; the type of ownership of the business, the current net worth, the size of the business operation and the line

business were established and studied how they influence MSMEs' decision of adopting IT in the enterprise's operation. The MSMEs IT adoption was also be investigated. For instance, are there MSMEs in Legazpi that are already IT adopters? The study identified the information technologies used by these early adopters, then, the extent of its use in the different functional areas of management of the business organization, such as in finance, production, marketing, operation and human resources management. The challenges that these MSMEs experienced in adopting or acquiring appropriate IT and innovative technologies were investigated as well, to provide ideas on what drive the adopters to acquire IT technology and what are the deterrent factors for those who had not acquired and use technology yet. Data gathered were analyzed using the steps of TOC in identifying the constraint why these MSMEs found it hard to adopt IT in their business operation. The possible remedy to identified constraints were formulated guided by the UTAUT. The data and the result of data analysis helped in the development of an Information Technology Adoption Program for MSMEs. The researcher proposed a functional and academically reviewed Information Technology Adoption Program for the MSMEs in general and the MSMEs of Legazpi in particular.

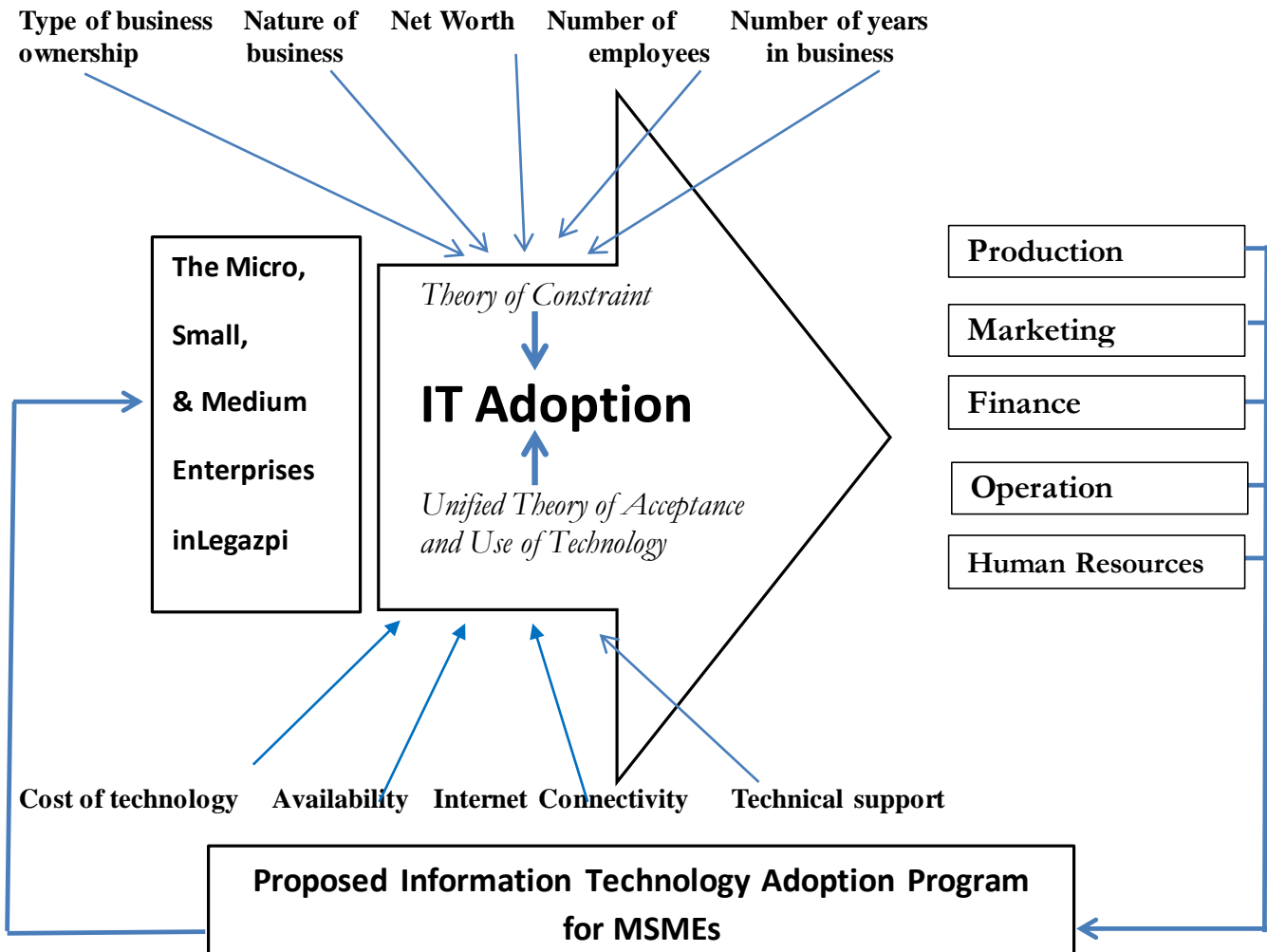


Figure 2: The Conceptual Paradigm

**BRIEF REVIEW OF RELATED LITERATURES &
STUDIES**

The Philippine MSMEs are defined by the DTI and the Magna Carta for MSME business. The role of MSMEs as drivers of economic development was also aptly discussed. Literature on information technology (IT) adoption in business and the MSMEs in particular abound - both local and foreign. These are the papers of Matikos (2014), Potter (2013), Muske, Wards, Swinney & Khoo (2007) Makeeves, Anderson & Kack (2014), Battilan, Casciaro (2012) and Soriano 2017. The findings of Moteagudo & Buindia-Martinez (2013), Godar, O'connor and Tylor (2005) said that MSMEs are the local innovators and business ideas generators.

Literatures show that MSMEs growth is affected by the kind of employees they have, but hiring the right employees remains as one of the challenges (Hull, 2013); (Nicolas, 2006); (Truk, 2014); (Shiemens, 2014); (Mazzarol, 2013); and (Yoshie & Taghizadeh, 2003). MSMEs are also challenged along market reach and network with suppliers, and recommend massive technology usage for better access (Boehe, 2013; West & Noel, 2009). But this challenge is connected with financial challenges, and lack of information knowhow on technology and experience. Market reach and marketing were also seen as growth challenge for MSMEs due to big business has many times the capacity for marketing. Numerous literature suggest that MSMEs take advantage of IT in accessing funds, markets and even supplier through internet of things (Boehe, 2013; West & Noel, 2009). Literatures also show that integrated markets such as the ASEAN and the integrated market around the world are reported to be investing on IT, digital technology infra-structure, and educational support for their MSMEs to be able to speedily adopt IT technologies in their business operation. Facilitating IT adoption through efficient technology eco-system is accessible according to Dejardins (2018), Allen (2017) and Qu (2018), Kudasz, Liddle, Makowski, & Schmitz-Felten (2010). MSMEs and IT adoption and innovation are also highly researched areas (Barroga, Dingal, Dipositario, Rola, Pura And Pabuayon, 2019; Bélanger, 2014; Sequera, Swathi and Surekha, 2012; Lim, 202) with focus on finance and marketing (Hamundu, Husin and Baharudin, 2021; Jenyo and Soyoye, 2015). Factors to MSME IT adoption were reviewed like the paper of

(Bengston, Boter & Mead, 2007; Jones, Simmons, Packham and Davies (2014; Ashurst et al., 2012).

During disruptive situation like the Covid-19 pandemic and natural calamities, MSMEs are the most vulnerable sector of industry, and their profit earning opportunity is greatly hampered. Literatures along that also suggest that they invest on adopting IT solutions to lessen the adverse effect of disruption. This find support in the studies of Shafil, Liu and Ren (2020), The DTI Monitoring Report on MSMEs Competitiveness (2020), Qu (2018). And the government agencies such as DTI and DOST are the most active in supporting the MSMEs towards IT adoption and innovation. Along that, theoretical frames were reviewed and found that the Theory of Constraint and the Grand Unified Theory of Business Development together are the most appropriate frame supported by the sub theories where the theory models is anchored on behaviour, i.e., use of the new technology (Sharma, 2009).

OBJECTIVES OF THE STUDY

The study was conducted to determine the Information Technology Adoption of the Micro, Small, and Medium Enterprises (MSMEs) in Legazpi City. Specifically, the study sought to:

1. Determine the profile of MSMEs in terms of:
 - a. Type of business ownership
 - d. Number of employees
 - b. Highest Educational Attainment of Originator
 - e. Number of years in operation
 - c. Nature of business/Industry
2. Identify the information technologies being used by MSMEs in terms of:
 - a. End-User devices/terminals
 - b. Software/Applications
 - d. Database
3. Determine the extent of IT adoption of MSMEs along:
 - a. Production
 - b. Financial Resource
 - c. Marketing
 - d. Operations
 - e. Human
4. Correlate the profile and extent of IT adoption of MSMEs along:
 - a. Production
 - d. Operations

- b. Financial Resource
 - c. Marketing
 - e. Human
5. Identify and describe the challenges encountered in adopting Information Technologies along:
- a. Cost of IT
 - b. Availability and access to IT resources
 - c. Internet Connectivity
 - d. Technical support
6. Recommend Information Technology Intervention Program for MSMEs in Legazpi City.

METHODOLOGY

This study on MSMEs IT adoption in their business operation is a descriptive - mixed method research where qualitative and quantitative data were collected to provide rich data for in-depth analysis. The quantitative data were gathered using the structured questionnaire based on the stated objective of the study. The qualitative data, on the other hand, were gathered from secondary sources data and some random interviews conducted by the researcher. Secondary data were sourced from past studies, government issuances on business and MSMEs and data from the offices of relevant government regulating agencies. Primary data were gathered from the responses of the MSMEs that participated in the study by accomplishing the questionnaire. There were 153 MSMEs respondents who provided information. The 153 respondents came from the target population of 193. The primary qualitative data, on the other hand, were gathered randomly from few selected informants through unstructured and random interviews. Another data source for this study were the documents secured from relevant regulatory and support government agencies. The secondary sources data were the documents from concerned government agencies and from some participating MSME that were utilized to give light to the stated objectives. The population of the study consists of the MSMEs in Legazpi City who are DTI Registered and licensed by the Legazpi City Business Center, and are home grown MSMEs of Legazpi City. Based on the data provided by Legazpi Business Center, there are 6,630 licensed MSMEs operating in Legazpi city. But upon review, majority of the MSMEs in the list are national in scope and are not Legazpi home grown MSMEs. Of the 6,630 recorded MSMEs, there are only 3,577 MSMEs that

are home grown, thus considered as the population of the study. The study used self-constructed questionnaire and observation guide. The questionnaire is composed of four parts (Appendix – B, page 117). The first part of the questionnaire established the profile of the respondents along type of ownership of the business, the current net-worth of the business, the nature of business and the length of existence. The second part of the questionnaire identified the information technology used by the respondents along hardware, software/apps and database. The third part determined the extent of adoption of the IT technologies along the functional areas, such as Production management, financial management, Marketing management and Human Resource management. And part four, the last part, looked into the challenges that MSMEs encountered in adopting IT technologies in their operation. The observation guide on the other hand, focused mostly on the extent of adoption and challenges observed in some MSME areas of operation. The qualitative data just added deeper meaning and understanding of the phenomenon observed. In line with research ethics, approvals from concerned offices were made in place. Due to different IATF requirements and LGU policies on meeting and personal interaction, the researcher contacted the listed respondents through their contact number and email addresses provided by DTI. Arrangement was made for limited face to face distribution of questionnaire and observation. But for those who refused face-to-face interaction, the questionnaires were sent through email or messenger account or whichever online media favourable to them. In the analysis of data, simple statistics were made use of, these are; frequency count, weighted mean and percentage, in the interpretation of the entrepreneurs' responses on their respective questionnaire. For the correlation of MSME profile to IT adoption on different areas of management, Chi Square test – of – independence was used. It is widely used to assess the relationships between two independent nominal variables, as in the case of this study. Tabular presentation of data, or matrix form was used to provide better visual appearance and was followed by numerical interpretation and descriptive discussion. The qualitative data were presented in narrative form after the thematic analysis was done. The qualitative narratives from unstructured interview provided strong support in the interpretation and discussion of the quantitative data.

The result on the profiling of home grown MSMEs in Legazpi City, as information technology adopters, are presented here.

RESULTS & DISCUSSION

Type of Business Ownership of MSMEs

The significant findings and results of this study is presented. Presentation of data and analysis regarding information technology adoption of the Micro, Small and Medium Enterprises (MSMEs) in Legazpi City were detailed out.

The data in table 1 present the type of business ownership of participating MSMEs IT adopters in Legazpi city. The type of ownership of business is a factor to IT adoption according to the study on MSMEs' Participation in the Digital Economy in ASEAN, conducted by Economic Research Institute for ASEAN and East Asia (2018).

THE PROFILE OF INFORMATION TECHNOLOGY ADOPTER MSMEs IN LEGAZPI CITY

Table 1
Types of Business Ownership

Indicators	F	%
Sole Proprietorship	101	66.01
Partnership	19	12.42
Family Corporation	12	07.84
Corporation	2	01.31
Cooperative	2	01.31
Others: Family Managed	17	11.11
Total	153	100

As to the type of ownership of business, most of respondent MSMEs in Legazpi are Sole proprietorship business. Out of the 153 MSMEs that participated in the study, 101 of these MSMEs are owned by a single person entrepreneur. Sole Proprietorship is being followed by Partnership and Family Managed business, respectively which is much lower already. Aside from Family Corporation, it is important to note also that there are MSMEs that operates as corporation and cooperative.

and East Asia (2018), business ownership is an important factor along IT adoption. The owner of a small or medium-sized business (MSME) decides whether to acquire technology based on their company's capacity and the cost of IT. They will consider the business's needs and budget. For partnerships and corporations, the decision to acquire technology involves consultations and agreements among multiple owners, which can sometimes be a lengthy process.

Such data presented is very significant as according to Economic Research Institute for ASEAN

Highest Educational Attainment

As to the highest educational attainment, table 2 presents the data gathered.

Table 2
Highest Educational Attainment

Indicators	F	%
Post Baccalaureate	3	01.96
College Graduate	99	64.71
College Undergraduate	26	16.99
HS Graduate	13	08.50
HS Under Graduate	5	03.27
Elementary Graduate	5	03.27
Elementary Undergraduate	2	01.30
Total	153	100

Table 2 shows that most of the MSME respondents of this study are College Graduates, 99 of them which represent the biggest part of the sample population. That figure is being followed by College Undergraduates, which represents 16.99% only of the total sample respondents. Elementary Undergraduate has the lowest number of respondents.

Although it is the next smallest portion of the respondents, Post Baccalaureate, where there are only 3 of the respondents, is also important to consider it. Owners of MSMEs may be considering further education to improve their opportunities. The level of education and type of degree may also impact their decision to adopt IT.

This is commendatory as educated individuals are more likely to manage their business effectively and are more likely to adopt technology to improve operations. Online career experts suggest that college graduates have the technical skills and other characteristics that make them better managers of businesses. According to Dragomir and Pânzaru (2015), most economic developed countries pay special attention to education and are inclined in the development of entrepreneurship as entrepreneurs are the engine of economic growth and development.

Nature of business/Industry

Table 3 presents the data gathered along nature or type of business operation of respondent MSMEs.

Table 3
Nature of the Business

Indicators	F	%
Food Processing	26	16.99
Food Service/Restaurant/Bar	59	38.57
Manufacturing	5	03.27
Water Refilling	4	02.61
Garments (RTW)	4	02.61
Trading	11	07.19
Construction and Supply	13	08.50
Refrigeration/Air-conditioning	4	02.61
Auto Repair Services	6	03.92
Laundry Services	5	03.27
Souvenir/ Native Product Shop	6	03.92
Event Place	5	03.27
Tourist Spot/ Resort	5	03.27
Total	153	100

The study found that the respondents represent a wide range of businesses, but a significant number are in the food service and food processing industry. Of these, 59 respondents are in food service businesses such as restaurants, bars, fast-food, and online food delivery. The next largest group is in food processing, making products such as Pili, fish, meat, and vegetable-based delicacies. Other industries represented include construction and trading, garments, water refilling, events, tourist places

and service businesses such as laundry, refrigeration, and auto repairs. The primary conclusion of the study is that the respondents represent a diverse and heterogeneous group of businesses. According to Bengston, Boter & Mead (2007), it is the size and their financial capacity and not much on the nature of business or industry but on the theory that resources of MSMEs that matters most as a factor.

Current Estimated Business Net Worth

Business net worth refers to the performance indicator that shows the value of your business's property after liabilities are paid. After settling all business debts, the net worth includes what is left over which can be used to

reinvest and other intentions. (<https://www.patriotsoftware.com>, ND). Table 4 presents the current business net worth of the respondents in terms of asset, which could have direct relation to the business'

capacity and need to acquire IT technology to support the business operation.

Table 4
Estimated Current Business Net Worth (in Philippines Peso)

Indicators	F	%
1000,000,001.00 and above	7	04.58
15,000,001.00 to 1000, 000,001.00	12	07.84
3,000,001.00 to 15,000,000.00	85	55.56
3,000,000.00 and below	49	32.02
Total	153	100

Most of the MSME respondents, as shown in table 4, are having a business net worth of Php 3,000,001.00 to 15,000,000.00 where 85 of them were identified in the bracket. This is closely followed by 49 respondents claiming that their current business net worth is Php 3,000,000.00 and below.

The smallest number of MSMEs is already medium enterprises, having business net worth of Php

1000,000,000.00 and above. And the remaining MSMEs are having a business net worth of Php 15,000,001.00 to 1000,000,001.00. These figures are very significant as net worth according to Nurhadi (2013) is highly related to capacity to acquire gadgets and IT technologies to further upscale their production, marketing and overall performance of their business.

Number of Years in Business Operation

Literatures shown that, the longer the business are in operation, the more they are exposed to market and competition issues and how IT can help. Table 5 presents

the profile of the MSME IT adopters in Legazpi City along length of years in business operation.

Table 5
Number of Year in Business Operation

Indicators	F	%
Above 20 Years	7	04.58
15 Years to 20 Years	4	02.61
10 Years to 14 Years	26	16.99
5Years to 9 Years	23	15.03
Below 5 years	93	60.79
Total	153	100

Most of the small and medium-sized businesses that participated in the study have been operating for 5 years or less. This data is important for understanding the extent to which these businesses have adopted technology and for determining how the city government can support them. The data in table 5 shows that businesses that have been operating for less than 5 years are the most common, followed by those operating for 5-9 years and 10-14 years. The smallest percentage of businesses have been operating for 15-20 years, and an even smaller percentage (7 respondents) have been operating for more than 20 years. These businesses are mostly in the construction and trading industry and are aware of the need for technology support.

According to Oliveira and Martins (2014), The decision to adopt IT in organizations is based on three factors: perceived benefits, organizational readiness, and external pressure. One theory is that businesses that have been operating for a longer time are more likely to have

been exposed to IT technology and to have identified the specific technology they need to stay competitive.

INFORMATION TECHNOLOGY BEING USED BY MSMEs INFORMATION TECHNOLOGY ADOPTERS OF LEGAZPI CITY

After establishing the relevant profile of the MSMEs of Legazpi along technology adoption, the next action of this study is to establish the information technology already being used by these MSMEs. The IT technologies, for the purpose of this study, were classified into;

End-User devices/terminals

End-user devices or terminals include a variety of equipment such as desktop and laptop computers, PCs, printers, document scanners, barcode scanners, smartphones, and consumer-oriented tablet devices. This

study aims to find out what devices are currently being used by small and medium-sized businesses in order to improve their operations and help them be more

competitive. Table 6 presents data on the technology being used by these businesses

Table 6
End-user Devices/Terminals Being Used

Indicators	F	%
Mobile Device	153	100
Printer	97	63
Laptop	89	58
Desktop	77	50
Biometrics	76	49
Fax Machine	20	13

Table 6 shows the end-user devices/terminals used by **MSME respondents**. All of the participating businesses use mobile devices such as cellular phones in their operations. These devices can also be used for navigating app-based technologies. Printers, laptops, and desktop computers are also commonly used among these businesses. Some businesses use biometrics for monitoring employee attendance and ease of compensation administration, particularly those with more than 10 employees. The table also shows that some businesses still use fax machines, citing accuracy and speed of communication as reasons for use. To improve IT adoption among small and medium-sized businesses, interventions should consider mobile gadgets, mobile applications, and their availability and affordability. As the economy becomes increasingly digitized, businesses are also adopting technology and digital platforms, and

customers are increasingly using online platforms and mobile devices.

Software/Applications

Software is a set of instructions, programs, or data that tell a computer what to do. It is the non-physical aspect of a computer, in contrast to hardware which refers to the physical components. Software can include applications that perform specific tasks and system software that manages the computer's hardware and allows other software to run. MSMEs in Legazpi City are already using IT technologies at present. This study aims to find out what IT technologies are currently used by small MSMEs in Legazpi. The research will show a list of software and applications that these businesses are already using in table 7.

Table 7
Software/Applications Being Used

Indicators	F	%
Social Media	117	75
G-Cash	84	55
Online Banking	71	46
Office Application	63	41
Online Market Places	49	32
Food Panda	49	32
Point of Sales	31	20
Favorpls	17	11
Grab	14	9
Pay Maya	5	3
LBC Connect	5	3

Table 7 shows that social media is the most commonly used software by MSMEs in Legazpi City. Many of these businesses use social media for marketing, sourcing resources and other transactions. Other commonly used software include G-Cash, Online Banking, and Office Applications, which are mostly used

for financial and marketing activities. Food Panda, Online Marketplace and Point of Sales are mostly used for facilitating transactions for food service and training businesses. On the other hand, Pay Maya and LBC Connect are the least used software by MSMEs. These are

mostly used by businesses in the trading and garments sectors.

Studies in Indonesia have found that as mobile devices become more affordable, social media use is also increasing, with the largest social network. Studies have also shown that small businesses can benefit from social media despite the challenges they may face.

Database

Oracle states that a database is a collection of organized information that is stored electronically in a computer system and typically managed by a database management system (DBMS). The research shows that most MSMEs in Legazpi City use cloud computing, with 97.39% of respondents using it. Other MSMEs, particularly those in education and training, use MySQL/Maria DB, which is used by 1.30% of study respondents. This is important for MSMEs during difficult economic times as it helps with communication and marketing and can improve operations. MSMEs adopt IT to increase their competitiveness and profitability. Although most MSMEs see the benefits of IT in simplifying and improving the flow of information and reaching their market, it is important to consider the MSME's capacity and culture when implementing IT solutions.

THE EXTENT OF INFORMATION TECHNOLOGY ADOPTION AMONG MSMEADOPTERS OF LEGAZPI CITY

The study is focused on determining the level of adoption of Information Technology (IT) among small and medium-sized enterprises (MSMEs) in Legazpi City and the country. It is important to understand the readiness of MSMEs to embrace the digital economy as it is crucial to make them competitive in the local and global market. The study measures the extent of IT adoption in various areas such as production, finance, marketing, operation, and human resources management. The study used a Likert scale of 1 to 5 to gauge the extent of adoption, with the results showing a range of adjectival ratings and interpretations.

Presented in Table 8 is the extent of adoption by MSMEs in Legazpi City in their production management function as gathered in this study. Along extent of technology adoption in the production function, the following data were gathered.

**Table 8
Production Function Indicator**

Indicators	Mean	Adjectival Rating
1. We order raw materials/goods online.	3.57	High
2. We acquire and maintain inventory information system	3.43	Average
3. We monitor production outputs and movement of output using MIS.	3.58	High
Σ Mean	3.52	Average

Table 8 shows that MSMEs have an average level of IT adoption (3.52) in production management. The data indicates that MSMEs have a high level of IT adoption in monitoring production output through management information systems (MIS) and ordering raw materials online. However, MSMEs have only an average level of IT adoption in maintaining an inventory information system (3.43). This suggests that MSMEs have standard IT technology in production management but need assistance to improve their IT technology to be on par with other businesses in the ASEAN region or globally.

The SETUP program of the Department of Science and Technology (DOST) is responsible for providing primary technology-related support to entrepreneurs in production management.

The study also shows that financial management is a critical function for any business organization and there are several financial management IT technologies available in the market to help MSMEs improve and fast track their finance functions. The data on this is presented in the next table.

Table 9

Financial Function

Indicators	Mean	Adjectival Rating
1. We are using a simple excel financial monitoring spreadsheet	3.84	High
2. We maintain an online banking account for the business	3.85	High
3. We accept payment online from customers/clients and pay suppliers online	3.92	High
Σ Mean	3.87	High

Table 9 shows that small and medium-sized enterprises (MSMEs) in Legazpi City have a high level of IT adoption (3.87) in financial management. This means that MSMEs are mostly using IT and high-caliber technology in their financial management. All indicators in the table received a high level of IT adoption rating, with accepting payments online from clients and paying suppliers online having the highest mean of 3.92, followed by maintaining an online banking account for business use (3.85) and using a simple excel financial monitoring spreadsheet (3.84). The study indicates that

financial management is the first functional area to go automated and produce technology-driven operations.

In marketing, with the fast-changing circumstances in the digital world, businesses need to be agile in their marketing activities and strategies to stay competitive. Even MSMEs that mostly operate locally need to be technology-driven in their marketing function. Table 10 presents the extent of IT adoption in the marketing management function of MSMEs in Legazpi City.

**Table 10
Marketing Function**

Indicator	Mean	Adjectival Rating
1. We maintain webpage to inform target market about our business	4.81	High
2. We conduct marketing activities through online media platform	3.59	High
3. We promote our product/services and make sales via online ordering system	4.18	High
Σ Mean	3.98	High

Table 10 shows that MSMEs in Legazpi City have a high level of IT adoption (3.98) in marketing management. All indicators in the table received a high level of IT adoption rating, with maintaining a webpage to inform target market about their business having the highest mean of 4.81, followed by promoting products and services via online ordering systems (4.18) and conducting marketing activities through online media platforms (3.59). This means that MSMEs in Legazpi already have a high level of awareness of the importance and the type of technology to use in marketing their products and their business and the capacity to access them.

The study also indicates that with the use of free facilities in social media, marketing online is even possible for businesses with low capital and net worth. Many new generation employees have the facility or expertise in marketing in social media, and as a result, many MSMEs promote and market their products and business online.

On the other hand, the data suggests that the operation management function among MSMEs in Legazpi City is not yet technology-driven.

**Table 11
Operation Function**

Indicator	Mean	Adjectival Rating
1. The business maintains logistics planning and implementation MIS	3.01	Average
2. Individual workers' productivity is monitored through an MIS	2.35	Low
3. The business utilizes computer and online apps in the product design	2.03	Low
Σ Mean	2.46	Low

Table 11 shows that small and medium-sized enterprises (MSMEs) in Legazpi City have a low level of IT adoption (2.46) in operation management. This confirms that MSMEs are already using IT in this functional area but they are using low level of technology. Among the identified indicators of IT adoption in the operation function, only logistic planning received an average level of adoption. However, monitoring individual worker productivity through an information system and designing of their product is not yet seen as necessary or the

technology is considered too expensive for the returns it provides.

In the past, human resource management has been a focus in assuring organization productivity and technology for managing people, from enhancing their skills and attitude, monitoring, compensation to performance management, had been developed as well. Human Resources Management Systems (HRIS) came to the market in 1990s (Deadrick and Stone, 2014).

Table 12
Human Resources Management Function

Indicators	Mean	Adjectival Rating
1. The business maintains biometrics for employee attendance monitoring	3.01	Average
2. Most of the HR functions and monitoring are done electronically	2.35	Low
3. Simple/customize HRIS in excel-word file is in place to monitor people performance and tainting	2.82	Average
4. Others: We acquired customised HRIS	5.00	High
Σ Mean	3.30	Average

Table 12 shows that MSMEs in Legazpi City have an average level of IT adoption (3.30) in human resources management. This indicates that MSMEs are already using IT in managing their employees, but mostly using average level of technology. It's worth noting that two MSMEs have already acquired and customized Human Resource Management Systems (HRIS) and consider their adoption to be at the highest level. This should be taken into consideration in proposed IT Adoption programs for MSMEs with more than 20 employees, as it can reduce the manpower requirement in the HR management office of the MSME.

The data shows that the use of biometrics in employee attendance monitoring has the highest computed mean and is within the adjectival rating of average level of technology adopted. There are also MSMEs that have adopted HRIS but only using excel, which is not yet automated. The MSMEs indicate that most of their HR operations are done manually, with a computed mean of 2.35 for HR functions and monitoring electronically is low, meaning only low level of technology is adopted.

Table 13
The Overall Extent of IT Adoption of MSMEs in Legazpi City

HR Function Variables	Mean	Adjectival Rating
Production Function	3.52	Average
Financial Function	3.87	High
Marketing Function	3.98	High
Operation Function	2.46	Low
Human Resource Function	3.30	Average
Σ Mean	3.42	Average

With the overall management functional areas of MSMEs computed mean of 3.42, show that there is an Average Level of IT adoption only among the MSMEs of Legazpi.

That data show that there is already IT Adoption among the MSMEs but are able to adopt standard technology only.

It is also noted in the table that Finance and Market are the two topmost priorities among the managerial functions in IT adoption among the respondents as the said function got an adjectival ratings of High. On the other hand, production and function got an Average adjectival rating only and operation management got adjectival rating of Low.

THE CORRELATION BETWEEN MSME PROFILE AND EXTENT OF IT ADOPTION OF MSMES OF LEGAZPI CITY

There are literatures proving that profile of the subject being studied has some degree of relationship to the variable being studied. In this case, The profile of the respondent MSMEs, such as; Type of business ownership, Highest educational attainment of originator, Nature of business/industry, Current net worth and the Number of

years in business operation correlated to the degree of IT adoption of MSMEs along Production function, Financial function, Marketing function, Operation function and Human Resource management function.

The Hypothesis of the study is that:

H₀ : There is no significant relationship between demographic profile and IT adoption along the functional areas of the business.

H₁ : There is significant relationship between demographic profile and IT adoption along the functional areas of the business

Table 14
Correlation of Business ownership along the five(5) variables

Variables	X ² Computed	df	X ² Critical	Decision
- Production	11.44	6	12.5916	Not significant
- Financial	6.07	6	12.5916	Not significant
- Marketing	4.44	6	12.5916	Not significant
- Operations	9.48	3	7.8147	Significant
- Human Resource	15.94	4	9.4877	Significant

Table 14 shows that there is no significant relationship between the type of business ownership and IT adoption in the production, finance, and marketing functions of the business. However, there is a significant relationship between the type of business ownership and IT adoption in the operation and human resources

management functions. This means that the type of business ownership plays a role in whether or not a business decides to adopt IT in the operation and human resources management areas. The study found that it is the operation and human resources management functions that are less likely to adopt IT.

Table 15
Correlation of Highest Educational Attainment of Originators

Variables	X ² Computed	df	X ² Critical	Decision
- Production	21.82	6	12.5916	Significant
- Financial	18.52	6	12.5916	Significant
- Marketing	21.04	6	12.5916	Significant
- Operations	13.38	6	12.5916	Significant
- Human Resource	30.74	4	9.4877	Significant

Table 15 shows the result of Chi Square statistical data. It is observed that the decision is to reject the null hypothesis in all of the managerial functions being correlated with highest educational attainment. The result further show that there is significant relationship between highest educational attainment production function, financial function, marketing function, operation function

and the human resources function. Therefore, educational attainment of the business originator (owner of the business idea) has a direct relationship or influence on decision to adopt IT in the functional area (Dragomir&Pânzaru, 2015). This is also a very significant input to consider in developing an IT adoption enhancement program.

Table 16
Correlation on the Nature of Business/Industry

Variables	X ² Computed	df	X ² Critical	Decision
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- Production	30.99	9	16.9190	Significant
- Financial	8.20	9	16.9190	Not significant
- Marketing	13.78	9	16.9190	Not significant
- Operations	19.63	9	16.9190	Significant
- Human Resource	5.36	4	9.4877	Not significant

Table 14.C shows that when it comes to the nature of business, some functional areas have a significant relationship with IT adoption while others do not. The results indicate that the nature of business has a significant relationship with the production and operation functions. On the other hand, it has no significant relationship with the financial, marketing, and human resource management functions. This means that the decision to

adopt IT in the production and operation functions depends on the specific needs of the function. This explains the average level of IT adoption in the production function and the low level of IT adoption in the operation function, as mentioned earlier in the report. The results suggest that this should be taken into consideration when creating a proposed IT adoption enhancement program.

Table 17
Correlation of the Current Net Worth

Variables	X ² Computed	df	X ² Critical	Decision
- Production	22.35	3	7.8147	Significant
- Financial	16.64	3	7.8147	Significant
- Marketing	9.71	3	7.8147	Significant
- Operations	15.07	4	9.4877	Significant
- Human Resource	8.18	2	5.9915	Significant

Table 17 shows that there is a significant relationship between the current net worth of an MSME business and IT adoption in all of the functional areas. The statistical data in the table supports the rejection of the null hypothesis in all of the functional areas, indicating a significant relationship between the current net worth of the business and IT adoption in production, finance, marketing, operation and human resources management.

This is expected as the decision to acquire IT technology involves costs, and the capacity to pay for those costs is based on the net worth of the business. Business size is considered a significant factor in relation to IT adoption as it directly influences the resources of MSMEs and their attitude and strategic response towards IT adoption (Bengston, Boter & Mead, 2007, Ashurst et al.,2012).

Table 18
Correlation on the number of years in Operation

Variables	X ² Computed	df	X ² Critical	Decision
- Production	2.90	6	12.5916	Not significant
- Financial	13.44	6	12.5916	Significant
- Marketing	15.65	6	12.5916	Significant
- Operations	24.58	8	15.0573	Significant
- Human Resource	13.73	4	9.4877	Significant

Table 18 shows that there is no significant relationship between the number of years a small and medium-sized enterprise (MSME) has been in operation and IT adoption in the production function. However, there is a significant relationship between the number of years a MSME has been in operation and IT adoption in the finance, marketing, operation and human resources functions. This means that whether a new MSME or an established one can choose to adopt IT in their production function depends on the owner of the business and their capitalization or net worth, as IT adoption can be based

on factors such as need (the product), willingness, and the capacity to pay for the cost of IT.

THE CHALLENGES ENCOUNTERED BY MSMES IN ADOPTING INFORMATION TECHNOLOGY IN LEGAZPI CITY

There are many challenges that the MSMEs encountered in adopting IT in their business operation. For this study, cost of technology, availability of the technology, quality of connectivity and technical support are among the areas that were investigated.

Table 19
Challenges Along Cost of Technology

Indicators	F	%
Technology is very costly	108	70.59
The cost does not compensate with revenue	21	13.72
No cash or fund available for now	73	47.71

Table 19 shows that the MSMEs surveyed face challenges with IT adoption because it is very expensive. 108 of the respondents stated this as a challenge. This is related to the MSMEs' financial capacity to invest in technology. This is why MSMEs tend to prioritize which functional

areas they should invest in IT first. Another challenge is that some MSMEs find that the cost of the technology does not outweigh the benefits it brings to the business. Additionally, some MSMEs stated that they do not have the funds to adopt IT.

Table 20
Challenges Along Availability of Technology

Indicators	F	%
Technology not available locally	26	16.99
Acquisition and installation requires 3 rd party	87	56.86
Tech System specifications not responsive to the business need (customization required)	32	20.91

The primary challenge MSME respondents face with availability and access to IT resources is that acquiring them also means hiring a 3rd party service provider to install and maintain the technology. 87 respondents raised this concern. The inconvenience and cost of hiring a 3rd party installer is a challenge. Additionally, 32 respondents reported challenges with aligning and customizing technology to their current systems and practices. 26

respondents stated that the technology they need is not available locally and must be obtained from Manila or international suppliers. Most automated business technologies rely on internet connectivity, and in Legazpi, internet connectivity is a major challenge for MSMEs. The research respondents shared their experiences with internet connectivity challenges.

Table 21
Challenges Along Internet Connectivity and Stability

Indicators	F	%
There is no internet connection/signal in the area	24	15.69
Internet connection is unstable/ unreliable	65	42.48
Data connection is expensive and weak	37	24.19

Table 21 shows that many MSMEs are facing challenges with internet connectivity. 65 respondents reported that their internet connection is unstable and unreliable, making it difficult for them to use their technology effectively. 37 respondents also reported weak internet connections, and 24 reported issues with poor network

providers. Additionally, some MSMEs reported a lack of internet service providers in their area, making it difficult for them to access the internet. Overall, poor internet connectivity is a significant challenge for many MSMEs.

Table 22
Challenges Along Technical/ Technology Support

Indicators	F	%
No one in the workforce has the knowledge and expertise of the technology	92	60.13
3 rd party tech support provider is not available locally	43	28.10

3 rd party tech support online is expensive for us	43	28.10
Others: Poor and unreliable support service provider	1	0.65

Table 22 shows that MSME owners are concerned that their current workforce lacks the knowledge and expertise to operate the technology, as reported by 92 respondents. Additionally, some respondents said that local tech support providers are not available and online tech support is expensive. The study also notes that poor and unreliable tech support service provider can be a challenge for some MSMEs.

THE RECOMMENDED INFORMATION TECHNOLOGY INTERVENTION PROGRAM FOR MSMEs IN LEGAZPI CITY.

The researcher recommends an *IT Adoption Enhancement Intervention Program* to help MSMEs in Legazpi City improve their technology use. The program should involve organized MSMEs and be led by the local government. According to Whaley (2016), improving infrastructure and promoting access to technology can help MSMEs become more aware of available resources and make it easier for them to adopt new technologies.

Here are the MSME IT Adoption Enhancement Intervention Program suggested by this study:

1. TECHNOLOGY ADOPTION AFFORDABILITY PROGRAM FOR MSMEs

Technology today is still very costly according to the 108 out of 153 respondent MSMEs. It is therefore concluded that cost of technology being among the major challenge faced by MSMEs in adopting technology in enhancing their operation and be competitive.

What is *Technology Adoption Affordability Program for MSMEs*? This is a holistic IT adoption enhancement program to increase the level of adoption of information technology among MSMEs. This can be done through MSME IT Adoption Subsidy, MSME IT Adopters Tax Holidays and IT Adopters Linkaging project with the aid of making IT technology affordable to MSMEs and ultimately to lead them to adopt IT and/or level-up IT in their functional areas where it is most needed.

For the *MSME IT Adoption Subsidy Project*, the government of Legazpi should allocate in the annual budget of the city to fund MSMEs intending to acquire technology for their operation through price cut or subsidy to. The subsidy shall range from 15% to as high 50% of

the total cost of the technology, until the technology is operational.

MSME IT Adopters Tax Holiday Project is another approach to help MSMEs afford IT Adoption through suspension of taxes for until the cost of IT adoption is recovered. Rules and policies should also be developed to protect the interest of the city government and to make the program effective. One very important component of the policy is that the MSME is member of the organization.

IT Adopters Linkaging Project is simply accessing the MSMEs to philanthropic multinational IT companies abroad to their CSR program. The MSME by themselves will not have voice and the personality to be able to access these companies and their programs that the MSMEs can be accessed to.

2. INFORMATION TECHNOLOGY INFRASTRUCTURE FACILITIES ENHANCEMENT PROGRAM

Another challenge identified by the study is internet connectivity and technology support services that are poor and expensive. Along these challenges, the city government through its legislative and police power shall monitor closely the Telecommunications Companies (TelCos) operating in the city and provide alternative avenues to stay connected 24/7. The following projects can be undertaken:

1. Service Monitoring of TelCos.

These Telecommunication Companies (TelCos) must be closely monitored and be mandated by the City Government along service quality and cost of services.

2. Establishment of Bicol Techno Hub.

Another avenue for improving IT adoption among MSMEs in the city is the promotion of an IT Techno Hub in the Bicol region and hosting it in the City of Legazpi. It supports MSMEs increasing their competitiveness in the digital economy and making them at the forefront (Sakudo, 2021).

3. GOVERNMENT SUPPORT POLICY AND PROGRAMS

The city government of Legazpi must develop a Comprehensive MSME Development Program that shall include IT adoption and digitalization of the MSMEs. The primary objective of the program is to develop ordinances

that shall promote IT adoption and digitalization of MSMEs. The city government shall include the creation of MSME Technology Enhancement Committee in the Sangguniang Panlungsod that shall look into the projects on capacitating the MSMEs with technology support and assistance that this MSMEs shall need.

CONCLUSIONS & RECOMMENDATIONS

With the results and discussions of the study, the following conclusions and recommendations are arrived at:

1. The MSMEs of Legazpi City being studied are mostly sole proprietorship. Most of the originators of the business are college graduates. Majority of the MSME businesses are in food service type of business. The current net worth of most of the MSMEs is Php 3,000,001.00 to 15,000,000.00— mostly micro and small businesses. And as to the number of years in business operation, most of the MSMEs are new, majority belong to 5 years and below bracket. It is recommended that sole proprietorship business organizations, which is the most in number among the MSMEs, may consider evolving into Partnership or even Corporation type of organization. It will give them opportunity to welcome investors to fuel up the financial capacity of the business to expand, increase production and invest on information technology.
2. Along educational attainments, there are already a very small number of business originators who venture on post graduate studies; it is also recommended that others follow suit as this will enhance their management and leadership skills. MSMEs need innovation of its products, improve its production and manufacturing processes to help them develop better quality and globally competitive products and services. Technologies for MSMEs must allow them to create economic opportunities for entrepreneurs by enabling them to adopt innovative products for commercialization and to use better systems to improve their manufacturing practices and business operations.
3. As to the End-User devices/terminals that are currently being used are mobile devices, laptops & desktops, printers and Biometrics. The softwares and applications being used are; social media, G-Cash, online banking and office application. The database used is cloud computing generally while schools uses MySQL/Maria DB database. It is recommended that the MSMEs work closely with each other, organize themselves according to the nature of their business or industry. As organized MSMEs they can work closely with the local government for assistance along appropriate IT adoption in their respective business nature.
4. On the overall, MSMEs of Legazpi City already adopted IT in their business operation, but on the Average Level only. Financial Management Function is with the High Level of IT adoption which is the same with the Marketing function. Operation Function, has low level of IT adoption, and the Human Resource is within average level of IT adoption only. On the Relationship Between MSMEs' Profile and the Extent of IT Adoption the following are recommended: The MSMEs as economic growth and development drivers of an economy they must be assisted to get along with in the inclusive development of an area. They should not be left behind in terms of technology tools in their business. It is also recommended that the government should look into strengthening and spurring IT adoption and even digitization regardless of the profile of the MSME.
5. The research found that the type of business ownership has an impact on the operation and human resources management functions, but not on production, finance, and marketing. Similarly, the highest educational attainment of the business owner affects IT adoption in all functional areas, while the nature of the business only affects production and operation. The current net worth of the business also has an impact on IT adoption in production and operation, but not in finance, marketing, and human resources management. Additionally, the number of years in operation of the MSME only affects IT adoption in finance, marketing, operation, and human resources management. The research recommends that the government should develop programs to increase IT and digital technology adoption in all functional areas of the business, regardless of the profile of the MSME.
6. Along cost of IT, the challenge encountered by the MSMEs is the cost as it is costly for them and they do not have the funds enough for the technology. On Availability and access to IT resources the most identified challenge is that they has to hire 3rd party service provider to install and maintain and most of the time the specifications is not perfectly responsive to their business' need (requires customization). As to Internet Connectivity and stability, it is concluded that the internet connection is generally unstable

and unreliable while data connection is expensive and weak. Along Technical Support, the main problem is that on one among the employees has the expertise technology and the tech support is usually not available locally and is expensive. On Challenges Encountered by the MSMEs in IT Adoption it is highly recommended that the MSME IT Adoption Enhancement program created and proposed by this study be further developed through in-depth researches on the areas that were not ventured by this study and have a deeper analysis. The studies that will be conducted will help improve the program and the program implementation, proposed in this study.

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