DIGITALIZATION IN VIETNAM FOOD & BEVERAGE INDUSTRY

by

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ABSTRACT

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The food and beverage (F&B) industry operates within a dynamic economic landscape, where product design must consistently adapt to evolving customer preferences. However, understanding these preferences poses a significant challenge due to the diverse experiences and changing demands across different periods, age groups, and regions. Consequently, gathering and processing customer data becomes arduous for F&B businesses, particularly in a complex market like Vietnam.

This research endeavors to shed light on the potential of digitization in assisting Vietnamese F&B enterprises to effectively collect and process customer data. By leveraging the mixed research methods such as individual interviews and questionnaires with industry members, the study aims to comprehensively explore this subject matter, providing insights that bridge academic theory with practical applications within the Vietnamese F&B industry. While the interview was performed with 15 industrial experts, the questionnaire was administered to 80 employees in F&B enterprises.

The study's findings offer valuable implications for managers seeking to refine their business strategies by aligning product development with customer needs. Findings show that the integration of digital technologies for data collection and processing in Vietnam's

F&B sector marks a substantial and pivotal transformation. This shift is influenced by various factors, encompassing human resources, strategic initiatives, technological advancements, and legal frameworks. The consequences of this digital evolution are significant, leading to improved operational efficiency, heightened employee productivity, better financial performance, and increased adaptability to market demands among F&B enterprises. Nevertheless, it's crucial to recognize the accompanying challenges, including concerns regarding data security and the imperative for workforce training and development to fully capitalize on the benefits of digitalization.

While the study provides valuable insights, it acknowledges its limitations, notably the reliance on a limited sample size for data collection. Consequently, the findings may not capture the full spectrum of customer data collection and processing methods within the F&B industry. Future research endeavors should aim to address this limitation by employing larger sample sizes to ensure a more comprehensive understanding of industry dynamics.

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CHAPTER I:

INTRODUCTION

1.1 Introduction

The Industrial Revolution 4.0 indicates the trend of data analysis in manufacturing technologies and it also assists enterprises in building business strategic orientations appropriate to each period to catch up with consumption trends and shopping habits of customers (Nagy et al., 2018). In business, in recent years there are emerging technologies adopted in business operations to promote efficiency, including cyber-physical systems (CPS), the Internet of Things (IoT), the Internet of Services (IoS), Robotics, Big Data, Cloud Manufacturing, Machine Learning and Augmented Reality (Deloitte, 2022). When an enterprise uses technologies in its business activities, the manufacturing processes will be more intelligent (Nagy et al., 2018).

In Vietnam, digital transformation has become the trend in all industries, including the food and beverage industry with the adoption of a number of digital tools (AutoTech, 2022). This digitalization process not only generates opportunities but poses challenges for firms as well (Nagy et al., 2018). Specifically, this research will focus on a problem which TH Food Chain Joint Stock Company (hereafter referred to as THFC) is facing. THFC is a large food and beverage enterprise (hereafter referred to as F&B enterprise) in Vietnam, among the Top 500 largest enterprises in Vietnam. THFC has gradually invested in modern information technology system to build effective input data collection, processing and analysis tools. However, in reality, the tools used to collect and process input data to transform into necessary and suitable data for product development have not yet been

synchronized, according to Mr. Nguyen Huu Khoa - Head of IT TH Group (Interview, 2022, V1). This leads to a lot of data that the company itself finds is important to evaluate product features such as purchasing behavior, or customer usage habits has not been automatically collected by TH. Currently, the data which TH obtained from customers only stops at the manual collection method through online surveys, or offline at TH's retail system in the provinces of Vietnam. This data, after being collected, will be saved in the form of soft copy or hard copy (paper form asked directly by TH's sales staff). For hardcopy data, it is often lost or difficult to find the necessary information. As for the data stored in soft files, the company itself does not have information screening tools, as well as automatic analysis. The work of selecting, filtering information and analyzing information is still done manually by the technology department. Therefore, the current problem of TH is that the input data after being collected is still not enough and there is no way to use them effectively for the research and production of products in accordance with the needs of customers in each period.

In addition, the recent COVID-19 pandemic has directly impacted economic sectors, organizations, production, supply chains and consumption. There are so many companies that stopped business or failed. The Fortune 2000 report reveals that roughly 94% of Fortune 1000 firms experienced disruptions in their supply chains due to the effects of Covid-19 (Ivanov, 2020). Therefore, in order to adapt to difficult situation of Covid 19, enterprises are looking for ways to change their approach to data and information collected from customers that will assist leaders to find the solution for their business. Technology has significantly influenced the approach to data research, offering enterprises innovative tools that have revolutionized and enhanced both data collection and analysis methods, as noted by Melo (2022).The Covid 19 pandemic and industry 4.0 impacted the business

strategy and business method of enterprises. Enterprises could not use traditional tools to acquire customers or collect data, and information from customers. In the past, according to Angelides (2001), conventional approaches to gathering qualitative data have presented practical challenges, often necessitating prolonged involvement and consequently yielding large amounts of data. Traditional tools could not provide useful information and important information to assist enterprises in designing products, and services that are tailored to customer needs. In the pursuit of maximizing resources, optimizing operations, and increasing profitability, entrepreneurs are continuously seeking avenues for improvement within their businesses (Melo, 2022). Within the food and beverage industry, one crucial aspect of this optimization process lies in the collection and processing of data. Understanding customer needs and behaviors deeply is paramount for businesses operating in this sector. Failure to grasp these insights could result in a disconnect between the products offered and the demands of the market. Given that the food and beverage industry caters to essential human needs, maintaining high-quality standards and adhering to regulations is imperative to ensure consumer satisfaction. Therefore, manufacturers in this industry must implement stringent control measures throughout their processes. This includes leveraging real-time data measurements collected from manufacturing and analysis processes. Such data not only aids in maintaining product quality but also serves as a tool for identifying and addressing any issues that may arise (Chen and Voigt, 2020). Overall, effective data collection and analysis serve as indispensable tools for food and beverage enterprises. By leveraging insights gleaned from customer data, businesses can tailor their offerings to meet market demands, uphold quality standards, and ultimately enhance their competitiveness and profitability in the industry.

In actually, enterprises in the food and beverage industry have an amount of data generated each day, and even each hour and they can be overwhelmed by that data amount if they don't know where to start (Council, 2017). They have still been struggling and do not know how to use the data collected from customers to be able to come up with appropriate product development strategies as well as business strategies. F&B enterprises need to invest in modern technologies such as iCloud, IoT, Google analysis, big data, etc. to achieve competitive advantages in providing products and services to meet consumers' needs (Wattanajantra, 2021). They want to plumb the data for information and insights that can help their businesses predict future trends or attitudes of the consumers (Shacklett, 2018). This research raises the question of whether how businesses in the food and beverage industry can utilize the data they collected from customers and the market as useful tools to assist them to make critical business decisions immediately. Because of the significance of technology in business operations, there are a number of studies performed in this field. Particularly, there are many studies specializing in exploring the utilization of technologies in processing and analyzing data. According to the research of Carlaw and Lipsey (2003, p.12), the result of output is not associated with the input's result that is interpreted to be the result of changes in technology. In other words, if enterprise wants to grow output, they need to change or update new technology in their business activities.

Currently, a huge amount of data, generated on the shop floor is not processed or retrieved to use an effective way (Cachada et al., 2019), mainly because the enterprise did not use technology in their business, like industrial machinery did not have open communication protocols "nor are equipped with the necessary hardware and Human-Machine Interfaces (HMIs)" to collect and process data. It means that, important data is being ignored in collection progress or the enterprise does not know how to enable the system of data

collection to achieve the automatic and transparent manner when using data from different sources. Thus, if an enterprise does not apply technology in their data collection process, they will not collect quality data for building products, and services. Because data is a valuable asset in assisting the enterprise to have a sustainable competitive advantage (Voleti, 2019a).

The competitive advantages include the product, price, sale channel, and so on. If an enterprise has products in accordance with the need of customer, the enterprise will have competitive advantage over other competitors. For example, the product of an auditing company is the audit report. During the COVID-19 pandemic, it was difficult for them to collect data from the customer because of the disruption that is imposed by COVID-19. Therefore, they used the technology in their audit process to ensure data accuracy and transparency and still be maintained the legitimacy of audit reports (Sharma et al., 2022). Overall, Technology 4.0 changes people's daily consumption habits and behaviors, plus possible abnormalities in our life such as the Covid 19 pandemic, the applied technology to the process of collecting and processing data obtained from customers and the market is very important for the development of the F&B and also other industries (Chen and Voigt, 2020). The following sub-section provides knowledge and insight into the research problem concerning the adoption of digital technologies in data processing and analysis in F&B businesses in Vietnam.

1.2 Research Problem

Internal data constitutes the wealth of information, statistics, and trends that organizations unearth through their day-to-day operations (Voleti, 2019b). This data encompasses a wide

array of facts and figures sourced from internal databases, software systems, interactions with customers, and various reports (Voleti, 2019a). It means that all enterprises in business progress will automatically generate data, including information that is collected from customers and the market. In the world, the data is generated every day and has been increasing with a growth rate of approximately 10 times every five years (Hendrickson, 2010).

Like other industries, the F&B industry is no exception. Even this industry has a huge amount of input data due to the nature of operations and continuous transactions on a daily basis. Therefore, it is challenging for F&B enterprises to collect and process data to achieve efficiency in building products in line with customer's needs (Chowdhury et al., 2020). However, there is a significant amount of data that is not collected or analyzed to serve for product process (Cachada˚ et al., 2019).

F&B enterprises in Vietnam also face the same issues concerning how data should be collected, processed and utilized for their business operations. For example, the Vietnam Milk Products Joint Stock Company (hereafter referred to as Vinamilk), the Tan Hiep Phat Beverage Group, the Nutrition Food Joint Stock Company, and the TH Food Chain Joint Stock Company, are facing data problems. These enterprises have been all in upgrading/investing the technology systems to serve their business activities, especially the adoption of technologies in data collection from customers that allow them to assess the needs of customers' products that assist to build high-quality products within shorter periods and satisfy customer's demands. In particular, the enterprise will make questions like what tools they will use to collect data? How to deliver new products and services in real time and tailored to customer needs to assist enterprises can reduce cost or improve

efficiency. These are priority considerations of leaders of Vietnam F&B enterprises. As reported in the FY22 annual report, TH True Milk (2022) affirms that one of the most important priorities of the Company in the next five years involves the development and implementation of technologies to transform the entire business operations, including how real-time customer data is collected, processed and used through technologies. Real-time data may include demographics of customers (age, gender, monthly income, etc.), frequency of purchase, online or offline purchase, preference of flavor, preferred payment methods, and so on. Based on these data, TH can adjust its products and marketing strategies to satisfy customer needs and preferences that allows the company to expand its customer base, resulting in profitability and business growth. The importance of customer data is not only obvious to TH but to any other in the F&B industry as well. Without the understanding of customer demands and preferences and market trends, F&B enterprises cannot offer products meeting customers' demands. Therefore, collecting and analyzing customer data is crucial for the growth of F&B enterprises.

Accordingly, F&B enterprises in Vietnam all understood the importance of data as well as data's influence on product development and building strategies. It is reported by VCCI (2022) that when discussing the difficulties of F&B industry a number of managers of F&B businesses admitted that huge flows of data from customer, market, suppliers, distributors, and manufacturing processes posed a number of factors for them. Ineffective data processing and analyzing leads to the outcomes of decision making concerning the development of product in alignment with customer demands and preferences.

In fact, if an enterprise sells products that do not match the needs of customers, the customer will not buy those products that lead to long-term inventory, reducing revenue,

and affect direct income of employees (Vo et al., 2019). Leaders of F&B enterprises also understood the importance of data on business activities, especially in researching and developing products that are tailored to consumer tastes. However, according to the opinion of some leaders of F&B enterprises, they have been considering two options; “i” Whether they should invest in technology to collect and process data effectively or “ii” Whether they should still use traditional methods to cut costs in investment activity. However, digitalization in manufacturing is the necessary trend to improve enterprise performance, especially in building the new product in accordance with customer demand (Carmela Annosi et al., 2020). Nevertheless, we have been living in Industry 4.0, thus enterprises must change their technology and move toward the Industry 4/0 vision as a stepwise process and different prerequisites should be in place (Buer et al., 2020).

F&B industry is one of the largest manufacturing sectors in the economy (Dani, 2014) that generates a number of economic and social contribution, for example labor generation or wealth creation. It affects not only economic growth but also health and society, etc (Dani, 2014). To accelerate the growth of F&B sector, digitalization is the key because it promotes industry’s operation efficiency and performance through the enhanced adaptability to customer demands and market trends (Buer et al., 2020; Thomson, 2022). Applying the technology in collecting and processing data is necessary. According to Dogan and Öztaysi (2018), advances in technology enable the processes of collecting, storing and processing data in a large amount. Enterprise can gain huge insights of customers and their desires (Dogan and Öztaysi, 2018), which will assist them to build products in accordance with customer demand.

Currently, almost of F&B enterprises in Viet Nam collected data from customer behavior with traditional tools. The traditional method only collected customer data through interviewing, making questionnaires, and observing (Dogan and Öztaysi, 2018). For example, when enterprises implement an interview by meeting customers directly in order to collect answers from customers. Customers will refuse to provide certain data or how to answer the interviewer's questions or only simply omit data that are required (Stopher, 2009). Furthermore, considering the situation of F&B business in the past three years it is revealed that digital tools are among the most effective tools for data collection from customers and markets. Due the outbreaks of the COVID-19 in a global extent, social distancing and travel limit measures were imposed by the Governments that prevented F&B enterprises' access to the customers for data collection. Hence, all activities related to face-to-face data collection from customers were stopped. Instead, the enterprise utilized online tools that allowed them to gather data from the customers without physical interactions. Facebook pool survey, Survey monkey, Google Forms, Skype interview, and so on are widely used for data collection from the enterprises. These facts implies that digital tools can become useful ones for data collection not only in normal situations but in pandemic contexts when physical interactions are limited as well. However, for the online channels, enterprises are difficult to collect useful data without using technology tools, especially customer behavior data. According to Engel et al. (1978, p.12), customer behavior is "the actions and decision processes of people who purchase goods and services for personal consumption". Louden and Bitta (2003, p.2) define customer behavior as "the decision process and physical activity, which individuals engage in when evaluating, acquiring, using or disposing of goods and services". From above definitions, we understood that customer behavior is important data in building product innovation to meet customer demand. However, customer behavior data has existed from different sources.

Therefore, enterprises collect customer behavior data from multiple sources that will not result in rich insights unless the data is collated to retain its integrity (Voleti, 2019). Thus, they did not know how to analyze those data in order to achieve the purpose of building product innovation. Enterprises also did not know how to select, and filter data in each category to apply in building products. Besides, traditional tools could not collect full information or have poor data quality from customer behavior. When enterprises collect poor data quality, it could lead directly to low customer satisfaction and high cost (Redman, 1998). Thus, in order to collect customer data effectively, enterprises need to invest in technology tools for collecting and processing data. When enterprises use the technology in the right way, it will detect the movements of customers to understand common routes and optimize facility location in production systems (Dogan and Öztaysi, 2018). Technology will support the process of collecting data automatically and processing the huge amounts of data collected from multiple sources (Cachada et al., 2019). For example, when applying Machine learning techniques to the process of collecting customer data, businesses will obtain data from customers' consumption behavior. Apple has applied Machine learning to the phone, when we go to the settings and turn on the "Optimized Battery Charging" mode the iPhone will learn from our daily charging routine so it can wait to finish charging past 80% until we need to use it.

Despite the aforementioned benefits of the adoption of digital technologies in data collection and processing, businesses struggle with a number of challenges, including technical challenges, organizational and sometimes compliance challenges (Dogan and Öztaysi, 2018; Stopher, 2009; Voleti, 2019a). These challenges can include the following:

1) identifying and managing all the data held by an organization;)

2) accessing all the required data sets and breaking down internal and external data silos;

3) achieving and maintaining good data quality;

4) selecting and properly using the right tools for the various manufacturing and management tasks;

5) having the right skills and enough skilled talent for the level of work required to meet organizational objectives; and

6) properly securing all the collected data and adhering to privacy and security regulations while enabling access to meet business needs.

For the above discussions, it is critical to perform the study to explore how digital technologies are performed by F&B businesses and what are the challenges of digitalization in data collection and processing for the generations of measures of using digital technologies in an automated, highly immediate manner.

Research Aim and Objectives

Based on the stated problems, in a concise manner, the aim and specific objectives are presented as follows:

The principal aim of this research is to investigate the impacts of adopting digital technologies on data collection, processing and analysis within F&B businesses in Vietnam.

This aim is selected as the overarching aim of the current study because the adoption of technologies and its impacts on data collection, processing and analysis have been extensively investigated in related literature (Dogan and Öztaysi, 2018; Cachada et al., 2019), hardly any studies focus on the impacts of digitalization on product design in the

context of F&B industry in Vietnam. Therefore, this aim is of great significance to fill the literature gap and generate implications for F&B enterprises for successful digitalization.

The specific objectives of the research are:

a) To investigate the current degree of digitalization within F&B businesses in Vietnam by looking at the deployment of digital tools for data collection, processing and analysis;

This objective is important because it enables to the researcher to understand the research background concerning the extent to which digital tools are adopted at F&B enterprises for data collection, processing and analysis.

b) To investigate the factors influencing the adoption of digitalization in data collection, processing and analyzing within F&B businesses in Vietnam;

The digitalization process at F&B enterprises are determined by different factors, both internal and external factors. While some factors promotes the digitalization process, other may prevent the success of digitalization in F&B enterprises. Therefore, it is critical to address these influencing factors to eliminate the hindering factors to ensure the success of digitalization.

c) To explore the effects of in data collection, processing and analyzing within F&B businesses in Vietnam on product and service designs meeting customers' demands;

This objective is generated because it is important to measure how digital tools affect the process of product and service designs within F&B businesses in Vietnam and whether the effects are positive or negative. The achievement of this objective will support F&B enterprises to make decision on whether they should adopt digital tools in data collection, processing and analysis or not.

d) To provide recommendations for the policy sector and the business sector in regard to the relevance of digitalization within F&B businesses in Vietnam as the driving engine of growth.

This final objective enables the researcher to propose recommendations for F&B enterprises regarding how to adopt digital tools in data collection, processing and analysis to facilitate product and service designs meeting customers' demands and preferences.

Research questions

In order to obtain research aim and objectives, the researcher attempted to address the following primary research question:

How does the adoption of digital technologies in data collection, processing and analysis influence product/service design process within F&B businesses in Vietnam?

Specifically, the following supporting sub-questions are derived:

1) To which extent are digital technologies adopted in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam?

2) What are the factors determining the adoption of digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam?

3) What are the impacts of digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam?

4) What should F&B enterprises do to ensure the success of adoption digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam?

These research questions are important in the current study because they enable the researcher to empirically address the process of adopting digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam which are hardly examined in previous studies (Dogan & Öztaysi, 2018; Cachada et al., 2019). Empirical findings will shed the lights concerning the importance and relevance of digitalization even for F&B businesses in Vietnam, determining factors, the impacts of digitalization on product/service design, and the implications for policy, business practice and research.

1.3 Purpose of Research

The world has just experienced the Covid-19 pandemic, and the ever-evolving 4.0 technology revolution, leads to constantly changing consumers' behaviors, habits, and shopping needs (Sajal Kohli et al., 2020). Besides, the products of F&B enterprises mainly serve the daily necessities of people, and the features of the products are quite specific compared to other industrial products such as time of preservation, quality, etc so F&B businesses always face the rapid change of consumers for their products during the production process. These difficulties are identified from the basic reasons that F&B businesses do not know how to turn data into useful tools in measuring and forecasting the future needs of consumers, since it may assist them to identify whether they should update, change or renew their products. The roles of data as well as data analytics are increasingly

becoming mission-critical in every industry, especially in the F&B industry (Hannila et al., 2022). Data plays a crucial role in the development and introduction of new products to meet customer demand. Managers perceive understanding customer needs as a significant driver for product development (IBM, 2017; Steinfeld and Beltoft, 2014). Prior research has highlighted the advantages that enterprises can gain from obtaining customer feedback, engaging in collaboration with customers (Brown et al., 2002; Robert and Candi, 2014; Narver et al., 2004; Noble et al., 2012; Cooper, 2014). Enterprises that acknowledge the importance of customer involvement in shaping product features are more likely to innovate successfully (Sarin and O'Connor, 2009; Franke et al., 2009; Bharadwaj et al., 2012).

According to the author's survey of some F&B enterprises in the top 500 largest enterprises in Vietnam (VNR500), researching and developing products still relies on some of the following factors:

1) The current products of the world have been provided into the market
2) Personal opinion of the boss or leader without research and analysis based on bigdata

According to the author's survey on Vietnam F&B enterprises, the reason is they do not know how to collect and process the collected data effectively. That is, they do not know how to filter and analyze that data to turn it into useful information in order to build new products to get a competitive advantage in the market. This is a very important, urgent need to have a solution for F&B enterprises in Vietnam. The products of F&B enterprises are specific, have a short use duration and serve the daily essential needs of consumers. Therefore, the characteristics of the products depends on the consumption behavior and

consumption habits of consumers (Sriariyanun et al., 2022). However, consumer behavior, consumption habits of consumers are changed constantly that leads to the prompt response of F&B enterprises in order to meet the needs of customers. Therefore, the purpose of research is to find solutions to support F&B enterprises to collect and use data effectively in business activities, especially in research strategy of new product development.

1.4 Significance of the Study

It is expected that the current study will generate both theoretical and practical contributions. Theoretical contributions of studies on digitalization in consumer data collection and processing at Food & Beverage companies in Vietnam are manifold and impactful. Firstly, conducting research on digitalization within F&B businesses in Vietnam is highly relevant there is relatively limited systematic research on the performance of F&B businesses in Vietnam and the adoption and use of digital technologies. In the past decade, some systematic research has been conducted regarding the adoption of technologies in businesses in F&B businesses (Hannila et al., 2022; Sriariyanun et al., 2022). However, hardly any studies focus on the adoption of technologies in data collection, processing and analysis. What is more, most of the research on innovation or advanced digital use in Vietnam and in other places is focused on other industries rather than F&B industry (large firms and not on SMEs). Therefore, research findings will fill the literature gaps.

Accordingly, the research endeavors deepen our understanding of the transformative power of digital technologies within the specific context of the F&B industry in Vietnam. By examining how companies in this sector leverage digital tools for consumer data collection

and processing, the researcher can uncover comprehensive insights into the dynamics of digitalization within emerging markets (Hannila et al., 2022)

Moreover, research in this area can advance theories related to data management, privacy, and ethical considerations in the digital age. As companies collect and process vast amounts of consumer data, theoretical insights into data governance frameworks, privacy regulations, and ethical guidelines become increasingly pertinent. By exploring how F&B companies navigate these complexities in the Vietnamese context, scholars can propose theoretical frameworks that address the ethical, legal, and societal implications of digitalization in consumer data collection and processing (Sriariyanun et al., 2022).

Additionally, the present study on digitalization in F&B companies contribute to theoretical discussions on business strategy and innovation. By examining how digital technologies enable companies to gain insights into consumer behavior, personalize marketing efforts, and optimize supply chain operations, researchers can enrich theoretical models of strategic management and innovation adoption (Hannila et al., 2022; Sriariyanun et al., 2022). This includes exploring concepts such as digital transformation, competitive advantage, and disruptive innovation within the context of the F&B industry in Vietnam.

Overall, theoretical contributions in this domain extend beyond the boundaries of the F&B sector, offering valuable insights into the broader implications of digitalization for consumer-facing industries in emerging markets. By integrating findings from the present study into theoretical frameworks, scholars can enrich the understanding of the complex interplay between digital technologies, consumer behavior, business strategy, and societal dynamics in the digital age.

Regarding practical contributions, empirical research findings provide F&B managers and involved stakeholder a rich understanding of current situation of the adoption digital technologies in data collection, processing and analysis within F&B businesses in Vietnam, influencing factors, and their impacts. This understanding will support F&B businesses develop appropriate, effective strategies for the successful implementation of digital tools for data collection, processing and analysis to improve their product/service design process, resulting in improved overall business performance.

Particularly, the practical contributions of study on digitalization in consumer data collection and processing at F&B companies in Vietnam are significant, concerning human resources as a crucial determinant of success. The present research sheds light on the evolving skill sets and competencies required within the workforce of F&B companies in Vietnam. By understanding how digitalization impacts job roles, responsibilities, and required expertise, companies can proactively invest in training and development programs to upskill their employees, ensuring they are equipped to leverage digital tools effectively (Hannila et al., 2022; Steinfeld and Beltoft, 2014).

Moreover, the present study highlights the importance of effective leadership in driving digital transformation initiatives within F&B companies. Leaders play a pivotal role in fostering a culture of innovation, experimentation, and adaptation to technological advancements. Through their vision, strategic direction, and commitment to digitalization, leaders can inspire and motivate employees to embrace new ways of working and capitalize on the opportunities presented by digital technologies in consumer data collection and processing (Noble et al., 2012; Cooper, 2014).

Furthermore, practical insights gleaned from the study can inform talent acquisition and retention strategies within F&B companies operating in Vietnam. As digitalization reshapes job roles and creates new career pathways, companies need to attract and retain employees with the requisite digital skills and capabilities (Bharadwaj et al., 2012). By understanding the competencies valued in the digital era and aligning recruitment and retention efforts accordingly, companies can build a workforce that drives innovation and competitiveness in the market.

In sum, by focusing on the practical contributions of studying digitalization in consumer data collection and processing at F&B companies in Vietnam, researchers and industry practitioners alike can enhance organizational capabilities, foster innovation, and drive sustainable growth in an increasingly digitalized marketplace. Effective leadership, coupled with a skilled and empowered workforce, emerges as the linchpin for success in navigating the complexities of digital transformation within the F&B sector in Vietnam.

1.5 Organization of the Thesis

Following the introductory chapter, the research thesis is structured into five main parts, each divided into chapters, sections, and sub-sections. These parts include Chapter 2 – Literature Review, Chapter 3 – Methodology, Chapter 4 – Results, and Chapter 5 – Discussion, Implications, and Recommendations.

Chapter 2 delves into the theoretical underpinnings of digitalizing businesses, with a specific emphasis on data collection, processing, and analysis. This chapter also reviews relevant theories to construct the conceptual framework for the study.

Chapter 3 is organized as follows: the initial section introduces the research methodology, exploring both positivism and interpretivism as research approaches and justifying the chosen approach. The subsequent section rationalizes the research design, examining deductive and inductive approaches. The third section elaborates on the methods, detailing data collection and analysis procedures. This section provides a thorough analysis and rationale for the research process, covering aspects from sampling to sample size, challenges encountered in data collection, and models of analysis. The concluding part of the methodology chapter discusses the quality of research, addressing aspects such as validity, reliability, and ethical considerations related to data collection.

Chapter 4 presents the research findings and their analysis, organized according to the research questions.

Chapter 5 discusses the research findings in conjunction with previous relevant studies and the research context. Additionally, it offers policy implications and recommendations for enterprises. This chapter also highlights the limitations of the doctoral thesis and suggests avenues for future research.

CHAPTER II:

REVIEW OF LITERATURE

2.1 Theoretical Framework

The F&B industry is also an important sector within the overall agriculture industry. It can be divided into two main areas: production and distribution. Production includes creating and processing products and selling the end products to consumers, including food and beverages (Huyen, 2023). Distribution is the process of buying and selling food and beverage products to consumers, including transporting and supplying products to intermediate points (shops, supermarkets...) or directly to consumers (Huyen, 2023).

The F&B industry is a sector that generates a lot of data resources in daily operation tasks (Houselink, 2021). However, the collection and processing of customer data in the F&B industry in Vietnam are currently facing numerous challenges. Part of it is due to the business strategies of F&B enterprises, partly due to the mindset of business owners, and another significant reason is related to the lack of capital and appropriate solutions.

Based on the demands and characteristics of the F&B industry, there have been several research studies supporting F&B enterprises in gaining knowledge and understanding of

theories to collect high-quality customer data to cater to the evolving needs of customers and develop suitable products for them. The EKB theory (Wen et al., 2014) and the consumer behavior research model by Kotler (2004) are essential theoretical models used in the study of consumer behavior and analysis of customer acceptance and utilization of services in various aspects, including examining external factors and individual characteristics of consumers.

In addition to these models, scientific studies have explored the relationship between consumer behavior and the intention to accept and use new services, particularly in the domain of the food & beverage industry, which have been validated in research models. From the research results of the theory of reasoned action (TRA), and the digitalization theory, researchers demonstrated the significance of customer data at each stage and the role of digitalization in business activities of enterprises. Since, F&B businesses can gain in-depth knowledge to apply in the process of collecting and processing customer data, serving the construction of products that align with customer needs.

Nowadays, F&B businesses have also digitalized the collection and processing of customer data to achieve effective business goals, as well as develop products that are suitable for customer needs. However, collecting customer data for the F&B industry in Vietnam is a significant challenge (VIRAC, 2023). The reason is that as technology continues to advance, the ways in which consumers make purchases have become increasingly diverse. For example, nowadays, consumers can buy goods through various online channels such as Facebook, Zalo, business websites, mobile app, or through e-commerce platforms or make direct purchases from retail outlets. When consumers engage in shopping behavior across multiple channels as illustrated above, their buying habits become scattered and

inconsistent (PWC, 2023). For example, a consumer might seek product information via various online channels but eventually purchase at a retail store. As a result, their buying behavior becomes fragmented and lacks continuity on a single shopping channel. This is one of the reasons why F&B businesses in Vietnam face significant challenges in the process of collecting data from customers. To apply digital data collection and processing in building products in line with customer needs, F&B businesses in Vietnam need to grasp some key theories and also concepts, and information of customers. For example, target customers or need to find where the customer is or what influence on buying decision of the customer. Massy (1968) emphasized that identifying the target customer enables enterprises to concentrate their marketing endeavors and resources on a particular demographic more inclined to express interest in their products or services. By targeting the appropriate customers, businesses can develop deeper connections with their clientele by comprehending their needs and preferences, subsequently customizing their offerings. This strategic approach facilitates effective marketing campaigns and enhances return on investment (Massy, 1968). In reality, when businesses identify their target customers, they gain an understanding of customers' age, gender, and preferences. For example, if the target customers are individuals aged from 15 to 25, food & beverage products should be designed with vibrant colors and convenient, fast features. Therefore, accurately identifying the target audience helps businesses effectively cater to their needs to serve and how to best position their products for each group (Cooil et al., 2008). In addition to identifying their target customers, businesses also need to know where their customers are located. For example, TH True Milk determined its audience customers are children and women who have medium-income earners. Therefore, TH True Milk only forced on opening True Mart stores that are located in the center city of provinces in Viet Nam (THFC website). Deeply understanding where their customer will assist enterprises can save sale

costs by selling to the right target customers, minimizing the need to transport goods to different locations, as well as avoiding prolonged storage time that can lead to the expiration of goods (Jerome 1960). In the study of Kushwaha et al. (2022) it is also stated that the influencing factor on customer purchasing decisions is crucial in shaping the products of businesses. Jarvenpaa and Tedd (1997) identified various factors that affect consumers' product purchases decision like product features, shopping experience, and customer service. From the result of the above two research, businesses will create effective marketing strategies and increase sales by understanding what drives customers to make purchasing decisions, enterprises can tailor their marketing efforts to better appeal to their target audience. In practice, when businesses grasp the influencing factors on customer purchasing decisions, they can proactively allocate appropriate resources to stimulate and expedite the customer's buying process. For example, Vinamilk Company created the "School Milk Campaign" by understanding the nutritional needs of primary school students. Consequently, Vinamilk collaborated with primary schools across Vietnam's cities to provide milk to students at a lower price than the market rate. This strategy attracted a majority of mothers who were willing to pay for the milk for their children.

There is a lot of information related to customers that need to be collected and processed in order to build and design products in line with customer needs. However, F&B businesses are currently mainly collecting and processing data manually (Thuy, 2017). This has had a significant impact on the business operations of F&B businesses. For example, if a sales accounting employee is absent and a new person replaces them, inefficiency in communication and data transfer will occur because the current manual processes are not automated. When the company has new employees, they have to take time to handle, learn and even reset or change processes to meet with the current business operation of the

company as well as increase the efficiency of operation of the company (Lobell, 2020). To automate the process of collecting and processing customer data, F&B businesses need to understand the following basic theories like the theory of consumer trends (Santos Millán, 2020) and acceptance of customer product, and service usage; the theory of consumer behavior of Engel et al. (1978); theory of reasoned actions (Fishbein and Ajzen, 1975), and theory of digitizing (Ng et al., 2018) the process of collecting and processing customer data.

Above studies' content will assist businesses adopting modern technology to effectively digitize the process of collecting and processing customer data as well as improving business efficiency and providing better services for customers.

2.1.1 The consumer trend and usage acceptance intention of the product of customers

Consumer trend is an important factor in the activities of marketing and push sale because they give businesses insight into the behaviors and preferences of their target customers. Consumer trends also assist shape products, developing marketing strategies as well as making business decisions right (Armstrong et al., 2014). By understanding what customers are interested in, what they want, and how they behave, enterprises can better develop products strategy and enhance the competitiveness of business in the market (Peter and Olson, 2007) which can ultimately lead to increased sales and profits. To understand and respond to consumer trends, enterprises need to examine the underlying patterns to push the new approach to developing and selling products (Thomas, 2021). Therefore, the consumer trend is an important factor that affects the business operations of enterprises. Enterprises must understand the needs and desires of customers to produce and provide

products that meet customer needs. If an enterprise does not have a clear understanding of consumer trends of customers, it may produce unsuitable products with the actual need of customers, leading to resulting in an imbalance between products and market needs. To achieve a competitive advantage in the current economy, the leaders should create value for the customer, which means they need to meet the needs of target customers and increase customer satisfaction (Porter, 1985). Leaders need to know the consumer trend of customers to determine appropriate products that meet customer needs and then expand their business.

Besides capturing consumer trends, enterprises need to have the knowledge and understanding of the usage acceptance intention of the product of customers. The consumer has the intention to use a product or service, which means they are ready to perform an oriented action to make the decision, and this intention is seen as the context of whether to use or decline of product in the future. Thus, the intention of the consumer will influence approaching behavior toward products (Venkatesh et al., 2003). When businesses can understand the usage acceptance intention of customers that is crucial for enterprises to create successful products and build long-term relationships with their customers.

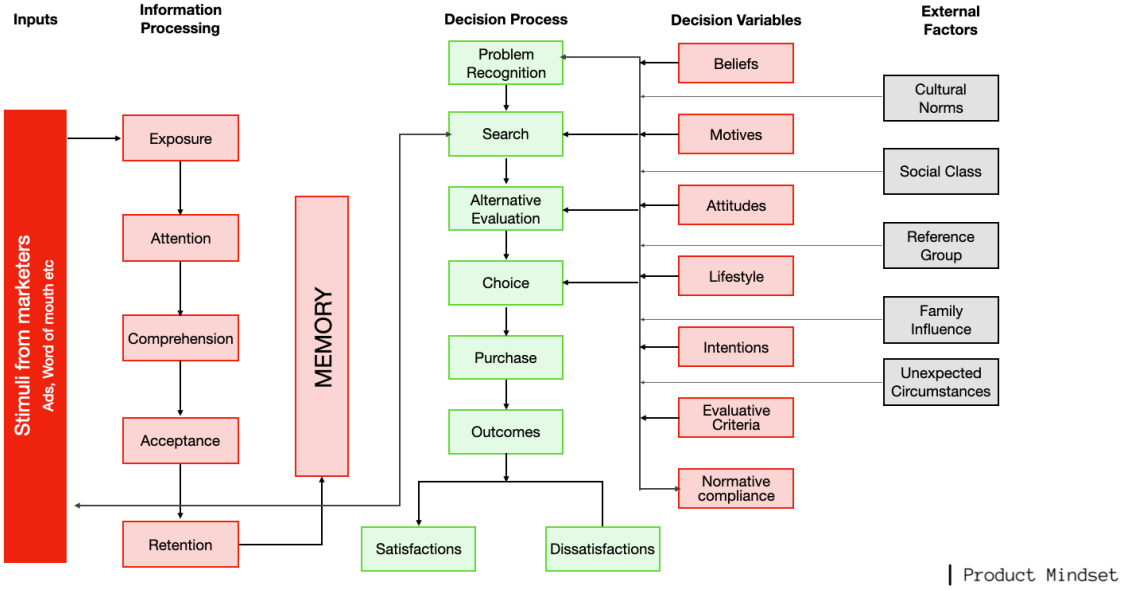
As per Ajzen (1991), intentions are perceived as indicators of the motivational factors driving behavior, reflecting the level of effort individuals are willing to exert and the extent of planning they undertake to execute a specific behavior. From this concept, we can understand that if a person has a positive attitude toward an action and feels they have control over it, then the intention to perform that action will be high. Conversely, if that person has a negative attitude and feels they have no control over that action, then their intention will be low. To supplement his research from 1991, Ajzen continued to develop

studies on consumer intention and added new concepts to his research in 2002. Here, Ajzen (2002) addressed that “intention is the action of people that are considered by three factors: “behavior beliefs, normative beliefs, and control beliefs. These beliefs are more strong people’s actions are bigger”. Ajzen (2002) emphasizes the role of consumer attitudes, subjective norms, and perceived behavioral control in shaping consumer intentions and behavior. According to Ajzen (2002), consumer intentions are influenced by a variety of factors, including personal values, emotions, past experiences, and situational factors. In addition, he emphasizes the importance of perceived behavioral control in determining whether or not intentions are translated into actual behavior. Furthermore, Ajzen's theory recognizes the potential for discrepancies between intentions and behavior. He suggests that this may occur when there are barriers to enacting one's intentions, or when situational factors lead to a change in the behavior of customers. Ajzen's theory also highlights the importance of understanding the social context in which consumer decisions are made. He argues that subjective norms, or the beliefs of others regarding a particular behavior, can play a significant role in shaping consumer intentions and behavior. From the concept of intention above, organizations are provided the understanding as well as predictability about consumer behavior. Understanding consumer intention that will assist organizations to develop more effective marketing and advertising strategies to persuade consumers to purchase their products.

In summary, acceptance and usage intention of the product is understood as the motivation to take action and make the decision that relates to the use or not to use products or services in the future. Therefore, enterprises need to have a deep knowledge of customer demand if they want to expand their market.

2.1.2 Consumer behavior theory model of ENGEL-KOLLAT-BLACKWELL (EKB)

The consumer behavior research model of Engel et al. (1978) described "Consumer behavior is whole activities that related to the researching, collecting, using process, and decline one product. It includes all processes that happened before, during, and after those actions". This model is built to research factors that relate to the behavior of the consumer, including input, belief, characteristics of an individual, and outside factors that impact purchasing intention. The models show the basic relationship between factors that influence the behavior of consumers, including four stages:



Source: Engle, Kollat, and Blackwell (1984)

Figure 2.1. Consumer behavior research model of EKB

The above model described consumer behavior as a continuous process from recognizing needs to gathering information related to a product's features through advertising and marketing efforts of the seller, then the customer will evaluate and compare features of a product with other competitor's products such as price, features, service, after-sales

support, etc. Finally, the customer will make a purchase decision. This process is influenced by factors such as the buyer's personality, social influence, and situational influence. Therefore, the decision-making process of customers is mainly influenced by internal and external factors. Among these factors, the collection of input information related to products and the impacts of the external environment are two key factors that influence the customer's final decision. When the customer used a product, they will evaluate the quality of the product, and service after selling, and this is an important factor to estimate consumer behavior (Fishbein and Ajzen, 1975).

Consumer behavior theory is a critical framework in the field of marketing and business studies. It provides valuable insights into how individuals and groups make purchasing decisions, thereby shaping the market dynamics. By examining the various factors that influence consumer behavior, this theory enables businesses to develop effective data collection and create successful products. In this literature argument, we will explore the significance of consumer behavior theory and its application in contemporary business practices.

At the core of consumer behavior theory lies the exploration of the decision-making process consumers undergo when purchasing products or services. The theory highlights the interplay of internal and external factors that influence these decisions. Internal factors, such as perception, motivation, attitudes, and personality traits, impact how consumers perceive products and respond to marketing stimuli. On the other hand, external factors like social, cultural, economic, and environmental influences contribute to shaping consumer preferences and purchasing behavior. Consumer behavior theory also emphasizes the importance of market segmentation and targeting. By recognizing the

diversity among consumers, businesses can identify distinct segments with unique needs and preferences. This enables marketers to tailor their products, promotional strategies, and pricing to meet the specific demands of each segment. By employing this approach, businesses can optimize their marketing efforts, increasing the chances of success in a competitive market. Besides, consumer behavior theory is also particularly relevant in the digital era, where e-commerce and online interactions have reshaped how consumers make decisions. With the rise of social media, online reviews, and influencers, the theory helps businesses comprehend the impact of digital platforms on consumer behavior. For example, result survey of Pwc Viet Nam (2020), almost of people have been using online channels to interact with others or find information about products, such as Google, Zalo, Facebook, etc. This understanding is crucial for crafting effective digital marketing strategies and utilizing various channels to engage consumers and drive sales.

Consumer behavior theory serves as a fundamental pillar in understanding the intricacies of market dynamics. By examining the psychological, social, and environmental factors that influence consumer decision-making, businesses can improve customer engagement, develop effective data collection, and build products. Embracing the insights of consumer behavior theory allows companies to adapt to evolving consumer trends, stay ahead of the competition, and thrive in an ever-changing business landscape.

The EKB model divides the consumer purchase decision process into five stages:

1. *Need recognition:* Consumers become aware of and recognize their needs through experience, learning, observation, or information search. Need recognition can be understood as the moment when consumers either have not yet formed a need or may have already developed a need for a product, leading to the emergence of demand through online

searches or exposure to product advertisements on social media. The consumer will realize that their actual state and ideal or desired state that could be different together (Klieb, 2019). For example, when consumers use Facebook and come across an advertisement for a new type of beverage, they become curious and start researching or visiting websites to search for new beverage products. When customers will realize that the current state and desired state which may be different (Kotler and Armstrong, 2014).

Thus, this stage shows that the business needs to run the advertising about their product by using the digital marketing tool since whenever a customer clicks on the advertising, they will be automatically directed to the homepage of the business.

2. *Information search*: After arising/developing the need to purchase a product, customers enter the stage of searching for products. This stage can be understood as the beginning of the shopping process. Solomon et al. (2010) addressed that when a customer seeks information, this action is satisfied their needs or solves their problem. Besides, the consumer also wants to browse the information to compare features of new products and current products with the products' market (Bloch et al., 1986). So, at this stage, businesses should focus on posting their product features on specialized websites and use digital tools such as sending automated emails or making automated phone calls to customers to introduce the products. However, males and females are likely to have different ways of liking and obtaining products (Mitchell and Walsh, 2004) thus businesses need to use different tools to advertise their products.

3. *Evaluation of alternatives:* In the research that is conducted by Engle, Kollat, and Blackwell, in this stage, customers will evaluate the products they have researched to

determine whether it meets their needs or not. In this stage, consumers have to evaluate alternatives from searching information in the previous stage (Solomon et al., 2010) as well as comparing the brands in the market and the brands that are included in the consumer's mind will have more opportunities to be selected (Jobber, 2007). The significance of this stage will assist businesses in gathering information about beliefs, attitudes, and intentions leading to the subsequent purchase process (Klieb, 2019). When a business could understand the beliefs, attitudes, and intentions of customers for their products, they will have more opportunities to sell out their products (Khan, 2020). From the above significance, the business should continuously advertise its products to identify its potential customers and have the necessary tools to sell to those potential customers.

Purchase decision: After evaluating the information, consumers will decide whether to purchase the product or not. Purchase is also considered as an intention, environmental factor, and status of the consumer (Klieb, 2019). Consumers can buy products to their self's expectations or under expectations in this stage. For example, the influence of friends' and family's attitudes and other unanticipated statuses such as product availability, stock-outs, etc. (Kotler and Keller, 2014) lead to different purchase decisions of consumers. Thus, businesses continually maintain and respond quickly to customer demands by building processes and methods for receiving feedback, which will support them to sell their successful product.

4. Post-purchase evaluation: After purchasing the product, consumers will evaluate the consequences of their decision and consider their satisfaction with the product (Klieb, 2019). Oliver (1977) explained that satisfaction of post-purchase is a function of expectations, perceived performance, as well as the confirmation or disconfirmation of

beliefs. In this stage, consumer invested a lot of time, and money into a purchase which lead to experience on whether the right decision was made (Kotler and Armstrong, 2014). This compels the consumer to seek corroborative information to alleviate cognitive dissonance, either by positively affirming their decision or concluding that it was an unwise choice.

From the research result in this stage, enterprises need to improve their service quality as well as build promotion programs for existing customers or customize or renew their products to meet customer needs.

Consumer satisfaction stems from the experiences encountered throughout every stage of the purchase journey, as the consequences of one stage directly influence the experiences in subsequent stages (Karimi, 2013). While many studies concentrate solely on the satisfaction derived from the final choice and its outcomes, they tend to overlook the satisfaction derived from the decision-making process itself. Although these two concepts have distinct underlying dimensions, they collectively exert a significant impact on the overall satisfaction of consumers (Karimi, 2013).

In sum, the EKB model posits that consumers' decisions hinge on factors they assess through rational knowledge. This model proves particularly relevant for businesses operating in competitive landscapes with numerous counterparts offering akin products or services. Furthermore, it underscores the importance of enhancing business visibility during the awareness stage via Search Engine Optimization (SEO). This strategic approach elucidates how a product or service can benefit customers and furnishes them with the necessary resources to evaluate and juxtapose offerings against those of competitors. Finally, provide excellent post-sales support to show customers those businesses away care

about their products even after customers have made a purchase. However, the model may be limited by ignoring more complex social and psychological factors, such as the influence of family and friends, emotions, and consumer attitudes toward the brand.

Similarly, in the research on consumer behavior of the EKB model, there are also many studies on consumer behavior to clarify the important role of consumer behavior in the business strategies of enterprises. For example, consumer behavior includes complex sectors, like attitudes, actions, and reactions of customers (Armstrong et al., 2014). Therefore, consumer behavior could assist enterprises in predicting the attitude of consumers (Peter and Olson, 2007). The behavior of a consumer is often a reflection of their underlying attitudes and beliefs about a product or service. Attitudes are a key component of consumer behavior (Sampson and Harris, 1970), and they are formed through a combination of personal beliefs, values, and experiences. For example, if a customer repeatedly purchases a particular brand of coffee, it may indicate that they have a positive attitude towards that brand. Attitudes are the mental and emotional evaluations that individuals hold towards a particular object or idea, while behavior is the action taken as a result of those attitudes (Fishbein and Ajzen, 1975b). Therefore, when a consumer exhibits certain behaviors toward a product, it can indicate their underlying attitudes toward it. For example, if a customer consistently purchases a product and satisfaction with that product, it means that the customer has a positive attitude toward that product. On the other hand, if a customer complains about a product, it means that the customer has a negative attitude toward that product. The attitude of consumers refers to their overall evaluation or feeling towards a product, brand, or company. It can be positive, negative, or neutral and it can influence consumer behavior and decision-making (Fishbein and Ajzen, 1975a). The attitude of customers can impact their buying decision as well as how they consume the

product and interact with the brand of the company. However, it is important to note that behavior may not always accurately reflect attitudes, as external factors such as social pressure or convenience can also influence behavior. Therefore, businesses should combine observations of consumer behavior with market research and surveys to gain a more comprehensive understanding of customer attitudes.

The consumer behavior theory of Philip Kotler (2014) is pointed to the buying decision process from receiving information about products and services and buying it to evaluate their quality, features, etc. Consumer behavior theory draws on various disciplines such as psychology, sociology, anthropology, and economics to understand the decision-making process of consumers. Some of the prominent researchers and scholars who have contributed to the field of consumer behavior include Philip Kotler (2014); Peter and Olson (2007); and Khan (2020). The consumer behavior theory of these authors is to understand how consumers make decisions and what factors influence customers' behavior in the marketplace. By analyzing consumer behavior, enterprises can gain insights into what motivates customers to purchase products, as well as what factors influence customers' decision-making process. When enterprises can learn through the study of consumer behavior, they can understand the characteristics of customers like customer sentiment, the feeling of customers, and what reasons lead to they will buy their products. This information can then be used to develop targeted marketing strategies, improve product offerings, and enhance customer experiences.

When an enterprise understands customer behavior, it will build an appropriate product strategy to push customers to decide to buy their goods. Debates about consumer behavior provide several implications for the enterprise in their business operation. For example, the

theory of Solomon (1996) is stated that consumer behavior is the progress of buying, which is started by finding, selecting, buying, and using the product to meet customer needs. According to this theory, consumers often use products as a way to express their identities and connect with others. Consumers use products to construct and communicate their identities to others. This is done through a process of self-expression, where consumers seek out products that align with their self-concept and personal values. For example, a consumer may choose to purchase a famous brand of clothing (LV, Chanel) to express their personality or social status to others. The theory of Solomon emphasizes the importance of understanding the social and psychological aspects of consumer behavior by recognizing the role that products play in self-expression and socialization, marketers can develop more effective strategies for connecting with their target audience and building long-term relationships with their customers. Similarly, the concept of consumer behavior of Belch (1998) also confirmed that all participants' activities while finding, selecting, purchasing, using, and evaluating the quality of products to meet their needs. The two theories, therefore, provide the enterprise the in-depth knowledge of selection, finding before the customer makes the purchasing decisions to fulfill the obligated needs.

In the dictionary of the American Marketing Association by Peter and Olson (2005, p. 12), consumer behavior is defined as "The dynamic interaction of effect and cognition, behavior and environmental events by which human beings conduct the exchange aspect of their lives". This definition addresses various activities that consumers engage in, including information search, product selection, purchasing, usage, evaluation as well as disposal when no longer needed. Consumer behavior is also evaluated by cultural, social, psychological, and individual factors, and it may be influenced by external factors such as

advertising, marketing, and economic conditions. So, consumer behavior is the result of the interaction progress between environmental factors and the perception of humans.

From the specific view of Kotler and Keller (2006), it is addressed that consumer behavior study focuses on individuals, groups, and organizations that are directly concerned with selecting, obtaining, using, and removing goods and services. Thus, the concept of consumer behavior by Kotler and Keller (2006) and the definition of consumer behavior in a dictionary of the American Marketing Association, both have similar research results, indicating stages of consumer behavior that include information search, evaluation, purchase, usage, and until product disposal. With the perspectives of these two theories, enterprises can gain knowledge about the stage of product disposal when customers no longer need the product. This is an important factor that supports businesses in researching the product life cycle.

From the research on consumer behavior above, we can understand that consumer behavior is an important factor in collecting and analyzing data processes of F&B enterprises (Singh and Singh, 2021). In this paper, the authors argue that understanding consumer behavior is crucial for F&B enterprises to effectively collect and analyze data, as it enables them to develop targeted marketing strategies, improve product offerings, and ultimately increase customer satisfaction and loyalty. When enterprises collect quality consumer behavior data, they will have enough elements to evaluate customer demand and position how come to their customer segments. This is background in building product strategies in line with customer and market needs.

2.1.3 Theory of Digitalization

The theoretical model of digitalization refers to the various frameworks, approaches, and perspectives that have been developed to explain the process of digital transformation in different domains of enterprise activity (Ng et al., 2018). This study also presents a comprehensive review of the existing theoretical models of digitalization and their application in various domains of enterprise activity, including marketing, finance, and human resources.

Some of the key theoretical models that describe digitalization like:

i. “Disruptive Innovation Theory”: Clayton M. Christensen, a Harvard Business School professor, introduced the concept of "Disruptive Innovation Theory" in 1997. According to the author, new technologies disrupt established markets and business models, paving the way for the emergence of novel industries and competitive paradigms. Disruptive innovation is defined as the process wherein an innovation reshapes a market characterized by complex and costly products or services into one marked by simplicity, convenience, accessibility, and affordability (Christensen, 1997, p. 11). According to Christensen, disruptive innovation occurs when a new product or service appears in the market and creates a new value that customers are willing to pay for instead of products of traditional competitors. It means that disruptive innovation will assist enterprises in building higher-value products as well as features of products that are in line with customer demand. Through this study, businesses can learn knowledge about disruptive innovation and how to apply it in their business activities as well as in building the product, and service to meet the market need.

ii. The effects of Industry 4.0 on the food and beverage industry of DemIR and DINcer (2020): This article delves into the repercussions of digitalization within the agriculture

and food production sectors, specifically exploring the utilization of artificial intelligence and the Internet of Things (IoT) in these industries. It underscores the complexity and difficulties inherent in the food and beverage (F&B) industry, which encompasses the processing of raw materials, production of semi-finished goods, and creation of final products. Through its examination, the article seeks to elucidate how digital technologies are reshaping operations within this intricate and demanding sector (DemİR and DİNcer, 2020). Besides, the term "Food industry" refers to the companies that have been producing products about food, beverage, and dietary supplements to sell to customers on the market (Luque et al., 2017). For features of the F&B companies that are mentioned above, F&B companies should have an innovative approach that "combines the best features of mass-production and customer orientation" (DemİR and DİNcer, 2020).

iii. The F&B industry has changed and developed in recent years. They applied technology and data management in the production process to achieve production efficiency and product quality (Shay et al., 2018). Digitalization is also assisted F&B enterprise change sales strategies to a combination of online and offline channels. Enterprises use online channels to reduce the costs of reaching customers (Kosior, 2022).

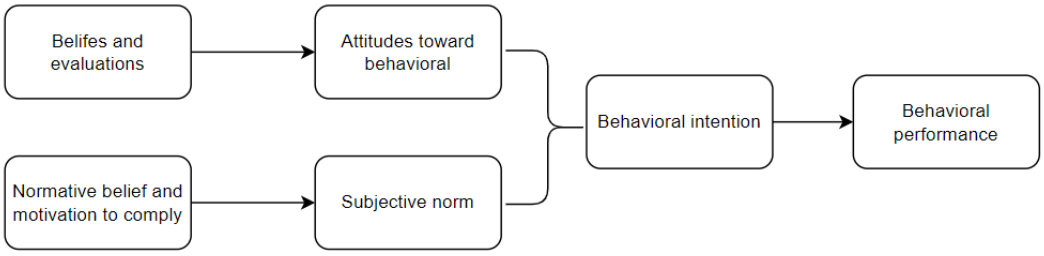
iv. Industry 4.0 in food processing: According to the Author, digitalization has changed and developed the food and beverage industry, including the applications of artificial intelligence, big data, and IoT in production, sales, and supply chain management (Romanello and Veglio, 2022). This study examines how digitization has impacted the food and beverage industry, including the challenges and opportunities of applying digital technology in the production process.

The Theory of digitalization is understood as the technology applications that F&B enterprises are applying to their business activities to transform from traditional business activities to digital business activities to minimize operating costs and improve the quality of products. It will assist enterprises to achieve high profits as well as position the company's brand name in the domestic and international markets. The Theory of digitalization also involves the collection and analysis of data processes, which assist enterprises in making more accurate, timely business decisions. It is particularly important in the F&B industry, where quality and inventory management is crucial to ensuring that products meet standards and are available on time. Digitalization in business activities of the enterprise, whenever it happens anywhere (social channels, fan page, website…), customer data would be collected and analyzed immediately for value and experiences that are better for customers of F&B enterprises. However, the aforementioned theories have not yet provided a solution for digitizing the process of collecting and processing customer behavior data automatically. Therefore, F&B businesses are still facing a mountain of customer data without an automated solution for collecting and processing it. In this study, the researcher attempts to propose a digitization solution to support F&B businesses in automatically collecting and processing customer behavior data, which can serve as a basis for the research and development of products and services that align with the market and customers' needs.

2.2 Theory of Reasoned Action

The Theory of Reasoned Action posits that behavioral intention can be elucidated by one's attitude toward the behavior and perceived norm. Attitude, in this context, refers to the positive or negative sentiments an individual harbors when engaging in a particular

behavior (Fishbein and Ajzen, 1975a). On the other hand, subjective norm pertains to how others perceive one's actions or behaviors.



Source: Fishbein and Ajzen, 1975

Figure 2.2. Model of the Theory of reasoned action (TRA)

According to the content of this theory, the final behavior is decided by the behavioral intention, not behavior. This theory is used in some industries, including medicine. However, this theory also studied the behavior and attitude of a person in using food and beverage goods. The Theory of Reasoned Action, formulated by Fishbein and Ajzen in 1975, aims to ascertain the consistency of the connection between an individual's behavior and their attitude in decision-making processes (Fishbein and Ajzen, 1975b). Widely regarded as one of the most influential theories elucidating human behavior (Venkatesh et al., 2003), it posits a causal chain wherein beliefs influence attitudes, which subsequently shape intentions, ultimately guiding behavior.

However, the Theory of Reasoned Action has its limitations. It assumes that human behavior is primarily governed by conscious decision-making processes. Consequently, it may not effectively explain behaviors rooted in daily habits or actions taken without conscious awareness. Additionally, the theory solely focuses on the relationship between individual attitudes and behaviors, overlooking the potential impact of social factors on

actual consumption behaviors. These social factors could significantly influence individuals' behavior beyond their personal attitudes.

Mr. Nguyen Van Tho - Director of Product Development – at THFC shared that "the change of consumer behavior of customer that depends on some factors like customer segment, different age groups". Mr. Tho also said, "the behavior in drinking or eating of different age groups that are different". Therefore, if enterprises want to expand their customer database, they must evaluate customer demand and build strategy products in line with the market need.

In summary, TRA is a theory, that is used to explain the process of information and change of human behavior. According to the theory, human behavior is influenced by intention, which depends on two factors: attitude and subjective norm. Attitude includes both emotions and beliefs that individuals have towards that behaviors, while subjective norm includes social pressure and expectations from those around them. This theory suggests that if a person has a positive attitude and low subjective norm, they will have performance performing the behavior is high. Conversely, if their attitude is negative and the subjective norm is high, the likelihood of them performing that behavior is low.

2.3 Literature Gaps

The investigation into related previous studies indicates that digitalization has been widely examined in different industrial contexts (Karimi, 2013; Ng et al., 2018; Kosior, 2022), including the F&B industry (Vo et al., 2019). In order to investigate how digitalization is integrated into different aspects of operations, different frameworks have been adopted by the scholars. While some theories were used to explain the motivation of digitalization from the perspectives of business, others were utilized to explain the rationales from the customers.

Most of the studies reveal the positive, significant impacts of digitalization in different operation aspects (Karimi, 2013; Kosior, 2022); however, there are several literature gaps found in the literature that the present study expects to fill. Firstly, although digitalization has been widely investigated in different settings, there are a dearth of studies employing the F&B industry in Vietnam as the research context. In recent years, digitalization has become a prevalent trends in the F&B in Vietnam, therefore, the exploration of digitalization in the Vietnam context provides valuable insights. Furthermore, little attention has been paid to the adoption of digitalization in collecting and processing customer data in the F&B industry in Vietnam. Thus, the researcher expects to gain interesting research findings concerning the current situation of digitalization, reasons explain the adoption of digitalization, and the impacts of digitalization. Research findings can be used to facilitate the success of digitalization among F&B enterprises in Vietnam.

2.4 Summary

The foundational theories used in digitization research for collecting and processing customer data in the F&B business industry demonstrate that the theories and theoretical models used by researchers to explain customer product/service usage behavior or to explain the concept of digitization and its role in the business operations of F&B companies. The theories and theoretical models have advantages and limitations in explaining actual new technology usage behavior, and these theories often address previous limitations or expand on previous theories. Although the theories differ in the factors that influence consumer behavior, these theories also have similarities in explaining the relationship between Attitude - Intention - Behavior acceptance of customer product/service usage as well as the important role of digitization in business activities (Lobell, 2020; Ng et al., 2018). For example, "Subjective Norm" influences "Behavior Attitude", "Behavior Attitude" influences "Behavior Intention", and "Behavior

Intention" influences actual usage behavior. Although these factors are related to TRA in explaining consumer attitude and behavior usage in different theoretical models, they derive from the effectiveness of that behavior (Karimi, 2013; Kosior, 2022). As presented in the above section, the theory of consumer behavior is the most commonly used by researchers to explain the intention to use technology by companies in the digitization of customer data collection and processing processes. The reason is that the theory of consumer behavior is considered the most effective in explaining the intention and acceptance behavior of customers to use products/services in the F&B industry (Venkatesh et al., 2003). In practice, customers in Vietnam have a habit of using cash, their consumption behavior is often influenced by others, and they are afraid of complexity and safety issues (Vo et al., 2019). Therefore, F&B companies nowadays face great difficulties in collecting sufficient data from customer consumption behavior, as well as in processing that data to apply it to research and develop products that meet market demands in each period. This is also a gap that previous articles have not addressed much. My research will focus on exploring how to develop a digital solution for the automated collection and processing of customer data in the F&B industry. However, due to the limitations of consumer behavior in Vietnam as mentioned above, my research will also have some limitations in finding a digital solution that can effectively and in real-time gather complete customer behavioral data.

CHAPTER III:
METHODOLOGY

This chapter delves into the comprehensive methodology employed to investigate the multifaceted phenomenon of digitalization within F&B enterprises operating in Vietnam. Recognizing the complexity and richness of this phenomenon, a mixed methods approach has been chosen to provide a well-rounded understanding that encompasses both quantitative and qualitative aspects.

The utilization of a mixed methods approach is especially relevant in studying a dynamic topic such as digitalization in the F&B sector (De Carolis et al., 2017; Santos & Martinho, 2020). This methodology enables the integration of numerical data, offering statistical insights into trends and patterns, with the depth of qualitative narratives, allowing for a holistic exploration of the underlying factors, challenges, and opportunities shaping the digital transformation landscape (Schniederjans et. al. 2020; Schiffer et al., 2019; Santos & Martinho, 2020). By combining these two approaches, this study seeks to overcome the limitations of relying solely on quantitative or qualitative methods, aiming for a more comprehensive and nuanced perspective.

This chapter outlines the research design, sampling technique, data collection procedures, and analysis techniques employed to address the research questions that guide this study. A detailed explanation of both the quantitative and qualitative methods, including their rationale and relevance to the research objectives, will be presented. Furthermore, the

research ethics, validity and reliability, limitations and delimitations will accordingly be discussed. Ultimately, this mixed methods approach will contribute to a more thorough comprehension of the impact and implications of digitalization on F&B enterprises in Vietnam, offering valuable insights for practitioners, policymakers, and researchers alike.

3.1 Overview of the Research Problem

As outlined in Chapter 1, recent times have brought significant shifts for F&B companies, including technological advancements, heightened competition, evolving customer demands, and increased concerns (Choi et al., 2017). Consequently, there's a pressing need for companies in this sector to undergo digital transformation. Digitalization offers numerous innovative opportunities for the F&B industry, facilitating solutions for challenges such as enhancing customer satisfaction, optimizing resource utilization, streamlining workforce efficiency, reducing costs, and ensuring quality control (Lee et al., 2015; Synnes & Welo, 2016; Schiffer & Wiendahl, 2019; Perzylo et al., 2021).

While digital transformation presents various benefits and opportunities, the adoption rate among F&B companies in Vietnam remains low, with only a few ventures embarking on the implementation process (Schuh et al., 2017). Inadequate planning, inappropriate strategies, and other factors contribute to the unsuccessful execution of digital transformation initiatives in certain companies. Particularly, small and medium-sized F&B businesses encounter barriers hindering their digitalization efforts, with digital tools being predominantly utilized by larger firms (VietCredit, 2021). Nonetheless, scholars like Manavalan and Jayakrishna (2019) suggest that digital transformation is gradually gaining traction despite these challenges.

Despite the obstacles, the necessity of becoming digitally transformed remains a crucial prerequisite for F&B companies (Yildrim & Demirbag, 2020), enabling them to navigate increased competition, evolving customer preferences, and the demand for enhanced quality. Therefore, it is imperative for all F&B enterprises aiming to maintain relevance in the market to embrace this trend and ensure they are part of the transformation journey (Zheng, 2020; Zapata et al., 2020; Bechtold et al., 2014).

3.2 Operationalization of Theoretical Constructs

To increase the ability to meet customers' demands and expectations, F&B companies have begun adopting current digital technologies (Dogan & Öztaysi, 2018; Cachada et al., 2019). In recent years, data-driven decision-making has become one of the most prevalent trends in every industry, businesses in all industries, including F&B industries. The abundance of diverse data types and sources poses a significant challenge for businesses in effectively handling and leveraging data to support product design processes (Wattanajantra, 2021). Digital technologies emerge as indispensable tools enabling F&B enterprises to manage market and customer data effectively (Cachada et al., 2019). However, the adoption of these technologies remains arduous (Illa et al., 2018). The progress and acceptance of digital transformation hinge on understanding the factors influencing its implementation procedures. While several studies have identified critical success factors and barriers to digital transformation, they often generalize findings across various sectors (Deepu et al., 2021; Sahu, 2019; Sahu et al., 2018). Researchers have also explored the drivers and barriers of digital transformation (Schniederjans et al., 2020; Jones et al., 2021; Kane et al., 2015). Nevertheless, enabling technologies for data collection and processing exhibit a

notably low implementation rate due to insufficient insights into the required methodologies (Perzylo et al., 2021; Schniederjans et al., 2020). Schiffer et al. (2019) emphasize the necessity of bolstering organizational procedures before introducing digital technologies.

Efforts have been made to develop readiness frameworks and maturity models to facilitate successful digital technology implementation in F&B companies (De Carolis et al., 2017; Santos & Martinho, 2020). However, scant attention has been given to factors influencing the successful adoption of digital technologies in the F&B sector. Defined implementation methods are lacking, hindering significant progress in practitioners' adoption journey (Kane, 2019). Hence, the current study aims to meticulously identify and evaluate the myriad factors affecting the adoption of digital technologies in data collection and processing within the F&B industry. By establishing connections between these factors, the study seeks to benefit researchers, practitioners, stakeholders, and management within the F&B sector (Smith et al., 2008).

To address these gaps, the study endeavors to assess the current implementation of digital technologies for data collection and analysis and identify factors crucial for the success of digital transformation in F&B companies. It will also scrutinize the methods and digital technologies implemented, their adoption levels, and effectiveness. The researcher seeks to uncover factors conducive to successful digital transformation and explore how data collection, processing, and analysis within F&B businesses in Vietnam influence product and service designs meeting customer demands.

3.3 Research Design

This study employed an exploratory mixed methods design within the pragmatic research paradigm. Creswell and Clark (2008) offer a comprehensive discussion on paradigms in social science research, delineating four versions or applications of the paradigm concept. They elucidate that a paradigm can be conceived as a worldview, epistemological stance, a set of shared beliefs, a model example, or a combination thereof. In this context, the term paradigm primarily serves as a descriptor of the epistemological stance adopted in the current research, forming the foundation for integrating both qualitative and quantitative approaches. This approach acknowledges the multifaceted nature of research inquiries and seeks to capitalize on the strengths of diverse methodological perspectives to enhance the depth and breadth of understanding. Table 3.1 shows a summary of four research paradigms.

Table 3. 1. Comparison of Four Important Paradigms Used in the Social and Behavioral Sciences

Paradigm	Positivism	Post-positivism	Pragmatism	Constructivism
Methods	Quantitative	Primarily Quantitative	Quantitative + Qualitative	Qualitative
Logic	Deductive	Primarily Deductive	Deductive + Inductive	Inductive
Epistemology	Objective point of view. Knower and known are dualism.	Modified dualism. Findings are probably objectively "true."	Both objective and subjective points of view.	Subjective point of view. Knower and known are inseparable.

Axiology	Inquiry is value-free.	Inquiry involves values, but they may be controlled.	Values play a large role in interpreting results.	Inquiry is value-bound.
Ontology	Naïve realism	Critical or transcendental realism.	Accept external reality. Choose explanations that best produce desired outcomes.	Relativism
Causal linkages	Real causes temporarily precedent to or simultaneous with efforts	There are some lawful, reasonably stable relationships among social phenomena. These may be known imperfectly. Causes are identifiable in a	There may be causal relationships, but we will never be able to pin them down.	All entries simultaneously shape each other. It's impossible to distinguish causes from effects.

		probabilistic sense that changes over time.		

Source: Tashadkori and Teddle (2018, p. 22)

Considering the four paradigms, the researcher selected the pragmatism for the study. The choice of pragmatism as the philosophical framework for the present study on digital tool adoption among Food & Beverage (F&B) companies stems from several compelling reasons tailored to the nature of the research and its objectives. Firstly, pragmatism offers a versatile approach that allows the researcher to blend various research methodologies and theoretical perspectives to best address the research questions at hand (Cherryholmes, 2012). Given the multifaceted nature of studying digitalization in a dynamic industry like F&B, pragmatism provides the flexibility needed to incorporate both qualitative and quantitative methods, as well as subjective and objective viewpoints, ensuring a comprehensive analysis of the phenomenon (Tashadkori & Teddle, 2018).

Moreover, pragmatism prioritizes the practical outcomes and implications of research, making it particularly well-suited for applied studies aimed at informing real-world practices and decision-making processes (Creswell & Clark, 2008). In the context of the present study, which likely seeks to provide actionable insights for F&B companies navigating the complexities of digital transformation, a pragmatic approach aligns with the goal of generating findings that can drive organizational change, innovation, and strategic decision-making in the industry.

Another key rationale for selecting pragmatism is its acknowledgment of the existence of multiple truths and perspectives on any given phenomenon. In the realm of digital tool adoption in F&B companies, where diverse stakeholders with varying interests, experiences, and understandings are involved, recognizing and accommodating these multiple viewpoints is essential for capturing the richness and complexity of the subject matter. According to Tashadkori and Teddle (2018), pragmatism empowers the researcher to embrace this diversity of perspectives, fostering a more inclusive and holistic understanding of digitalization in the F&B sector.

Furthermore, pragmatism encourages reflexivity and awareness of the researcher's role in shaping the research process and interpreting the findings. By acknowledging their own biases, values, and assumptions, researchers can engage in critical reflection to ensure the integrity and validity of their research outcomes. This self-awareness is particularly crucial in studies like the present one, where the researcher's decisions and interpretations may impact the validity and reliability of the study findings, ultimately enhancing the credibility and rigor of the research (Cherryholmes, 2012; Tashadkori & Teddle, 2018).

In summary, the selection of pragmatism as the philosophical framework for the present study on digital tool adoption among F&B companies is driven by its flexibility, emphasis on practical outcomes, recognition of multiple perspectives, and promotion of reflexivity. By adopting a pragmatic approach, the researcher can navigate the complexities of the research topic effectively, producing insights that are not only academically rigorous but also relevant and actionable for industry stakeholders.

Concerning the choice of the mixed research methods, the exploration of digitalization within the context of Food and Beverage (F&B) enterprises in Vietnam necessitates a research design that can effectively capture the intricate interplay of quantitative trends and qualitative nuances (Hair et al., 2007). As such, a mixed methods research approach has been selected to provide a comprehensive understanding of the multifaceted phenomenon of digitalization and its impact on F&B enterprises. This section presents a detailed rationale for the choice of mixed methods, highlighting its compatibility with the research objectives and the unique advantages it offers.

Firstly, the use of mixed methods design ensures comprehensive understanding of the studied issues (Bell et al., 2022). The adoption of digital technologies in the F&B sector is a multidimensional process that encompasses both quantitative data, such as adoption rates or the extent of adoption, as well as qualitative aspects, such as influencing factors determining the adoption of technologies in data collection and processing in product design or the managers' perceptions of what F&B enterprises should do to ensure the success of technology adoption, and strategic decision-making. A mixed methods approach allows for a holistic exploration of this phenomenon, capturing not only the "what" (quantitative data) but also the "why" and "how" (qualitative insights) behind the observed trends.

Secondly, Zikmund et al. (2013) argue that the mixed methods design promotes research findings' triangulation and validation. By integrating both quantitative and qualitative methods, the research gains the advantage of data triangulation, where different types of data are used to corroborate and validate each other. This approach enhances the credibility

and reliability of the findings, mitigating potential biases or limitations inherent in each individual method.

Thirdly, the use of mixed methods enables the researcher to gain depth and richness in research findings (Burns & Burns, 2008). Qualitative methods enable the researcher to delve deep into the experiences, perceptions, and motivations of stakeholders involved in the digitalization process. This depth allows for the identification of underlying factors, barriers, and opportunities that may not be apparent through quantitative data alone. The richness of qualitative insights complements the quantitative findings, enriching the overall analysis.

Fourthly, it is stated by Eriksson and Kovalainen (2015) that the contextualization of the thesis encouraged the researcher to use the mixed methods research. The F&B industry in Vietnam operates within a unique cultural, economic, and social context. A mixed methods approach facilitates the contextualization of the digitalization phenomenon, providing a more nuanced understanding of how these contextual factors influence the adoption and implementation of digital technologies within F&B enterprises. Additionally, Cameron and Price (2009) support holistic recommendations. The combination of quantitative trends and qualitative insights enables the formulation of more comprehensive and informed recommendations for F&B enterprises, policymakers, and industry stakeholders. The actionable insights derived from this approach are more likely to address the intricate challenges and harness the opportunities presented by digitalization.

Finally, the flexibility is facilitated by the mixed research methods (Bell et al., 2022). Digitalization is a rapidly evolving phenomenon, and the mixed methods approach allows

for flexibility in adapting to changes in the research landscape. It enables the researcher to explore emerging trends and capture real-time developments through qualitative means, while also providing a historical and longitudinal perspective through quantitative data.

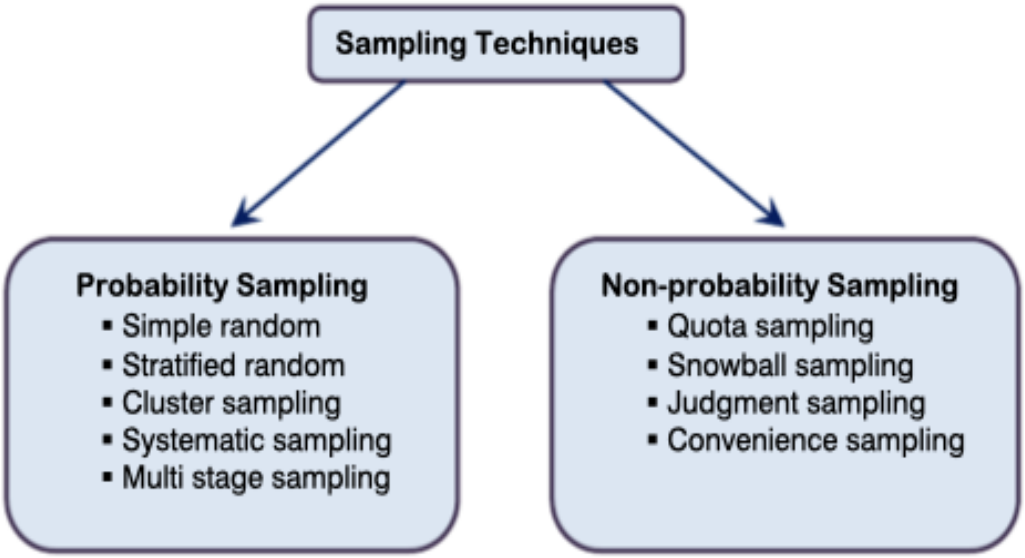
In conclusion, the selection of a mixed methods research design for the study concerning digitalization in F&B enterprises in Vietnam is driven by the need to holistically investigate the complex and dynamic nature of digital transformation. By integrating quantitative data and qualitative insights, this approach aims to provide a more robust and comprehensive understanding of how digitalization is shaping the F&B industry in Vietnam and its implications for various stakeholders.

3.4 Population and Sample

The population of the current study involved all employees, both managerial and non-managerial positions, from large F&B businesses in Vietnam, including Fleur De Lys Hospitality, Nestle Viet Nam, L'amant Café, Zeta Group, TH Group, and Nutifood VN. This population was selected because currently digitalization has not widely implemented in Vietnam in the F&B sector. Only large F&B have enough resources and competence to adopt technologies in operations. Therefore, to have the insights of how digital technologies are utilized for data collection, processing and analysis to facilitate product design and manufacturing the population of the current study covered those working in large F&B companies that have had experiences of adopting digital technologies.

In the realm of sampling techniques, it's essential to first understand the concept of sampling and the rationale behind researchers' preference for certain sampling methods.

Sampling involves selecting a subset from a chosen sampling frame or the entire population under study. This process serves multiple purposes, including making inferences about a population or generalizing existing theory. The choice of sampling technique determines the extent to which these objectives can be achieved. Broadly, sampling techniques can be categorized into two types: 1) Probability or random sampling and 2) Non-probability or non-random sampling (Singh & Masuku, 2014). Before delving into the specifics of individual sampling techniques, researchers typically decide on the overarching sampling approach. Figure 3.1 illustrates the various types of sampling techniques for reference and comparison.



Source: Singh & Masuku, 2014

Figure 3 1. Types of sampling techniques

Specifically, probability sampling methods, such as simple random sampling, systematic sampling, stratified random sampling, cluster sampling, and multi-stage sampling, ensure that every element in the population has an equal chance of being selected for the sample (Zikmund, 2002; Brown, 2007). According to Ghauri and Gronhaug (2005), simple

random sampling involves randomly selecting cases from a complete list of the population, which can be costly and time-consuming if the population is widely dispersed. Systematic sampling selects every nth case after a random start, offering simplicity but potentially introducing bias (Sharma, 2017; Ackoff, 2003). Stratified random sampling divides the population into subgroups, ensuring representation from each subgroup, while cluster sampling divides the population into clusters and selects clusters for sampling, particularly useful for geographically dispersed populations (Wilson, 2010; Davis, 2005). Multi-stage sampling involves a step-by-step process, concentrating samples in specific geographical regions to save time and resources compared to random sampling of the entire population (Yin, 2003).

Accordingly, Breweton and Millward (2001) state that non-probability sampling methods, including quota sampling, snowball sampling, convenience sampling, and purposive or judgmental sampling, do not rely on random selection and may not represent the population accurately. Quota sampling selects participants based on predetermined characteristics to match the population distribution. Snowball sampling recruits additional participants through existing participants, beneficial for closed populations (Wilson, 2010). Convenience sampling selects readily available participants, often chosen due to its simplicity and low cost, while purposive or judgmental sampling deliberately selects cases or participants based on their relevance to the research question, providing valuable insights not easily obtained through random sampling (Maxwell, 1996).

In the current study, the sampling techniques were adopted in alignment with each phase of the research.

Qualitative Phase

During the initial qualitative phase of the research, participants were chosen using a purposeful sampling strategy (Patton, 1990) According to Browner et al. (2001), the selection of an appropriate sampling method is a critical aspect of research design, as it directly influences the quality and generalizability of the findings. In the current study, a purposive sampling method has been employed to strategically select participants for both quantitative and qualitative data collection. There are several reasons explaining the choice of the purposive sampling method and its alignment with the research objectives. Firstly, purposive sampling is of relevance to the current (Cochran, 2013). Purposive sampling, also known as judgmental or selective sampling, is particularly suitable when the researcher aims to target specific individuals or groups that possess relevant information related to the research objectives. Given the focused nature of the study on digitalization within the F&B industry in Vietnam, purposive sampling allows for the deliberate selection of participants who have firsthand experience and expertise in the subject matter.

Secondly, the use of purposive sampling promotes the study's expertise and insight (Singh & Masuku, 2012). The F&B industry is a complex domain with various stakeholders, including business owners, managers, employees, and customers. Each of these groups holds unique perspectives and insights regarding the impact of digitalization. Purposive sampling enables the researcher to identify and engage individuals who possess expert knowledge or extensive experience in the field, ensuring that the collected data are both meaningful and informative.

Accordingly, purposive sampling allows the researcher to approach diverse perspectives (Bernard, 2002). Within the F&B industry, digitalization affects different aspects such as

customer interactions, supply chain management, marketing strategies, and operational processes. Purposive sampling allows for the inclusion of a diverse range of participants representing various roles and positions within enterprises, leading to a more comprehensive understanding of the multifaceted impacts of digitalization.

Moreover, given the potentially limited pool of individuals with in-depth knowledge of digitalization in the F&B sector, purposive sampling is a practical approach that optimizes the use of resources (Dörnyei, 2007). It avoids the need to survey or interview a large number of participants who may not contribute significantly to the research objectives.

Furthermore, for the qualitative component of the study, purposive sampling ensures that participants' experiences, perspectives, and narratives are rich and contextually relevant. This approach enhances the depth and authenticity of qualitative data, contributing to a more nuanced exploration of the underlying factors and challenges related to digitalization (Zhi, 2014).

Finally, within purposive sampling by selecting participants based on their expertise and relevance, the research gains increased validity and trustworthiness. The insights and findings obtained from participants who possess substantial knowledge in the field are more likely to reflect accurate and reliable information (Tongco, nd).

In conclusion, the choice of the purposive sampling method for the current study aligns with the research objectives by allowing for a targeted and informed selection of participants. This approach ensures that the collected data are relevant, insightful, and representative of the diverse perspectives within the F&B industry, ultimately contributing

to a more robust and meaningful analysis of the impact of digitalization in Vietnam's F&B enterprises.

The qualitative phase of the research entailed selecting participants who met the following criteria:

1) The participants must work for F&B companies in Vietnam and have at least five years of experience.
2) The participants must work in managerial positions at their F&B businesses.
3) The participants must be directly involved in the process of adopting digital technologies in data collection and analysis at their business
4) Participants must be willing to fill in the consent form to state their agreement of participation of interviews.

Participants were initially contacted via email, where they received an introduction outlining the scope and purpose of the study. No incentives were offered for participation. Throughout the qualitative research process, participants were required to read and complete informed consent forms at each stage. They were also given the opportunity to withdraw from the study at any point as part of the informed consent process. The invitation to participate and the informed consent documents pertaining to the qualitative phase of the research can be found in Appendix A. Overall, the researcher selected 15 respondents who were managers, regardless of managerial levels, at large F&B companies in Vietnam such as Nestle Vietnam, TH Group, Golden Gate Restaurant Group, and so on. These F&B companies are companies who are seeking solutions for adopting digital technologies in collecting and analyzing data for product design to meet customer demands. A breakdown

of participant demographics by gender, age, years of experience, and working positions were presented in Table 3.2. Participants in individual interviews are marked by an asterisk.

Table 3. 2. Demographics of Interview Participants

Demographics	Responses	F	%
Gender	Male	12	80.00%
	Female	3	20.00%
Age	Less than 30	1	6.67%
	From 30 to 45	9	60.00%
	More than 45 years old	5	33.33%
Years of experience	Less than 5 years	1	6.67%
	From 5 to 10 years	11	73.33%
	More than 10 years	3	20.00%
Working position	Top manager	6	40.00%
	Middle manager	9	60.00%

Source: Composed by the author

As shown in Table 3.2, among 15 selected interview participants three of them were female, accounting for 20% while the rest (12 participants) were male. In terms of age, participants in the age basket of 30-45 years old made up 60% of the sample, followed by more than 45 years old participants (33.33%) and less than 30 years old (6.67%). Another demographic characteristic examined in the current study referred to years of experience. It should be noted that all interview participants had at least five years of experience working in the F&B industry in Vietnam which allowed them to have a thorough understanding of their businesses and the adoption of digital technologies in their operations. More than half of the interview participants had worked for their businesses for 5-10 years (73.33%) while 20% of the participants affirmed that they had been working for their F&B companies for more than 10 years old. Finally, six out of 15 participants (40%) were top managers in their F&B businesses, and 60% of the participants were middle

managers. In this qualitative phase, such demographic features as working experiences and managerial working positions are of great significance because these features ensure that they have enough experiences, competence and access of the adoption of digital technologies at F&B enterprises in Vietnam. Accordingly, this enables the researcher to acquire comprehensive insights of studied issues.

Quantitative Phase

In the quantitative phase of the research, random sampling was adopted with all current full-time employees who are directedly involved in digitalization and invited by e-mail to complete an online survey regarding their perceptions of how digital technologies were utilized in data collection and processing at their F&B companies.

Using random sampling in a survey that involves employees as the research instrument the current study offers several significant advantages. This approach helps ensure the reliability, validity, and generalizability of research findings. Firstly, according to Heckathorn (2015), random sampling allows the researcher to select employees from various positions, departments, and levels within F&B enterprises. This representation ensures that the perspectives of both frontline staff and management are included, providing a comprehensive understanding of how digitalization impacts the entire workforce.

Secondly, random sampling minimizes selection bias by giving every employee an equal chance of being included in the survey. This prevents overrepresentation of specific employee groups and enhances the credibility of research findings (Olken & Rotem, 2005).

Thirdly, digitalization affects different roles and functions within F&B enterprises differently. Using random sampling ensures that the researcher captures a diverse range of experiences, opinions, and attitudes, helping you paint a complete picture of the impact of digitalization on employees (Gonçalves et al., 2012).

Fourthly, with a randomly selected sample, the researcher can apply statistical tests to analyze the data and make meaningful conclusions about the broader employee population in F&B enterprises. This enhances the robustness of findings and allows the researcher to draw more confident insights.

Fifthly, findings obtained from a randomly sampled employee group are more likely to be applicable to the larger employee population within F&B enterprises across Vietnam. This generalizability is crucial for making informed recommendations or predictions about digitalization trends (Charles & Fen, 2007).

Particularly, random sampling eliminates potential bias introduced by the researcher when selecting participants. Etikan et al. (2016) explain that this objectivity contributes to the scientific rigor of the thesis and strengthens the credibility of research.

Finally, by employing random sampling, the researcher can avoid targeting specific individuals or departments, which can be important for ethical reasons. It ensures that no employee group is unfairly singled out during the research process (Charles & Fen, 2007).

In summary, using random sampling in a survey involving employees as the research instrument for the thesis on digitalization in F&B enterprises in Vietnam provides a solid

foundation for gathering reliable, unbiased, and generalizable insights. This approach allows the to explore various employee perspectives, draw meaningful conclusions, and contribute valuable knowledge to the field of digitalization in the F&B industry.

Invitation emails containing a survey link were dispatched to 120 potential participants, resulting in 80 completed surveys, yielding an overall response rate of 65.83%. These invitations to participate incorporated informed consent disclosures and advisories, emphasizing the voluntary nature of survey completion. No incentives were offered for survey completion. A detailed breakdown of respondents by gender, age, work experience, and role in digitalization is presented in Table 3.3.

Table 3. 3. Demographics of Survey Participants

Demographics	Responses	F	%
Gender	Male	60	74.68%
	Female	20	25.32%
Age	Less than 30	23	29.11%
	From 30 to 45	38	46.84%
	More than 45 years old	19	24.05%
Years of experience	Less than 5 years	24	30.38%
	From 5 to10 years	48	60.76%
	More than 10 years	8	8.86%
Working position	Managerial	12	13.92%
	Non-managerial	68	86.08%

Source: Composed by the author

Data collected from the survey revealed that nearly two-thirds of the participants (74.68%) were male participants while the rest (25.32%) were female. Referring to the age range, it was reported that 46.84% of the survey participants were in the age basket of 30-45 years old, followed by less than 30 years old (29.11%) and more than 45 years old (24.05%). The

researcher also looked into the participants' tenure of working in the current study, 60.76% of the participants affirmed that they had 5-10 years of experience working for their businesses while 30.38% only worked for their F&B companies less than 5 years. Finally, among 80 participants responding to the questionnaire, 86.08% are non-managerial participants while the rest (13.92%) were working in managerial positions.

3.5 Instrumentation

3.5.1 Interview

Data collection in this study involved both qualitative interviews and a quantitative survey. Interviews are commonplace in various social contexts, spanning job interviews, media interactions, social work assessments, and performance reviews (Lancaster, 2005). Despite their diversity, all interview forms share a common objective: the elicitation of information from the interviewee by the interviewer (Bryman & Bell, 2015). In research interviews, interviewers aim to extract a range of information from respondents, including behavioral patterns, attitudes, beliefs, values, and norms.

Different interview formats exist, with structured interviews being the most prevalent. In structured interviews, also known as standardized interviews, all respondents are presented with the same set of questions to maintain uniformity (Crossan, 2013). This approach ensures consistency in responses across all participants, facilitating data aggregation (Guba & Lincoln, 2014).

Conversely, unstructured interviews, often conducted alongside observational data collection, are prevalent in the ethnographic tradition of anthropology (Bloom & Crabtree,

2006). Ethnographers gather data by observing participants and recording field notes, while simultaneously selecting informants for ongoing interviews based on their knowledge and roles within the setting (Cohen et al., 2007). Through these interviews, researchers aim to uncover the meanings behind observed behaviors and interactions, with questions emerging organically as the researcher gains deeper insights into the setting.

In-depth interviews served as the exploratory qualitative research tools chosen for this study to understand the managerial perspective of the adoption of digital technologies for data collection and processing that support product designs at their F&B businesses. Interview questions were semi-structured which allowed the researcher to acquire as much information as possible (Cohen et al., 2007). Besides the interview questions which had been pre-defined, the researcher utilized several questions emerging from the participants' responses during the interviews. In other words, semi-structured interviews offer flexibility in data collection. While there is a set of core questions to guide the interview, the researcher can adapt the conversation based on participants' responses (Bryman & Bell, 2015). This flexibility enables the researcher to explore unexpected avenues, delve deeper into interesting points, or clarify ambiguous responses, ensuring that the data collected is comprehensive and rich in detail (Crossan, 2013).

Additionally, semi-structured interviews facilitate participant engagement and rapport building. By allowing participants to express themselves freely and engage in a conversational manner, the researcher can create a comfortable environment conducive to open communication. This rapport fosters trust between the interviewer and the participant, encouraging honest and candid responses, which are essential for obtaining reliable qualitative data (Guba & Lincoln, 2014).

The interviews were directed only at the fifteen managers of different F&B businesses operating in Vietnam. The researcher allotted flexible time for each participant, ranging from one to one and a half hours, depending on the participant's knowledge and willingness. Among these interviewees, there were some top managers who took the leading roles in their businesses such as the chairman, founder, and CEO meanwhile the others were plant directors, head of IT, head of digitalization, and so on. All of these interviewees had an in-depth understanding of the need for digitalization in their F&B businesses for product design to meet customers' demands and preferences, how digital technologies were integrated into data collection and processing, how digital technologies helped data collection and processing, challenges of the adoption of digital technologies, and factors driving the success of adopting digital technologies. Interview transcripts were respectively included in Appendix B.

3.5.2 Survey

The survey was conducted using Google Forms, a widely favored web-based survey tool known for its cost-effectiveness, user-friendliness, and independence in survey design and deployment. Google Forms offers various design options and technological features, including multiple question formats, the capability to download data in diverse formats, and the ability to detect multiple responses. These features made it a preferred choice for this study, as it facilitated easy survey creation and management.

The survey was meticulously crafted to ensure clarity and ease of completion for respondents. Each page of the survey included a progress bar, indicating the respondents'

progress and providing a sense of completion. Moreover, the survey incorporated information about the study's purpose and guidelines, fostering transparency and encouraging participation. According to Wright (2005), such considerations help build trust in the researcher's credibility and increase respondent engagement.

At the outset, participants were presented with an introductory page outlining the study's necessity, participants' rights, and contact information for queries. Background information, including age, gender, years of experience, and job roles, was collected to contextualize responses. Subsequent questions delved into topics such as consumer behavior in F&B companies, the significance of understanding consumer behavior, impacts on product strategy, data collection methods, challenges, and the role of digital technologies.

The method of online surveys allows researchers to reach a broad geographical audience, albeit with potential challenges such as low response rates. Given this, a population encompassing F&B employees was targeted to ensure a sufficiently large sample for analysis. Online survey tools like Google Forms have emerged as convenient research instruments, providing rapid data collection and synchronous result compilation.

Despite their convenience, online surveys present both advantages and disadvantages. While they offer access to diverse participants and reduce researcher effort, concerns exist regarding data validity, sampling issues, and survey fatigue among users. However, the anonymity afforded by online surveys often encourages more honest responses compared to postal surveys. Yet, detecting deception and increasing response rates remain challenges for researchers.

In survey design, three key aspects were considered: clear presentation, closed-answer formats, and the Likert scale.

Clear presentation: Google Forms' user-friendly interface facilitated clear presentation, ensuring respondents could easily navigate and complete the survey. These design considerations aimed to optimize respondent comprehension and data quality, enhancing the reliability and validity of survey findings.

Closed answers: Close-ended questions are utilized in questionnaires for their efficiency and ease of analysis. By providing predefined response options, using Likert scale responses, close-ended questions streamline the data collection process, making it quicker and simpler for respondents to answer. This standardized format ensures uniformity in responses, minimizing bias and facilitating straightforward analysis by allowing researchers to easily quantify and categorize the data. Additionally, close-ended questions reduce respondent burden by presenting options for selection, thus requiring less cognitive effort compared to generating answers from scratch (Sudman & Bradburn, 1982).

Utilizing a Likert scale for response sets offers several advantages. One notable benefit is the ease of coding closed-ended questions, simplifying data analysis for computer-based processing (Bryman & Bell, 2015). For instance, questions in the survey were scored as follows:

Strongly agree = 5

Agree = 4

Neither agree nor disagree = 3

Agree = 2

Strongly disagree = 1

Overall, there were two sections included in the questionnaire. While the first section involved the items exploring the participants' perceptions of the role of customer behaviors to product design and production, the second section consisted of items investigating the perceptions of the impacts of digitalization on product design and manufacturing. There were five items included in each sections. These items were all designed in Likert scale. There was only one open ended question at the end of the survey that was used to exploit more ideas related to the studied issues from the participants. Details of the survey questions are included in Appendix C.

3.6 Data Collection Procedures

Before commencing data collection from interviews and surveys, the researcher conducted a pilot study as a preliminary evaluation of the survey and interview questions' dependability, content validity, and overall effectiveness (Creswell, 2014). The pilot study aimed to identify any potential issues and areas for improvement before engaging with the full participant pool.

For the pilot test of the survey, initially, a survey comprising 23 items was prepared by the researcher. This survey was adapted from the study conducted by Park (2022), with additional introductory and concluding communication pieces integrated into Google Forms. To facilitate ease of access and ensure mobile compatibility, a personalized survey

URL was generated (Ferguson, 2015), offering procedural scaffolding for participants (Huang et al., 2012).

A subset of twelve individuals, constituting 10% of the researcher's intended survey sample, was selected to participate in the pilot study. While the pilot study aimed to include three managers and nine employees from F&B companies, there was slight variation in participant demographics, reflecting diverse locations across Vietnam. The twelve pilot study participants were managers and employees who had experience in adopting digital technologies for data collection and analysis. Considering the results of pilot survey and the context of the current study, 11 items were used for the main survey. In terms of the pilot interview, two managers were selected from 12 participants of the survey participated in the pilot interview. Interview questions in the main interview were the same in the pilot interview.

After the pilot interview and survey, data were collected qualitatively and quantitatively respectively. Referring to qualitative data from the interview the data collection procedures for the qualitative aspect of the research using in-depth interviews involved the following steps:

1) Approaching the participants: After acquiring the consent letter from the participants, the researchers arranged the interview time with the participants. While 12 out of 15 participants participated in the interview through telephone, Zalo and Skype, the others answered through emails.

2) Introduction: Before asking the official interview questions, the researcher answer name, working position, thesis title, and the objectives of the interview. The researcher also asked for the participants' willingness for the interviews.

3) Interviewing: The researcher interviewed the participants question by question. During the interviews, sometimes the researcher used additional questions that emerged from the participants' responses to explore more facets of digitalization in data collection and processing at their F&B enterprises. The average time for each interview was 47 minutes, ranging from 18 minutes to 122 minutes. The researcher used a telephone to record all the interviews for future transcription for the analysis.

4) Concluding: The researcher thanked the participants for their contributions and stated the commitment for the use of data collected from the interviews. Particularly, the researcher also asked for the recommendations for the study.

In terms of quantitative data from the survey, the data collection procedures for the quantitative aspect of the research using surveys involved the following steps.

1) Getting contacts: The research collected email address from the participants to send the Google Docs link for the survey.
2) Sending the survey: Google Docs link of the survey was sent to all the willing participants through email. The researcher manage the responses from the participants. The reminding letter was sent to the participants to remind them of completing the survey.
3) Checking and managing the responses: The researcher constantly checked the response rate. When the response rate was satisfying, the researcher acquired the results from Google Docs for the analysis.

By following these data collection procedures for both qualitative in-depth interviews and quantitative surveys, the research yields robust and insightful findings that contribute to the understanding of digital transformation in this industry context.

3.7 Data Analysis

Data collected from the interview and survey were also processed, analyzed and interpreted qualitatively and quantitatively respectively. Qualitative data collected from in-depth interviews was processed based on the checklist of thematic proposed by Braun and Clarke (2012). According to Braun and Clarke (2012), thematic analysis is a widely used qualitative data analysis method that aims to identify, analyze, and report patterns (themes) within the data. The process involves systematically coding the text, identifying themes, and interpreting their significance. The analysis of qualitative data involved the following steps:

1) Data transcribing: Before transcribing, the researcher familiarized with the recordings by listening to it carefully. The researcher paid attention to accents, speech patterns, and background noise, as these factors can affect transcription accuracy. Then, the researcher manually transcribed the recordings by using Microsoft words, pausing and rewinding as needed to ensure accuracy. The researcher typed out the dialogue verbatim, including pauses, laughter, and any other relevant vocalizations. Furthermore, the researcher also timestamps at regular intervals (every ten minutes) to track the progress of the transcription.
2) Coding: Coding was performed through tabularization. The researcher used themes and sub-themes for coding. Firstly, the key ideas of participants' answers

were organized based on the themes, including the extent of digitalization at F&B enterprises, factors influencing digitalization in customer data collection and processing, impacts of digitalization on product design and manufacturing of F&B, and recommendations for successful digitalization. Secondly, sub-themes were also developed based on the key themes. For example, sub-themes of factors influencing digitalization include people, capital, leadership, technology and so on.

3) Categorizing: Data was selected and grouped based on themes and sub-themes for analysis.
4) Quotations and Exemplars: Relevant quotes and exemplars were selected to support each theme. These excerpts were integrated into the analysis to provide context and vivid illustrations of participants' viewpoints.

5) Presenting and analyzing data: Data was analyzed based on themes that are aligned with the research questions.

Regarding quantitative data from the survey, the data analysis involved the following steps based on Osborne (2008).

1) Sorting out data: The researcher sorted out data collected from the survey that had been delivered through Google Docs link.

2) Using excel and diagrams for percentage analysis: With reference to data collected from the questions of consumer behaviors, percentage analysis was presented with percentage and visualized through diagrams.

3) Descriptive statistics: Data collected from the second section of the questionnaire was processed through SPSS to gain descriptive statistics. Mean and standard deviation were utilized to indicate the participants' perceptions of influencing factors and their impacts on F&B enterprises.

4) Interpretation: The quantitative findings were interpreted within the context of existing literature and the research objectives. Implications of patterns, trends, and relationships were discussed in relation to digitalization in F&B enterprises in Vietnam.

By employing these data analysis methods for both qualitative in-depth interviews and quantitative surveys, the research will yield comprehensive and valuable insights that contribute to the research field.

3.8. Research Ethics

In conducting research on digitalization in F&B enterprises in Vietnam using interviews and surveys as data collection tools, it is essential to uphold a high standard of research ethics. This ensures that the rights and well-being of participants are protected and that the research process maintains integrity, honesty, and transparency (Barrow et al., 2017; Rhodes, 2005). The following research ethics considerations should be taken into account:

1) Informed Consent: Prior to participating in interviews or surveys, participants were provided with clear and comprehensive information about the research purpose,

procedures, potential risks, benefits, and their rights. Participants must provide informed and voluntary consent to participate, and they were assured of their right to withdraw from the study at any point without consequences (Barrow et al., 2017).

Informed consent letter for the interviews was included in Appendix A. There are two sections covered in the consent letter. The first section involved the explanations of terms and conditions of the interview participants. In this section, the researcher explained the objectives of research, objectives of the interviews, rights and duties of the participants, and terms related to use of data. In the second section, the researcher presented the interview questions to provide the participants an overview of the interview. When the participants signed in the consent letter, they agreed with all the terms. The use of consent letter ensures the willingness of the participants (Barrow et al., 2017).

2) Confidentiality and Anonymity: Participants' identities and responses were kept confidential and anonymized in the reporting of results. Data were stored securely and only accessible to authorized researchers. Any direct quotes or information that could potentially identify participants were properly anonymized (Rhodes, 2005).

3) Beneficence and Non-Maleficence: The researcher prioritized the well-being of participants. Adequate measures were taken to minimize potential negative impacts. If sensitive topics were discussed, the researcher ensured that participants were provided with appropriate support or resources (Rhodes, 2005).

4) Privacy: The researcher ensured that participants' privacy was respected throughout the research process. The researcher avoided intrusive or overly personal questions. (Barrow et al., 2017).

5) Avoiding Coercion: Participants were not be coerced or pressured into participating. They were free to decline participation or withdraw at any time without negative consequences (Barrow et al., 2017).

6) Transparent Research Practices: The researcher clearly explained the research aims, methodologies, and intentions to participants. The researcher was open about the potential implications of the research, both positive and negative (Barrow et al., 2017).

7) Researcher's Bias: The researcher was aware of biases and took steps to minimize the researcher's influence on the research process and outcomes. Objectivity is essential in data collection, analysis, and interpretation (Rhodes, 2005).

8) Acknowledgment and Collaboration: The researcher properly acknowledged the contribution of participants to the research (Rhodes, 2005).

9) Reporting Accuracy: The researcher presented the findings accurately and truthfully, without misrepresenting or exaggerating results. The researcher clearly distinguished between conjecture, interpretation, and factual data (Rhodes, 2005).

By adhering to these research ethics considerations, the study on digitalization in F&B enterprises in Vietnam will contribute to knowledge while treating participants with respect, dignity, and integrity.

3.9 Validity and Reliability

Ensuring reliability and validity for the research findings of the current study is crucial for producing trustworthy and credible results (Bryman & Bell, 2015). The following measures were adopted by the researcher establish reliability and validity for both the interview and survey data collection methods.

1) Ensuring Reliability

Interview

Pilot Interviews: The researcher conducted pilot interviews with a small group of participants to test the interview protocol, question wording, and flow. This helped identify any ambiguities or issues that could affect the consistency of responses (Crawford et al., 2001).

Survey

Pilot Surveys: The researcher administered the survey to a small sample of participants who were similar to the target population. This helps identify any confusing or unclear questions and ensures that the survey is well-received and understood (Crawford et al., 2001).

Coding Consistency

The researcher ensured consistent coding of survey responses by providing clear guidelines to coders and establishing a coding protocol (Crawford et al., 2001; Fan & Van, 2010; Kraut et al., 2004).

2) Ensuring Validity

Interviews

Credibility: The researcher spent sufficient time in the field to build rapport and trust with participants. The researcher documented the research process and interactions with participants to enhance the credibility of qualitative findings (Fan & Van, 2010; Kraut et al., 2004).

Triangulation: The researcher gathered data from multiple sources, such as different participants or documents, to cross-validate and confirm the accuracy of qualitative findings

Surveys:

Content Validity: The researcher ensured that survey questions accurately capture the intended constructs by conducting a thorough literature review. Additionally, the researcher sought input from experts in the field to review and validate the survey instrument for content relevance (Crawford et al., 2001; Fan & Van, 2010; Kraut et al., 2004).

Criterion Validity: The researcher compared survey results with an established criterion or measure related to digitalization in F&B enterprises. This provides evidence of the validity of the survey instrument (Bryman & Bell, 2015; Crawford et al., 2001).

By following these steps, the researcher can systematically ensure both reliability and validity for the research findings. Combining careful methodological design, pilot testing, member checking, and validation techniques contributed to the robustness and credibility of research.

3.10 Limitation and delimitations of research design

3.10.1 Limitations

The current study expected to explore the adoption of digital technologies in data collection and analysis facilitating product design among Vietnamese F&B companies. Despite the researcher's attempts, there are still some limitations in the research design. Firstly, the sample size of the quantitative phase is relatively small. The sample size is only 80 respondents. The reason for a small sample size is that the adoption of digital technologies is only available in large F&B in Vietnam; therefore, the sample pool for the current study was restricted. A small sample size leads to the limitations in generalization and reliability of research findings. Secondly, literature review is an important part of any research, because it helps to identify the scope of works that have been done so far in research area. Literature review findings are used as the foundation for the researcher to be built upon to achieve research objectives. However, related studies in the studied field in the Vietnamese context is limited.

3.10.2 Delimitations

Delimitations help set boundaries and provide clarity about what the study will and will not address. Here are some delimitations relevant to the current study research (Theofanidis, 2018).

1) Geographic Scope:

Vietnam: This research focuses exclusively on F&B enterprises within the geographical boundaries of Vietnam. Findings and conclusions may not be generalizable to other countries or regions.

2) Type of Enterprises:

F&B Sector: The research is limited to the Food and Beverage (F&B) industry, encompassing restaurants, cafes, food stalls, and similar establishments. Other sectors are not considered within the scope of this study.

3) Size of Enterprises:

Large enterprises: The study focuses on F&B enterprises of varying sizes, with a specific emphasis on large enterprises.

4) Research Tools:

Interviews and Surveys: The research employs in-depth interviews and surveys as the primary data collection tools. Other qualitative or quantitative methods, such as case studies or experiments, are beyond the scope of this study.

5) Digitalization Aspects:

Broad Digitalization Concepts: The study broadly explores the digitalization practices, challenges, and impacts within F&B enterprises. However, it may not deeply investigate specific technical details or platforms associated with digital transformation but focuses on the adoption of digitalization in data collection and processing in product design and manufacturing.

6) Timeframe:

Current Scenario: The research captures the state of digitalization in F&B enterprises in Vietnam up until the time of data collection. It may not account for potential future developments or changes beyond this timeframe.

7) Participants:

Selected Participants: The study involves a purposive sample of F&B enterprise stakeholders, including managers, owners, IT personnel, and employees directly involved in digitalization initiatives. It may not encompass the perspectives of individuals outside these roles.

8) Language Limitation:

English and Vietnamese Languages: The interviews and surveys were conducted in Vietnamese to prevent language barriers that may restrict participation to those who are proficient in English, potentially excluding some participants. Meanwhile, the research was written in English.

3.11 Conclusion

This chapter provides a comprehensive outline of the methodology employed, encompassing research design and the instruments utilized in the study. The research adopted a positivist paradigm, with justification provided for this choice. Employing a mixed-method approach, the study utilized both quantitative (online survey) and qualitative (in-depth interviews) methods to delve into participants' perspectives regarding the adoption of digital technologies in data collection and analysis, particularly in the context of product design within F&B companies. The rationale behind conducting three phases of research for data collection from both strands was expounded upon, involving in-depth interviews with managers and online surveys targeting members of F&B companies. The subsequent chapter delves into the findings derived from both phases of the research, drawing comparisons with existing literature.

CHAPTER IV:

RESULTS

This chapter presents the culmination of extensive research, offering insights into the state of digitalization within the F&B sector in Vietnam. By addressing these research questions, we aim to provide a comprehensive understanding of the current digital landscape in F&B enterprises, the factors that shape digital adoption decisions, the transformative effects of digital technologies, and the guidelines for achieving successful integration. The results presented herein contribute to not only advancing academic discourse but also offering practical implications for F&B businesses aiming to harness the benefits of digitalization.

Through an intricate interplay of empirical data, statistical analysis, and qualitative insights, this chapter unveils a panoramic view of the digitalization journey within F&B enterprises in Vietnam. The subsequent sections delve into each research question, unraveling the nuances, trends, challenges, and opportunities that collectively define the role of digital technologies in shaping the modern F&B landscape.

4.1. Results of Research Question 1

The extent of adoption of digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam

4.1.1. Data of customer behaviors in the F&B sector

In today's fast-paced business environment, the Food and Beverage (F&B) industry faces constant challenges to innovate and meet consumer demands (Schuh et al., 2017; VietCredit, 2021). According to Yildrim and Demirbag (2020), digital technologies have become a critical tool for F&B businesses worldwide, enabling them to streamline processes, enhance product/service design, and gain a competitive edge. The current study attempts to explore the extent to which digital technologies are adopted in data collection, processing, and analysis within the product/service design process of F&B businesses in Vietnam. To provide depth and context, this analysis incorporates excerpts from interviews conducted with industry professionals and responses from survey participants.

Before, examining the extent of adopting digital technologies for data collecting, processing and analyzing, the researcher endeavored to explore the participants' perceptions of the importance of data collection of customer behaviors. Specifically, the researcher used five questionnaire items to measure the participants' perceptions of role of data of customer behaviors to product development. In more detail, when being asked about their point of view of how important data of customer behavior is to the development of products and service, 100% of the participants affirmed that it is important.

Accordingly, the participants also shared their perceptions of the role of consumer behaviors in each stage of product development process. Figure 4.1 shows the results concerning this aspect.

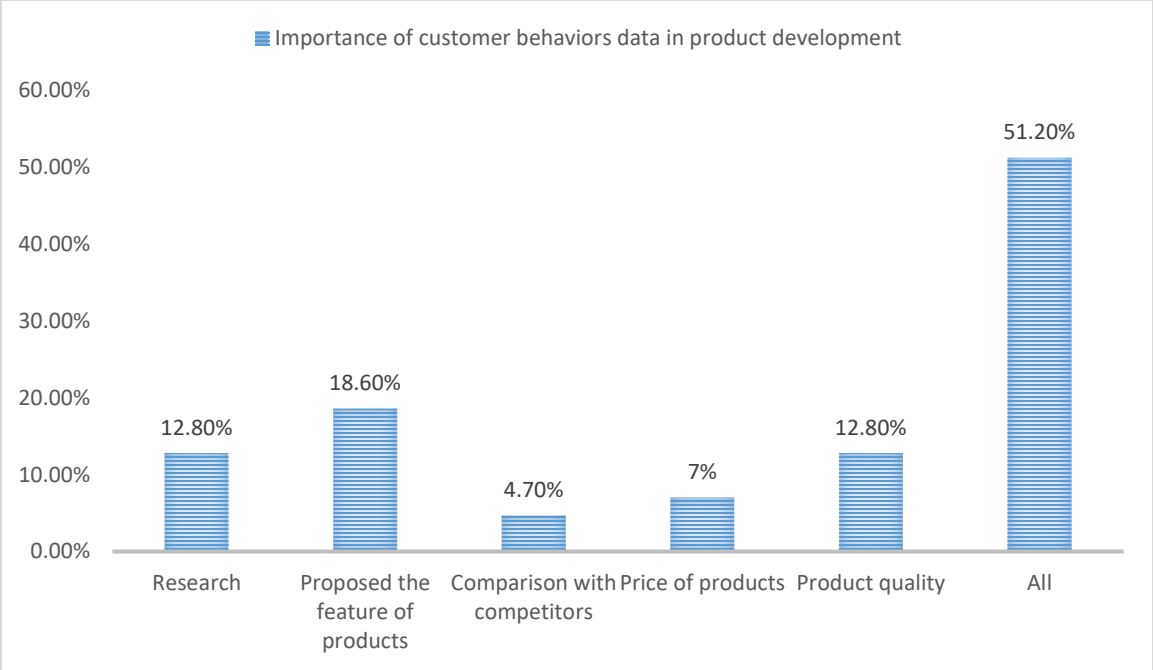


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Figure 4.1. Importance of Customer Behaviors Data in Product Development

As shown in Figure 4.1, the results show that more than half of the participants (51.20%) agreed that customer behavior data is of great significance to all stages of product development, including research, proposal of product features, competition comparison, product pricing and product quality. In other words, customer data behaviors play a central and invaluable role in all stages of product development, from initial research and ideation to the final product's pricing and quality (Dani, 2014; Thomson, 2022).

Referring to the stage of research and ideation, customer behavior data helps identify unmet needs, pain points, and gaps in the market. By studying how customers interact with existing products or services, companies can pinpoint areas where innovation is most needed. In particular, customer behavior insights inspire creative thinking. They provide a

foundation for brainstorming ideas that directly address customer preferences, desires, and behaviors.

Regarding the phase of proposal of product features, understanding how customers use similar products or react to certain features helps in prioritizing product functionalities. This ensures that the most valuable and desirable features are incorporated into the product design. Moreover, customer behavior data informs user-centered design processes, ensuring that the product is intuitive and aligns with the way customers prefer to interact with similar solutions (Zheng, 2020; Zapata et al., 2020).

Accordingly, in the phase of competition comparison, analyzing customer behaviors regarding competing products or services helps in benchmarking against industry standards. This information enables companies to identify areas where they can outperform competitors or offer unique value propositions (Bechtold et al., 2014; Cachada˚ et al., 2019). By understanding how customers perceive and engage with competitors, companies can position their product strategically to attract target customers effectively.

Also, the role of data of customer behaviors is also demonstrated in the phase of product pricing, customer behavior data reveals price sensitivity and willingness to pay. This information guides companies in setting competitive and profitable price points that resonate with their target audience. F&B companies can use customer data to develop pricing strategies, such as dynamic pricing or bundling, that align with customer preferences and maximize revenue (Lee et al., 2015; Synnes & Welo, 2016).

Finally, in terms of product quality, monitoring customer feedback and behavior post-launch is critical for maintaining and improving product quality. Schiffer and Wiendahl (2019) affirm that by tracking how customers interact with the product and identifying issues, companies can address quality concerns promptly. Equally important, customer data behaviors provide an ongoing feedback loop for product refinement. Companies can iteratively enhance the product based on real-world user experiences, ensuring it remains relevant and competitive.

Data collected from the survey is supported by data collected from in-depth interviews with the industrial professional in the F&B sector in Vietnam. The participants expressed their acknowledgement of the role of data of customer behaviors on the process of product development. Participant 3, as a CTO of a F&B company in Vietnam admitted, "*The understanding of customer behaviors is particular important for the process of product development in the sector of F&B in Vietnam because it enables F&B companies to improve existing products or create new products to improve customer experiences, resulting in their enhanced loyalty and referrals to others."* The participants show that they highly appreciated the role of understanding of customer behaviors in product design and manufacturing within F&B industry; because this understanding determined the level of F&B products can meet needs and preferences of customers.

Summing up, incorporating customer behavior data into every stage of product development is essential for creating products that resonate with the market and meet customer expectations in the F&B industry. It not only enhances the chances of product success but also reduces the risk of costly missteps. Moreover, it fosters customer-centric

product development, where the product is designed and refined based on real customer needs and behaviors, ultimately leading to greater customer satisfaction and loyalty.

In the survey, the researcher also examined the methods currently used by F&B companies to collect customer data. It is revealed in Figure 4.2 that 55.8% of the participants used all methods for collecting data of customer behaviors, including sales staffs, agencies, and distributors, events, customer responses, online channels and friends and colleagues. Among the channels, the channel of sales staff, agencies and distributors was perceived as the most prevalent channel of customer data collection (25.6%), followed by customer responses (14.6%), events and online channels (7% respectively), and friends and colleagues (1.2%).

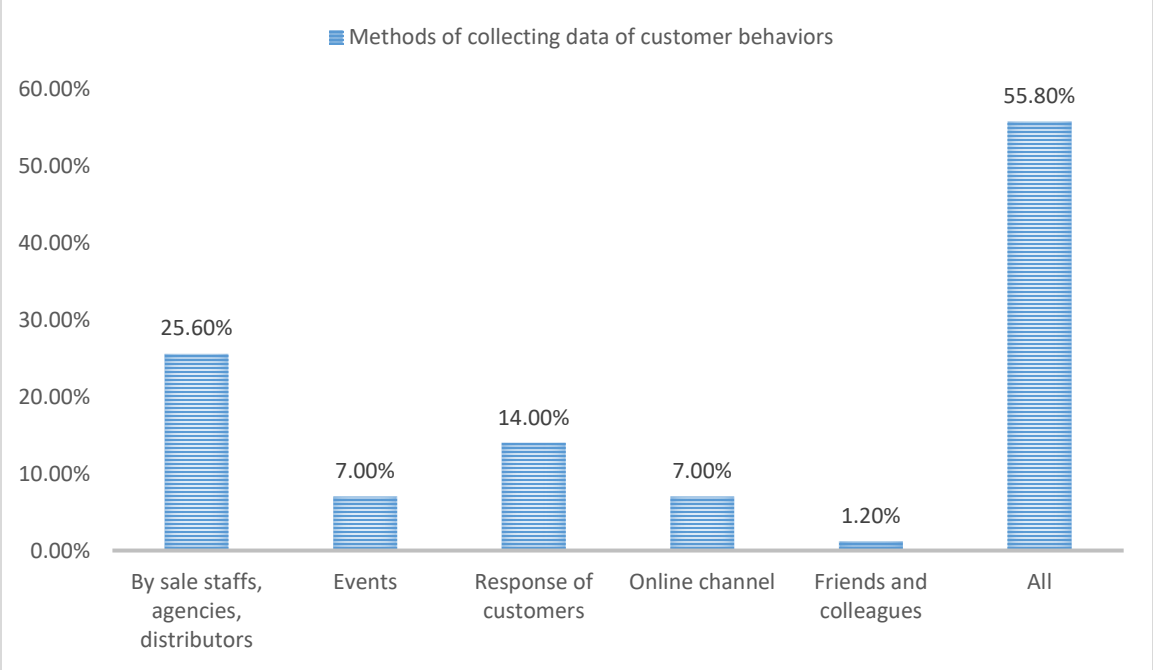

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Figure 4 2. Methods of Collecting Data of Customer Behaviors

Data collected from the interviews also clarified the data collected from the survey. Participant 4, as an CEO of a F&B company in Vietnam, explained: "*Currently, F&B enterprises in Vietnam utilize both online and offline channels for collecting customer data. Referring online channels, the company website and E-commerce sites are major sources to acquire customer feedbacks. Concerning offline channels, the networks of retailers, supermarkets and convenience stores are the major points for F&B companies to collect customer data*." In other words, the results show that both online and offline tools are valuable sources for their data collection.

Participant 3, as the CTO, shared the same idea with the results gained from the questionnaire when stating that although there was an increase in the use of online channels for data collection their proportion was still low. He claimed: "*Although F&B companies increasingly use different online channels to collect customer data, the contribution of online channels in F&B companies in Vietnam is not substantial.*" In other words, it is agreed among the participants that despite the increasing use of online channels in data collection, in the F&B industry in Vietnam, these tools are not streamline tools.

Referring to other channels of data collection in the F&B sector, Participant 2 (Director of Digital Transformation of a famous restaurant chain) appreciate the channels from sales staffs. He explained: "*We have digitalized the entire chain of restaurants. POS has been established at all restaurants. We regularly review sales reports and POS system data to analyze purchasing patterns, popular menu items, and customer preferences. Furthermore, we encourage sales staff to administer brief customer surveys after transactions to gather feedback on service quality and menu choices*." Data collected from the interview shows

that sale staff is still one of the most effective channels currently employed by F&B enterprises in Vietnam for data collection.

Participant 3 and Participant 12 (Sales manager) mentioned the network of agencies and retailers as one of the most effective channels for collecting customer data. Participant 3 emphasized: "*F&B companies in Vietnam mainly operated with the B2B model; in other words, they relies on their networks of retailers and outlets to distribute products to end-users. Therefore, retailers and points and sales become the major source of customer data for F&B companies. We cannot directly collect information or feedbacks from the customers but we acquire data from our points of sales*. In the same line, Participant 12 stated: "*We established data-sharing agreements with agencies and distributors to exchange information on sales trends, distribution channels, and customer feedback. Furthermore, we conducted regular meetings with agencies and distributors to discuss market insights, customer demands, and feedback collected from their end*." These responses indicate that similar to the channel of sales staff, the distribution network is also an effective way for F&B enterprises in Vietnam to collect customer data, facilitating the process of product development and manufacturing.

Concerning online channels, most of the participants agreed that there was an increasing in the use of online channels for data collection, ranging from website analytics, order history, E-commerce platforms and so on. A marketing manager, Participant 9, stated: "*We use automatic post-purchase email surveys to online customers to gather feedback on their ordering experience*." She also added: " *We implement feedback forms on our website, mobile apps, and within the restaurant or café to collect data on customer satisfaction, menu preferences, and service quality. We also monitored social media platforms for*

customer reviews, comments, and mentions of our F&B business. Other F&B companies also utilize social listening tools to track sentiment and trends." Accordingly, Participant 13 as a Sales Director affirmed: "*F&B enterprises tend to leverage web analytics tools like Google Analytics to track online customer behavior, including website visits, page views, and conversion rates. Moreover, if you offer online ordering, analyze customer order history to understand popular menu items, order frequency, and seasonal trends*."

Other channels such as F&B events or promotions are also utilized by F&B enterprises to collect data of customer behaviors through distributing surveys to attendees to capture their opinions on food quality, event experience, and suggestions for improvement (Participant 13 and Participant 8) or through event analytics tools to track attendance, foot traffic, and sales during specific events (Participant 11 and Participant 12).

In terms of the challenges encountering F&B companies in Vietnam when collecting data of customer behaviors, the researcher used the fourth questionnaire items to address these challenges; results are shown in Figure 4.3.

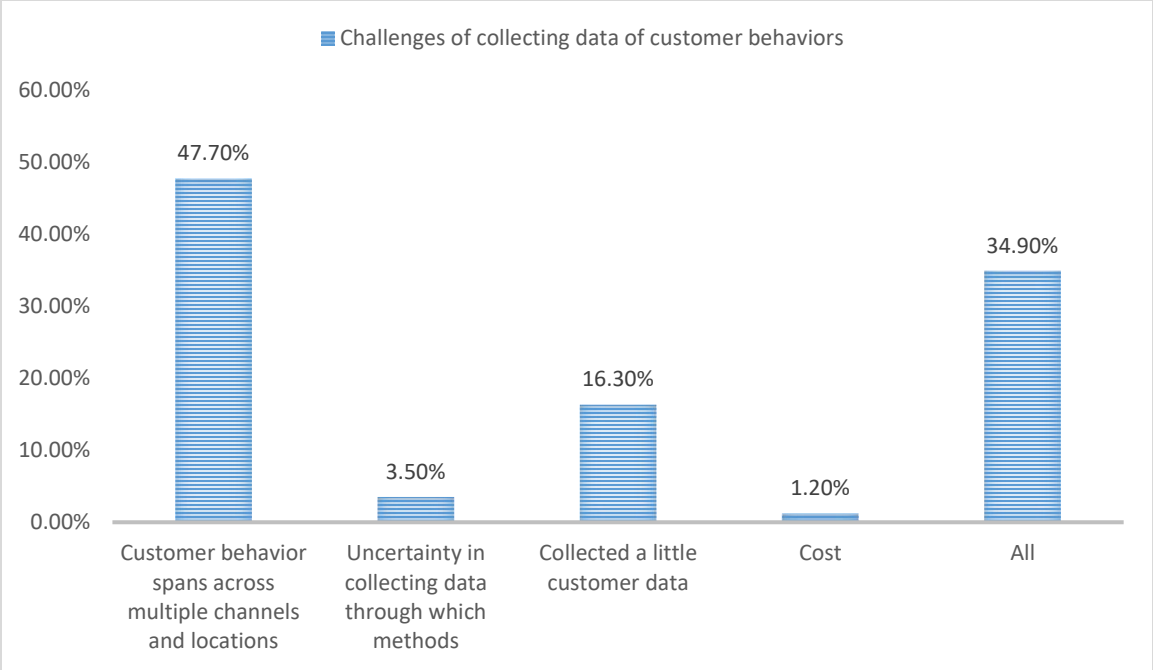

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Figure 4.3. Challenges of Collecting Data of Customer Behaviors

Responses from 86 participants in the F&B sector in Vietnam indicated that 34.9% of the participants admitted that their F&B encountered all challenges ranging from complexity in channels of customer behavior spans, uncertainty in collecting data methods, the amount of customer data, and cost. Among these challenges, complexity in channels of customer behavior spans was found as the most powerful challenge (47.70%). These findings are also supported by interview results when six participants mentioned the complexity of customer journey with different F&B distribution channels as one of the major challenges of their businesses. Participant 3 argued: "*Customer behavior in the F&B industry spans various channels, including in-store interactions, online orders, social media mentions, and more. Managing and integrating data from these diverse sources can be complex*."

Concerning the uncertainty of the methodology for data collection, some participants (Participant 6, Participant 9 and Participant 10) stated that their F&B encountered substantial difficulties in selecting the methodology for data collection. Specifically, Participant 6, as the Director of IT, wondered: "*About methodology as a manufacturer we don't have the understanding and we don't know how the methodology is used to capture the information from the customers. Therefore, there are many consultancy firms they come and advise us implementing with the main ideas to get those kinds of information. That means we don't have the knowhow and the knowledge of this area so every coming to us is new. So we don't have the methodology to do something. So how we can do it*." *Sharing the same perspective, Participant 8 as an IT Operation Manager asserted: "Determining the most effective methods for collecting customer behavior data can be challenging. With rapidly evolving technology, it's crucial to stay updated on the latest data collection techniques.*"

In contrast to the challenges of complexity in channels of customer behavior spans and uncertainty in collecting data methods, no interview participant mentioned cost as the challenge of collecting data of customer behaviors.

After investigating the associated aspects of collecting data of customer behaviors among F&B companies in Vietnam, the researcher delved into the methods of product development. Results are presented in Figure 4.4.

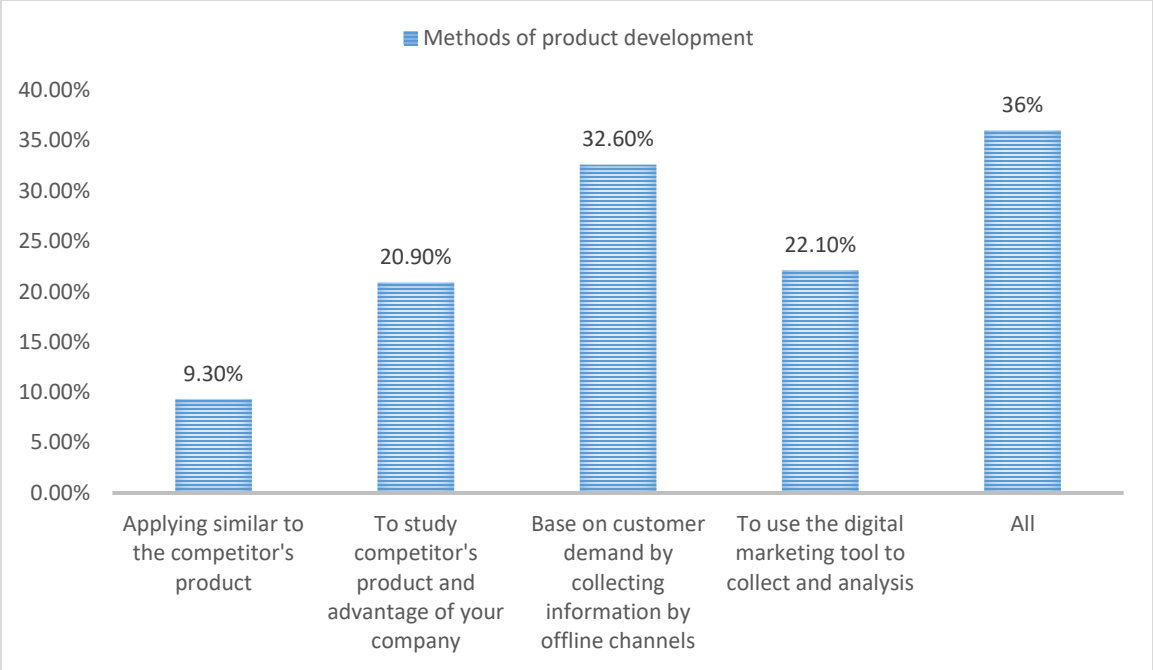

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Figure 4.4. Methods of Product Development

Referring to which methods are used by F&B enterprises in Vietnam for product development, interestingly 36% of the participants admitted that product development in F&B companies in Vietnam involves a multifaceted approach that considers competitor analysis, customer demand, and digital marketing tools. Considering the respective, single method, 32.6% of the customers stated that their F&B businesses relied on customer demands collected from offline channels to develop their product lines. This result was also identified in the interviews when the majority of the participants highlighted the importance of information of customer demands acquired through offline distribution network to R&D activities. In more detail, Participant 11 as the Vice Director of Materials explained: "*We conducted surveys within our physical F&B outlets to gather feedback directly from customers. We asked about their preferences, favorite dishes, and any suggestions for new offerings*." Participant 3 also stated: "*As stated we mainly distribute*

our goods to the customers through the network of physical stores; therefore, we utilize these points of sales for acquiring customer data of their demands and preferences of our products for product improvement and development." Further, Participant13 also mentioned "*We placed feedback forms near the cash register to encourage customers to share their opinions and ideas about our products*."

Accordingly, 22.1% of the participants also selected digital marketing tools for analysis. In the interview, the participants also revealed how digital marketing tools gradually became one of the mainstream tools for product development. Participant 9 stated: "*Customer feedbacks and testimonials in social media and E-commerce sites provide us interesting, valuable insights of customer demands, market trends, and customer expectations that support F&B enterprises in developing new products*."

Besides these above-mentioned methods, Participant 5 argued that the traditional methods such as following the model of the competitor are still implemented by F&B enterprises in Vietnam.

In sum, results collected from the survey and interview reveal that F&B enterprises in Vietnam are aware of the importance of data of customer behaviors in the process of product development. They also shared their F&B enterprises' use of different methods and channels of collecting customer data serving product development.

4.1.2. The extent of adoption of digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam

Data collected from the survey and interview also reveals insights of the extent of how F&B enterprises in Vietnam adopt digital technologies for data collection, processing and analysis serving the development of products. Firstly, the researcher examined how digital technologies are integrates in tasks of data collection and processing among F&B enterprises in Vietnam. Figure 4.5 shows the results.

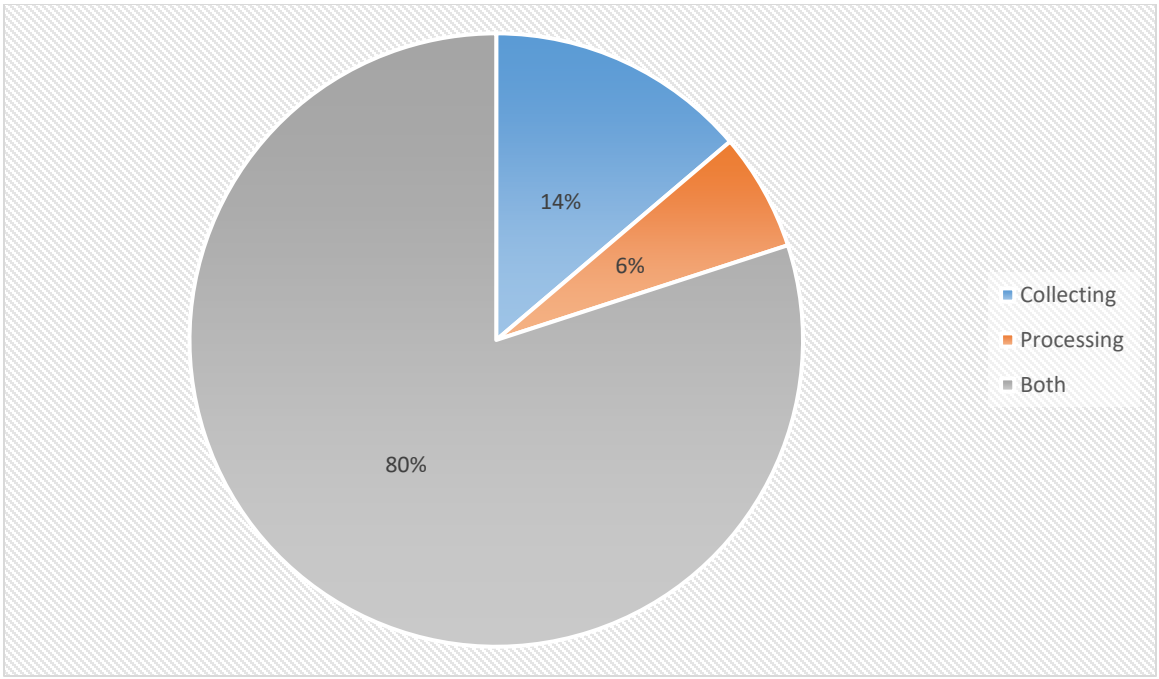

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Figure 4.5. Integration of Digital Technologies in Tasks of Data Collection and Processing

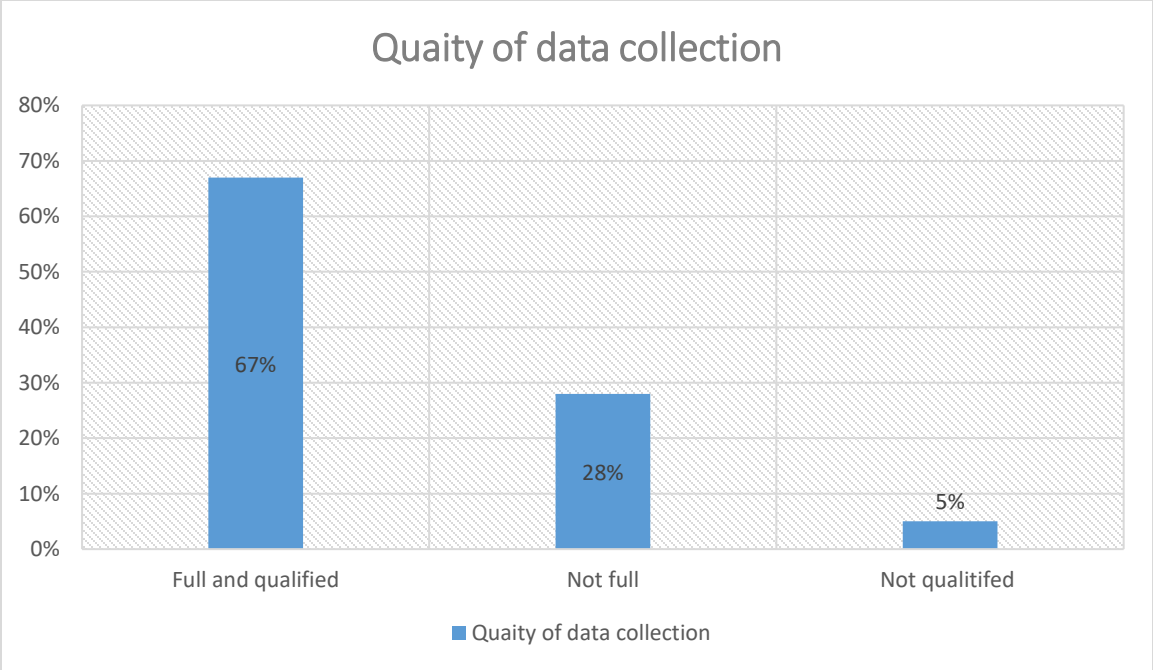
It is revealed in Figure 4.5 that all the participants affirmed the adoption of digital technologies in different tasks of collecting and processing of customer behavior data at Vietnamese F&B enterprises. Specifically, 80% of the participants stated that their F&B businesses digitalized both data collection and processing. This result implied the adoption of digital technologies through the F&B sector in Vietnam. Accordingly, nearly 14% of

the participants only adopted digital technologies in only collecting data of customer behaviors. Finally, 6.2% of the participants stated that their F&B businesses only utilized digital tools for data processing.

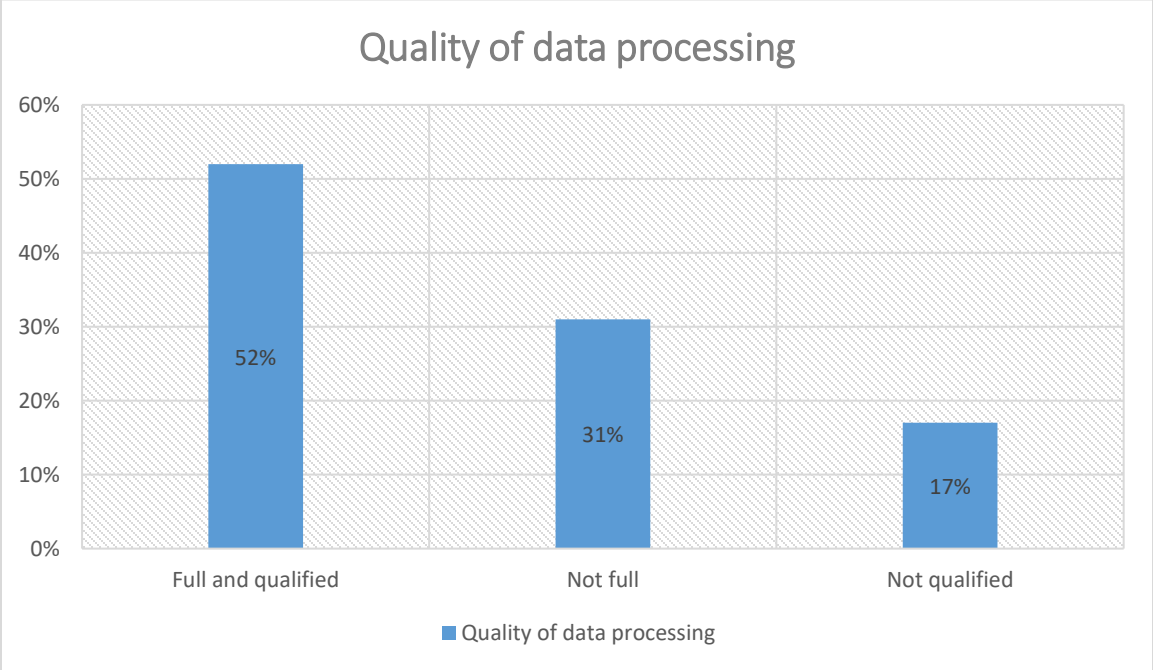
Actually, the integration of digital technologies in data collection and processing tasks within F&B enterprises in Vietnam has gained importance as businesses aim to enhance efficiency, improve customer experiences, and stay competitive in the market (Vo et al., 2019). Some major tools used by the F&B companies in Vietnam include POS systems, customer relationship management (CRM) systems, online ordering and delivery platforms, mobile apps and social media monitoring. Firstly, Point-of-sale (POS) systems are widely used in F&B establishments in Vietnam. These systems not only facilitate transactions but also collect data on sales, inventory, and customer orders. This data is crucial for inventory management and decision-making. Secondly, F&B businesses often employ CRM systems to collect and manage customer information. This includes details such as customer preferences, contact information, and order history, allowing for personalized marketing and service. Thirdly, many F&B enterprises have integrated online ordering and delivery platforms into their operations. These platforms collect data on customer orders, preferences, and delivery addresses, enabling better service and targeted promotions. Fourthly, some F&B businesses in Vietnam have developed mobile apps that customers can use to place orders, make reservations, and provide feedback. These apps collect valuable data on user behavior and preferences. Finally, F&B enterprises monitor social media platforms for mentions, reviews, and comments related to their brands. Social listening tools help gather customer feedback and sentiment analysis.

Concerning data processing tool, the results show that big data analytics tools are utilized by F&B companies in Vietnam to process data of customer behaviors. Digital technologies enable the processing of massive datasets that would be impractical to handle manually. Big data analytics tools can identify patterns, correlations, and anomalies within large volumes of data. Additionally, F&B enterprises can use machine learning algorithms and artificial intelligence to process and analyze data. These technologies can automate decision-making processes, detect fraud, and predict customer behavior based on historical data. Moreover, NLP (Natural Language Processing) technology enables the processing and analysis of unstructured text data, such as customer reviews and social media comments, to extract sentiment and insights. Lastly, digital technologies empower businesses to build predictive models that forecast future trends, customer behavior, and market dynamics based on historical data and algorithms.

To evaluate the extent of digitalization in data collection and processing at F&B enterprises in Vietnam the researcher explore explored quality of data collection and processing. Figure 4.6a and 4.6b shows the results.



Source: Composed by the author



Source: Composed by the author

Figure 4.6. Quality of Data Collection and Processing

As shown in Figure 4.6a and 4.6b, although more than half of the participants affirmed the quality of data collection (67%) and processing (52%) when using digital technologies, the other still complained that with digitalized data collection and processing at F&B enterprises are not full and qualified.

In order to acquire more insights of the extent of digitalization of data collection and processing for product development among F&B enterprises in Vietnam, the researcher interviewed the industrial professionals. Results obtained from the interviews are relatively controversial. While some participants affirmed the deep integration of digital technologies across the industry, the others affirmed that digitalization is only prevalent for large F&B companies in Vietnam. Specifically, Participant 1 – the Director of Sales – stated: "*In the sector of F&B and FMCG in Vietnam, the digitalization in collection and processing of customer behavior data has been performed only by large companies or foreign corporations such as Unilever or Vinamilk. In contrast, most of small and medium F&B enterprises in Vietnam have not integrated digital technologies in collecting and processing customer data."* In the same viewpoint, Participant 9 claimed: "*Although all F&B enterprises expects to adopt digital technologies in collecting and processing customer behavior data to develop their products meeting customer demands and expectations, only large F&B firms are capable of adopting these technologies. Limited resources prevented small and medium F&B enterprises from adopting digital technologies*." Furthermore, Participant 5 also stated: "*Only 15%-20% of F&B companies in Vietnam can successfully adopt digital technologies to collect, process and analyze data of customer behaviors, serving the development of products. Actually, there are many F&B enterprises, regarding of their size, investing in digitalization in data collection and processing; results of this not satisfied. Most of them cannot fully leverage the functions or*

benefits of digitalized systems of data collection and processing." Also, Participant 6 stated: "*The current situation of digitalization in data collection and processing is not mature*."

In contrast, other participants affirmed the increasing prevalence of adoption of data collection and processing among the F&B companies in Vietnam. Specifically, Participant 2 explained: "*I assumed that 100% of food service provider chains in Vietnam has adopted digital tools in data collection and processing. Digitalization is performed through all stages from ordering to payment at our restaurant chain. POS is widely established at restaurants and serves as a digital tool for data collection*." Aligned with the perspective of Participant 2, Participant 4 argued: "*Digital tools have been widely and deeply integrated in data collection and processing among F&B enterprises in Vietnam. My company has also adopted these technologies for such a long time. In general, in the F&B industry digital tools are effectively utilized by the companies for data collection and processing*."

The investigation of digitalization in the F&B industry in Vietnam also point out that the prevalence of digitalization in data collection and processing for product development in the Food and Beverage (F&B) industry in Vietnam being more pronounced among large enterprises compared to small F&B enterprises. There are several reasons explaining this difference. Firstly, large enterprises typically have more financial resources and a larger budget to invest in digitalization initiatives. They can afford to purchase advanced software, hardware, and hire skilled professionals to implement and manage these technologies. In contrast, smaller F&B businesses may have limited resources, making it challenging for them to invest in expensive digital solutions. Secondly, large F&B

enterprises can leverage economies of scale to justify the investment in digitalization. They often have a wider customer base, more extensive supply chains, and greater production volumes, which means that the potential benefits of digitalization, such as cost savings and process efficiencies, are more significant. Thirdly, large enterprises can establish partnerships with technology companies and solution providers more easily. They have the negotiating power to secure favorable terms and customize digital solutions to their specific needs. Smaller F&B businesses may not have the same bargaining power or access to such partnerships. Fourthly, large F&B enterprises often have more complex and diverse operations. This complexity can drive the need for digital tools to manage various aspects of the business, from supply chain logistics to quality control. Small enterprises with simpler operations may not see the same level of benefit from digitalization. Fifthly, large enterprises may be subject to more stringent regulatory requirements, especially if they export products internationally. Digitalization can help them maintain compliance with food safety, labeling, and traceability regulations (Zheng, 2020; Zapata et al., 2020; Bechtold et al., 2014). Smaller enterprises may operate primarily in the domestic market and face fewer regulatory pressures. Accordingly, large enterprises generate a substantial amount of data, which can be valuable for decision-making and product development. They are more likely to invest in data analytics tools to extract insights from this data (Lee et al., 2015; Synnes & Welo, 2016). Smaller businesses may have less data to work with and may not prioritize data-driven decision-making to the same extent. Moreover, large enterprises face strong competition both domestically and internationally. To remain competitive, they are more inclined to adopt digital technologies to improve their product development processes, stay ahead of industry trends, and respond to changing consumer preferences (Schiffer & Wiendahl, 2019; Perzylo et al., 2021). Lastly, large enterprises often have more structured and long-term strategic planning processes. They can incorporate digitalization

into their long-term business strategies, whereas smaller enterprises may focus on immediate survival and short-term goals.

In sum, there is a controversy over the results of the extent of digitalization of data collection and processing for product development. While some participants pointed out the wide adoption of digital technologies, others stated that only large F&B firms are capable of implementing the digitalized tools and systems for data collecting and processing, serving the development of products. Moreover, it is important to note that digitalization trends can evolve over time, and smaller F&B enterprises may also adopt digital tools and technologies as they become more accessible and affordable. Additionally, government initiatives, industry associations, and technological advancements can influence the adoption of digitalization among smaller businesses in the F&B sector in Vietnam. Factors influencing the adoption of digital technologies for data collection and processing are presented and analyzed in the next section.

4.2. Results of Research Question 2

Factors determining the adoption of digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam

4.2.1. Results from the questionnaire

In order to understand the stakeholders' perception of factors driving the successful implementation of digital technologies in collecting and processing data for the development of products at F&B enterprises in Vietnam, the researcher utilized both the

questionnaire, interview and document. Responses from these instruments revealed that there were a number of factors influencing the progress and outcomes of digitalization for product development, including people, technology, business strategy, and legal framework.

In terms of data collected from the questionnaire, Table 4.1 shows the results collected from the questionnaire.

Table 4.1. Factors Influencing the Adoption of Digital Technologies in F&B Enterprises

Factors	M	SD
People		
Role of people to implementation plan of digital technologies	4.11	0.63
Role of people to assessment and analysis of data quality	4.32	0.47
Role of people to decision making	4.58	0.51
Technology		
Suitability of technology	4.01	0.48
Safety and security	4.54	0.60
Efficiency	4.50	0.61
Business strategy		
Determine aim and priority	4.03	0.58
Data manage & analysis method	4.00	0.62
Processing	3.95	0.56
Product development plan	3.98	0.49
Legal framework		
Easy implementation	3.42	0.46
Difficult implementation	3.35	0.50

(M – Mean; SD – Standard Deviation)

The provided results offer a profound understanding of the intricate interplay of factors that shape the adoption of digital technology in the context of collecting and analyzing data

for product development. These influential factors encompass People, Technology, Business Strategy, and the Legal Framework, each contributing uniquely to the adoption landscape. In more detail, referring to the influencing of People, the role of individuals in the successful implementation of digital technologies is undeniably pivotal. As discerned from the mean scores, respondents place a strong emphasis on the significance of people in this process. Particularly, respondents overwhelmingly agree that individuals wield substantial influence in decision-making (M = 4.58) and in the assessment and analysis of data quality (M = 4.32). These high mean scores underscore the integral role of human expertise in guiding the adoption of digital technology.

The relatively moderate standard deviations in these People-related factors imply a convergence of viewpoints among respondents, indicating a notable consensus regarding the positive impact of people in these domains. Notably, the high mean score for the role of people in decision-making (M = 4.58) accentuates organizations' recognition of human judgment as essential for leveraging digital technology effectively.

In terms of Technology, data collected from the questionnaire also revealed that the suitability, safety, security, and efficiency of technology stand as paramount considerations in the adoption equation. Respondents ardently stress the importance of technology in driving efficiency (M = 4.50) and in ensuring safety and security (M = 4.54). These robust mean scores signify the pivotal role of technology in streamlining data collection and analysis processes while safeguarding data integrity and security.

The relatively lower standard deviations in these Technology-related factors suggest a heightened degree of unanimity among respondents. This alignment indicates a consensus regarding the indispensable and positive impact of technology in these realms.

Regarding the impacts of Business Strategy, in the current study business strategy emerges as a formidable driving force in the adoption of digital technology for data collection and analysis. Though receiving slightly lower mean scores compared to People and Technology, the determination of aims and priorities (M = 4.03) and the management of data and analysis methods (M = 4.00) are held in high regard as essential facets of business strategy.

The standard deviations accompanying these Business Strategy factors unveil a spectrum of opinions among respondents. This diversity may stem from varying organizational perspectives on the precise role and prioritization of business strategy in the context of data collection and analysis.

Finally, the researcher also explored the participants' perceptions of the impacts of legal framework on the adoption of digital technologies among F&B enterprises. Responses to the questionnaire indicate that factors entwined with the Legal Framework occupy a relatively less influential position in the collective perception of respondents. Easy implementation within the legal framework (M = 3.42) is deemed as less critical, while difficult implementation (M = 3.35) is regarded even less favorably.

The low mean scores assigned to these Legal Framework factors suggest that organizations may encounter challenges or uncertainties stemming from the legal dimensions of digital

technology adoption. Moreover, the standard deviations hint at the breadth of perspectives and experiences concerning legal considerations in technology adoption.

In sum, these results unveil the intricate and multifaceted nature of digital technology adoption for data collection and analysis in the realm of product development. While People, Technology, and Business Strategy hold prominent positions in the adoption discourse, the Legal Framework assumes a comparatively subdued role. The standard deviations across factors signal a mosaic of viewpoints and approaches among organizations, reflecting the nuanced complexity of decision-making in technology adoption. Ultimately, these insights underscore the imperative for organizations to judiciously balance and integrate these factors to orchestrate successful digital transformations in data-driven product development endeavors.

4.2.2. Results from the interview

People Factor

In order to clarify the results collected from the questionnaire, in the interview with managers of F&B enterprises in Vietnam the researchers also endeavored to gain expert insights about factors determining the success of technology adoption at F&B enterprises in Vietnam, serving the development of products. Specifically, all the participants (15 out of 15) mentioned people as one of the most powerful influencing factors in which nine participants listed People as the most important factors. Leadership vision was a recurrent theme in the interviews, with managers emphasizing the critical role that visionary leaders play in guiding digital technology adoption. Participant 4 emphasized that "*I think the leader's forward-thinking vision regarding technology integration has been the catalyst*

for F&B enterprises' success" The consensus was that leadership vision sets the direction and instills a sense of purpose, motivating teams to embrace digital tools.

Furthermore, strategic decision-making by F&B leaders emerged as a key driver of digital technology adoption. Managers stressed the importance of leaders' decisions regarding technology investments, resource allocation, and long-term planning. One manager (Participant 9) noted, "*The leadership's commitment to allocating resources for technology upgrades and talent acquisition has accelerated F&B enterprises' digital journey*." Effective decision-making aligns resources with organizational goals, facilitating the seamless integration of digital tools.

In the interview, the managers also agreed that leaders' willingness to take calculated risks and promote innovation was highlighted as pivotal. Managers pointed out that leaders who encourage experimentation and are open to innovation foster an environment conducive to technology adoption. A manager (Participant 13) stated, "*The leaders' encouragement to experiment and learn from failures has been instrumental in technological advancements of F&B enterprises in Vietnam.*" A culture of innovation allows organizations to adapt and thrive in the digital age.

The participants in the interview also stated that communication and employee engagement strategies employed by leaders significantly impacted technology adoption. Managers emphasized the importance of leaders effectively communicating the benefits of digital tools to employees. Participant 4 highlighted, "*The leaders engaged employees in the decision-making process, making them feel invested in the technology's success by delivering the benefits of technologies to business and communicating strategies and plans*

of digital technologies to them." Engaged employees are more likely to embrace new technology and actively participate in data collection and analysis efforts.

Moreover, resource allocation decisions made by leaders played a significant role. Managers stressed that leaders who allocated resources, both financial and human, for technology implementation and employee training, facilitated the adoption process. It is stated by Participant 7 that "*The leaders recognized the importance of investing in technology infrastructure and workforce training, which proved instrumental. Therefore, they invested a significant part of revenue on technologies and employee training to facilitate the adoption of digital technologies in data collection, processing and analysis."* Adequate resources are essential for successful technology adoption.

In contrast, the wrong decision by the leaders may lead to the failure of adopting digital technologies in data collecting, processing and analyzing to serve the development of F&B products. Participant 8 clarified: "*Sometimes the leaders relied on their subjective experiences and opinions to make the decisions about digital investment and the adoption of digital technologies without the considerations of market factors. These decisions led to the failure of digital technology adoption and loss of money*."

In sum, leadership vision and decisions are pivotal in driving the adoption of digital technology for data collection and analysis in Vietnam's F&B industry. Visionary leaders who embrace innovation, make strategic decisions, communicate effectively, set performance metrics and allocate resources wisely are at the forefront of digital transformation in this sector. As evidenced by the insights from the interviews with managers, strong leadership is the linchpin for navigating the complexities of technology

adoption in the F&B industry. Leaders who prioritize these aspects are instrumental in steering their organizations toward data-driven product development and staying competitive in Vietnam's dynamic market.

While leadership vision and decisions play a significant role in technology adoption, the influence of employees cannot be overstated. In the interview, the participants also emphasized the role of employees for the adoption of digital technology for data collection and analysis. One of the central themes that emerged from the interviews was the pivotal role of employee engagement and buy-in. Managers emphasized that when employees at all levels understand the benefits of digital technology and actively support its adoption, the transition is significantly smoother. As one manager (Participant 14) highlighted, *"If our employees were enthusiastic about the potential improvements that digital technology could bring, and their eagerness would make a significant difference in the adoption process."*

Accordingly, managers consistently underscored the importance of equipping employees with the necessary skills to effectively utilize digital tools. Employee training programs were viewed as essential for fostering competence and confidence. Participant 11 mentioned, "*Investing in employee training allowed F&B enterprises in Vietnam to bridge the digital skills gap, ensuring the workforce was proficient in data collection and analysis*." Skilled employees are more likely to embrace and make the most of digital technology.

Additionally, collaboration across different functions within an organization was identified as a key factor in successful technology adoption. Managers recognized that employees

from various departments needed to work together seamlessly to maximize the benefits of digital tools. Participant 6 shared, "*All teams from marketing, operations, and R&D collaborated closely in using data for product development, which wouldn't have been possible without the employees' commitment to collaboration*."

Last but not least, it is identified in the interview that resistance to change can be a significant hurdle in technology adoption. Managers highlighted that employees who are provided with the necessary support and guidance are more likely to overcome resistance and embrace new technology. Participant 10 stated, "*The leadership should take the time to address employee concerns, providing reassurance and addressing misconceptions, which helped mitigate resistance*."

Summing up, the role of employees in the adoption of digital technology for data collection and analysis in Vietnam's F&B industry cannot be overstated. Their engagement, buy-in, skills, collaboration, and willingness to adapt to change significantly influence the success of technology adoption initiatives. F&B enterprises in Vietnam that prioritize employee engagement, skill development, and a culture of innovation are better positioned to harness the full potential of digital technology for data-driven product development. As evidenced by the insights from the interviews with managers, employees are not just the end-users of technology but active contributors to its successful implementation, making them indispensable partners in the journey towards digital transformation in the F&B industry.

Technology factor

Besides People factor, factors associated with Technology were also identified as one of the most important factors determining the success of adopting digital technologies in data

collecting, processing and analyzing for product development based on the participants' responses in the interviews. The participants revealed that the adoption of digital technologies for data collection, processing, and analysis has become increasingly critical for F&B enterprises in Vietnam as they seek to enhance product development and stay competitive in a rapidly evolving industry. A robust technological infrastructure emerged as a fundamental factor influencing the adoption of digital technologies in F&B enterprises. One manager from a renowned restaurant chain emphasized (Participant 2) the significance of this factor, stating, "*Having a robust technological infrastructure is crucial. We invested in high-speed internet, reliable servers, and up-to-date hardware. This has allowed us to seamlessly integrate digital tools into our operations.*" This sentiment was echoed by another F&B manager (Participant 6) who added, "*Without the right infrastructure, digital technologies can be frustrating. We've seen smaller businesses struggle due to inadequate resources. It's not just about having the latest software; it's about the foundation*." These interview responses underline the pivotal role of technological infrastructure as the backbone of digital adoption in F&B. Without a strong foundation, the implementation of digital technologies can lead to operational inefficiencies and hinder product development efforts. Thus, investments in infrastructure are vital for a smooth integration of digital tools.

Furthermore, data security and privacy emerged as a pressing concern for F&B enterprises in Vietnam. A manager in the beverage sector (Participant 1) shared, "*We handle sensitive customer data, so security is paramount. We've implemented encryption and access controls to safeguard customer information. It builds trust with our customers*." Another F&B manager (Participant 12) emphasized, "*Data privacy regulations are becoming stricter. Ensuring compliance with these regulations has become a significant concern for us. We've had to invest in data protection measures and staff training*." These results

highlight that F&B enterprises are acutely aware of the importance of data security and privacy, especially in handling customer information. Compliance with regulations and customer trust are at stake, necessitating substantial investments in data protection measures. These concerns are driving F&B enterprises to adopt digital technologies that prioritize data security.

Finally, the scalability and flexibility related to technology flexibility were identified as pivotal factors that shape the adoption of digital technologies in the F&B sector. Participant 7 noted, "*We started small with digital tools, but as our business expanded, we needed scalable solutions. The ability to add new features and adapt to changing needs is crucial for long-term success*." Another manager (Participant 13) shared, "*In this industry, things can change rapidly. We need technology that can keep up. Flexibility allows us to experiment with new menu items and marketing strategies*." It is indicated from the interview responses that the managers underscore the dynamic nature of the F&B industry and the importance of digital technologies that can scale and adapt. Scalability ensures that digital solutions can grow alongside the business, while flexibility empowers F&B enterprises to respond swiftly to changing market conditions, facilitating innovative product development.

In sum, the adoption of digital technologies for data collection, processing, and analysis in Vietnam's F&B enterprises is significantly influenced by technology factors such as robust technological infrastructure, data security and privacy measures, and scalability and flexibility of digital tools. These factors collectively play a pivotal role in enabling F&B enterprises to harness the full potential of digital technologies for enhanced product development and competitiveness in the industry.

Business strategy

The adoption of digital technologies for data collection, processing, and analysis has become a cornerstone for product development within the F&B industry in Vietnam (Vo et al., 2019). The impact of business strategy on this adoption is substantial, as F&B enterprises navigate the path towards digital transformation to gain competitive advantages, streamline operations, and better understand their customers' needs (Cachada˚ et al., 2019; Buer et al., 2020).

Firstly, the participants revealed that business strategies centered around customer-centricity have significantly influenced the adoption of digital technologies in the F&B sector. This approach emphasizes understanding consumer preferences and tailoring products accordingly. Participant 8 explains, "*Our business strategy revolves around offering unique and personalized experiences. By harnessing data from our loyalty program and social media engagement, we can create new beverages that resonate with our customers*."

Secondly, it is identified that for F&B enterprises focusing on operational excellence, data collection and analysis have proven invaluable. Participant 9 states, "*Our strategy is all about operational efficiency. Digital technologies have allowed us to optimize inventory management, reduce wastage, and predict demand accurately. This has not only lowered costs but also allowed us to introduce new dishes more frequently*."

Thirdly, the participants expressed their perspective of allocation strategy. The allocation of resources is a pivotal factor in the adoption of digital technologies. Enterprises that

prioritize technology investment within their business strategies are better positioned to leverage data for product development. Participant 5, notes, "*We made a conscious decision to allocate a significant portion of our budget to digital tools and data analytics. This strategic move has helped us refine our product offerings based on sales trends, customer feedback, and ingredient availability*."

Finally, some F&B businesses have chosen strategies that emphasize supply chain integration and transparency. Participant 13, a manager at a beverage company, states, "*Our strategic focus is on ensuring the quality and traceability of ingredients. By implementing digital technologies for supply chain management, we can track the journey of each ingredient, from farm to table. This transparency is a selling point for our products*."

In sum, the adoption of digital technologies for data collection, processing, and analysis in Vietnam's F&B industry is deeply intertwined with a company's chosen business strategy. Whether it's customer-centricity, operational excellence, resource allocation, supply chain integration, or regulatory compliance, these strategies shape the extent to which digital tools are leveraged for product development. F&B managers who align their strategic priorities with technology adoption are poised to not only meet the evolving demands of the industry but also gain a competitive edge by delivering products that resonate with their target audience.

Legal Framework

The final influencing factor identified during the interview involved legal framework. the legal framework plays a pivotal role in shaping the adoption of digital technologies for data

collection, processing, and analysis in the F&B industry in Vietnam (Vo et al., 2019; Buer et al., 2020). F&B enterprises are keenly aware of the necessity to comply with relevant regulations, and the legal environment significantly influences their approach to adopting digital tools for product development.

Vietnam has introduced data protection laws in recent years, similar to the European General Data Protection Regulation (GDPR). These regulations necessitate careful handling of customer data, which has a profound impact on how F&B enterprises collect and process data. Participant, a manager at a popular restaurant chain in Hanoi, highlights, "*We have to be meticulous in how we collect and store customer data. The legal requirements have driven us to invest in secure digital systems that protect sensitive information. This, in turn, enhances our customers' trust in our brand."*

Moreover, the legal framework also affects how F&B businesses leverage consumer data for personalized product development. Strict regulations on data privacy and consent mean that enterprises must tread carefully. Participant 4, explains, "*We would love to use customer data to create personalized experiences, but we have to respect their privacy. So, we've designed our digital engagement strategies to prioritize opt-in consent and adhere to data protection laws*."

Overall, the legal framework in Vietnam has a profound impact on the adoption of digital technologies for data collection, processing, and analysis in the F&B industry. Businesses are not only motivated by compliance but also by the need to respect consumer data privacy. F&B managers recognize the importance of aligning their digital strategies with the legal environment to operate ethically and competitively in a rapidly evolving industry.

4.3. Results of Research Question 3

The impacts of adopting digital technologies in data collection, processing and analysis for product/service design process within F&B businesses in Vietnam

The adoption of digital technologies for data collection, processing, and analysis has brought about significant impacts on various aspects of F&B enterprises in Vietnam, including their people, technology, business strategy, product strategy, and ultimately, their business results (Dani, 2014; Dogan and Öztaysi, 2018). Questionnaire and interview respondents emphasized the great impacts of the adoption of digital technologies on different aspects of business.

4.3.1. Results from the questionnaire

In the questionnaire, the researcher explored the respondents' perception of how the adoption of digital technologies affects F&B enterprises' people, technology, business strategy, product strategy, and business outcomes. Results are shown in Table 4.2.

Table 4.2. Impacts of the Adoption of Digital Technologies in F&B Enterprises

Factors	M	SD
People		
Mindset change	4.25	0.55
Performance improvement	4.29	0.60
Enhancement of labor efficiency	4.38	0.41
Technology		
Investment in new technologies	4.19	0.52
Upgrading current technologies	4.13	0.61
Business strategy		
Change in business strategy	4.07	0.60

Enhancement of efficiency of business strategy	3.94	0.44
Product strategy		
Shorter research time	3.97	0.61
Shorter development time	3.93	0.48
Better features	4.05	0.52
Better competitiveness	4.08	0.43
Better image	4.03	0.59
Business results		
Decrease in operation cost	4.12	0.59
Decrease in sale cost	4.05	0.62
Increase in sale revenue	4.11	0.53
Improvement in brand name	4.08	0.41

(M – Mean; SD – Standard Deviation)

As shown in Table 4.2, it is revealed in the questionnaire that the adoption of digital technologies for data collection, processing, and analysis in F&B enterprises in Vietnam has resulted in multifaceted impacts on various aspects of these companies, including People, Technology, Business Strategy, Product Strategy, and Business Results with the mean range from 3.93 to 4.38. Specifically, the adoption of digital technologies has prompted a notable shift in mindset within F&B enterprises, as evidenced by a mean score of 4.25 with a deviation of 0.55. This suggests that employees are increasingly open to embracing digital tools and methodologies. Additionally, performance improvement and enhanced labor efficiency, with mean scores of 4.29 and 4.38, respectively, indicate that digital technologies have empowered the workforce to become more efficient and productive.

In terms of technology, F&B enterprises in Vietnam have made substantial investments, as indicated by mean scores of 4.19 for investment in new technologies and 4.13 for upgrading current technologies. These scores, coupled with relatively moderate deviations,

highlight a consistent industry trend toward embracing and improving technology infrastructure. This demonstrates a commitment to staying technologically competitive in the market.

Furthermore, digital technology adoption has influenced business strategies within F&B enterprises, with a mean score of 4.07. This suggests a notable shift in strategic thinking to incorporate digital capabilities. While the deviation of 0.60 indicates some variation in the degree of change, it underscores that most companies are adapting their strategies to leverage digital tools effectively. Enhancing the efficiency of business strategies, with a mean score of 3.94, remains an area where some companies are working to catch up.

Concerning product strategy, it is revealed that the impact of digital technologies on product strategy is substantial. These technologies have led to shorter research and development times (M = 3.97 and 3.93, respectively), indicating that F&B enterprises can bring new products to market more swiftly. Additionally, digital tools contribute to better product features, competitiveness, and image, with mean scores ranging from 4.03 to 4.08. The deviations in this category suggest a relatively consistent adoption of digital technologies for product strategy enhancement.

Finally, the adoption of digital technologies is translating into positive business outcomes for F&B enterprises. Notably, there is a decrease in operational and sales costs, with mean scores of 4.12 and 4.05, respectively. Additionally, there is an increase in sales revenue (M = 4.11) and an improvement in brand name (M = 4.08). The low deviations in this category indicate a widespread realization of the benefits of digital technology adoption on business results.

In conclusion, the adoption of digital technologies is significantly impacting F&B enterprises in Vietnam across multiple dimensions. It is driving changes in people's mindsets, improving performance, and enhancing labor efficiency. Technology investments and upgrades are becoming commonplace, and digital capabilities are increasingly integrated into business and product strategies. As a result, F&B companies are experiencing positive business outcomes, such as reduced costs, increased revenue, and improved brand reputation. These findings underscore the transformative role of digital technologies in shaping the F&B industry in Vietnam, driving competitiveness and efficiency across the board.

4.3.2. Results from the interview

The adoption of digital technologies for data collection, processing, and analysis has had a profound impact on the F&B enterprises in Vietnam across various dimensions, including people, technology, business strategy, product strategy, and overall business results (Lee et al., 2015; Synnes & Welo, 2016; Schiffer & Wiendahl, 2019; Perzylo et al., 2021). In interviews with managers from these companies, several key insights emerged.

Firstly, it is agreed by the majority of F&B managers that the adoption of digital technologies have direct and great impacts on F&B enterprises' people. According to Participant 5, "*The integration of digital technologies has triggered a significant mindset change among our employees. They now understand the importance of data-driven decision-making."* Another manager (Participant 12) highlighted, "*The workforce has had to upskill to effectively utilize these technologies. This has not only improved their*

individual performance but also their overall adaptability." Accordingly, F&B managers also emphasized that digital technologies have led to improved labor efficiency. As one manager (Participant 8) put it, "*Tasks that used to take days or weeks can now be accomplished in a matter of hours, thanks to automation and data analytics. This has significantly enhanced the workforce's productivity*."

In the interview, the researcher also identified that the adoption of digital technologies has prompted companies to invest in new technologies and upgrade their existing systems. Specifically, Participant 7 stated, "*To stay competitive, F&B enterprises in Vietnam have made substantial investments in cutting-edge technologies. This has allowed us to stay ahead of the curve and offer innovative solutions to our customers*."

Accordingly, in the interview managers also noted that the incorporation of digital technologies has necessitated changes in business strategies. One manager (Participant 11) stated, "*Our business strategy had to evolve to align with the data-driven approach. We now make more informed decisions and can adapt quickly to changing market dynamic*s."

One of the most important impact of adoption of digital technologies identified in the interview is the impact on product strategies of F&B enterprises in Vietnam. The managers in the interview greed that digital technologies have streamlined product development processes. Participant 8 noted, "*F&B comapnies can now gather market data rapidly and identify trends, which has significantly reduced their research and development time. This agility has given us a competitive edge*." Additionally, managers highlighted that digital technologies have enabled them to develop products with better features. "*F&B enterprises can fine-tune our products based on real-time customer feedback and market insights,*

making our offerings more competitive," mentioned one manager (Participant 6). Moreover, according to interviews, the adoption of digital technologies has positively impacted brand image. A manager (Participant 10) stated, "*The ability to deliver high-quality, data-driven products has enhanced F&B companies' brand reputation. Customers now view us as an industry leader.*"

Finally, the managers in the F&B industry in the interviews indicate the significant influence of digital technologies on F&B enterprises' business results. Managers agreed that digital technologies have contributed to lower operational costs. "*Automation and efficient data processing have reduced our operational expenses significantly*," mentioned Participant 2. Participant 9 also added, "*F&B enterpriese also optimized sales costs, as we can target our marketing efforts more precisely."* Digital technologies have led to increased sales revenue for F&B enterprises. "*The data-driven approach has resulted in better customer engagement and satisfaction, leading to higher sales*," said Participant 13. Finally, the adoption of digital technologies has boosted the overall brand name of these enterprises. A manager (Participant 2) affirmed, "*Our commitment to innovation and data-driven decision-making has improved our brand's reputation and trustworthiness in the eyes of our customers.*"

In conclusion, the adoption of digital technologies in F&B enterprises in Vietnam has ushered in a transformative era, impacting every facet of their operations. These technologies have not only improved efficiency and competitiveness but also reshaped the mindset of their workforce, leading to better business and product strategies and ultimately enhanced business results.

4.4. Results of Research Questions 4

Measures adopted by F&B enterprises do to ensure the success of adoption digital technologies in data collection, processing and analysis for product/service design

It is indicated from results of the questionnaire and interview that F&B enterprises have recognized the pivotal role of digital technologies in shaping their product and service design. To ensure the success of adopting digital technologies in data collection, processing, and analysis, these enterprises have implemented a range of measures that have not only streamlined their operations but also enhanced customer experiences. In the current study, the researcher focused on measures associated with people and business strategy.

4.4.1. Results from the questionnaire

In the questionnaire, the researcher used two questionnaire items to explore the participants' perception of how F&B enterprises in Vietnam use strategies related to people and business strategies to ensure their success of adopting digital technologies. Results are shown in Table 4.3.

Table 4.3. Measures to Ensure the Success of Adopting Digital Technologies in F&B Enterprises

Measures	M	SD
People		
Adequate staffing	4.10	0.58
High performance	4.33	0.47
Commitment	4.17	0.50
Attractive labor policy	4.16	0.54
Business strategies		
Product in line with customer demand	4.36	0.53

Competitive price	4.19	0.44
Modern technology	4.14	0.49
Focus on PR	4.24	0.58
Suitable sales channels	4.15	0.63

(M – Mean; SD – Standard Deviation)

The table shows valuable insights into the measures adopted by the F&B enterprises to ensure the successful adoption of digital technologies in data collection, processing, and analysis for product and service design. These measures encompass two primary categories: "People" and "Business Strategies."

People

Adequate Staffing (M=4.10, SD=0.58): F&B enterprises recognize the importance of having a sufficiently staffed team to handle the implementation of digital technologies. The mean score of 4.10 suggests that enterprises generally consider staffing levels adequate. This is crucial because skilled personnel are needed to effectively collect, process, and analyze the data generated by these technologies.

High Performance (M=4.33, SD=0.47): High performance among the workforce is a key factor in the success of digital technology adoption. With a mean score of 4.33, F&B enterprises place a significant emphasis on maintaining a high-performing team, likely through training and performance incentives. This is essential for leveraging digital tools to their full potential.

Commitment (M=4.17, SD=0.50): The commitment of employees to the digital transformation process is crucial. A mean score of 4.17 indicates that F&B enterprises

actively work on fostering a commitment to this initiative among their staff. This commitment can lead to better adoption and integration of digital technologies into daily operations. Moreover, it aids F&B companies in reducing operational costs, such as expenses associated with hiring new staff and mitigating the risk of data loss or business information loss.

Attractive Labor Policy (M=4.16, SD=0.54): Having an attractive labor policy is essential for retaining and attracting top talent in the competitive F&B industry. The mean score of 4.16 suggests that F&B enterprises understand the significance of offering favorable labor policies to ensure that they can secure the skilled workforce needed for successful digital technology adoption.

Business Strategies

Product in line with Customer Demand (M=4.36, SD=0.53): The highest-rated measure in the table, with a mean score of 4.36, underscores the paramount importance of aligning product and service design with customer demand. F&B enterprises are keen on leveraging digital technologies to gather and analyze customer data, ensuring that their offerings are in sync with market preferences.

Competitive Price (M=4.19, SD=0.44): Maintaining a competitive price point is a fundamental aspect of success in the F&B industry. With a mean score of 4.19, enterprises are leveraging digital tools to analyze pricing strategies and optimize their offerings to remain competitive.

Modern Technology (M=4.14, SD=0.49): The adoption of modern technology is an obvious and necessary step for digital transformation. The mean score of 4.14 reflects that F&B enterprises are actively investing in and embracing modern technologies to enhance their data collection, processing, and analysis capabilities.

Focus on PR (M=4.24, SD=0.58): Public Relations (PR) plays a vital role in the image and reputation of F&B enterprises. The mean score of 4.24 suggests that businesses are actively using digital technologies to manage their PR efforts, which can positively influence consumer perception and trust.

Suitable Sales Channels (M=4.15, SD=0.63): The choice of sales channels is crucial in the digital age. A mean score of 4.15 indicates that F&B enterprises are taking measures to select and optimize sales channels that are best suited for their target audience, leveraging data analysis for these decisions.

In conclusion, the results from this table indicate that F&B enterprises are proactively adopting various measures to ensure the success of digital technology adoption in their operations. They are investing in both their workforce and strategic approaches, with a strong focus on aligning products with customer demand, maintaining competitiveness, and using modern technology to drive their success in the ever-evolving F&B landscape. These measures collectively contribute to enhancing the efficiency and effectiveness of their data collection, processing, and analysis efforts for product and service design.

4.4.2. Results from the interview

The interviews with managers in the F&B industry have yielded insightful proposals regarding measures aimed at ensuring the success of adopting digital technologies for data collection, processing, and analysis in product and service design. These proposals touch upon various aspects of F&B enterprises, including leadership, employee engagement, and strategic considerations, and provide a comprehensive view of the strategies needed for digital transformation.

One recurring theme from the interviews is the critical importance of data-driven decision-making. Managers emphasized that leveraging digital technologies for data collection is not enough; it is essential to harness this data effectively. As one manager (Paricipant 6) succinctly put it, "*Data is the new currency in our industry. We need to collect it comprehensively, process it intelligently, and analyze it strategically*." This perspective highlights the need for F&B enterprises to invest in robust data analytics tools and talent to extract actionable insights from the wealth of information they collect.

Several managers emphasized the pivotal role of strong leadership in driving digital transformation initiatives. One manager (Participant 4) stated, "*Leadership should not just set the vision but also actively champion digital adoption.*" This highlights the need for leaders to set the tone, allocate resources, and provide unwavering support for digital initiatives. Leadership commitment is instrumental in fostering a culture of innovation and ensuring that digital technologies become ingrained in the organization's DNA.

Additionally, managers stressed the significance of employee training and empowerment in the successful adoption of digital technologies. Several interviewees pointed out that "*having the right tools is half the battle; the other half is having the right people who know*

how to use them." Proposals include ongoing training programs and fostering a culture of digital literacy to ensure that employees are proficient in utilizing data analytics tools effectively. This measure is seen as crucial for aligning the workforce with digital transformation goals.

Another noteworthy proposal was the importance of customer feedback loops. Managers acknowledged the power of digital technologies in collecting customer feedback in real-time. One manager (Participant 11) noted, "*Digital platforms allow us to listen to our customers 24/7. Their preferences and feedback should be central to our product and service design."* This feedback-driven approach ensures that F&B enterprises can swiftly adapt and refine their offerings to meet changing consumer expectations.

Furthermore, managers highlighted the need for a flexible and agile business strategy. In the fast-paced F&B industry, where trends can shift rapidly, adaptability is key. According to Participant 10, "*Our business strategy should be like software, not hardware. We must be able to update and pivot quickly based on the data insights we gather*." This proposal underscores the importance of using digital technologies not just for data collection but also for agile decision-making and strategy adjustments.

In sum, the insights gathered from interviews with F&B industry managers underscore the multifaceted approach required for the successful adoption of digital technologies in data collection, processing, and analysis for product and service design. These proposals emphasize the need for a data-driven culture, leadership, employee training, customer-centricity, and strategic adaptability. By embracing these measures, F&B enterprises can position themselves for success in an increasingly digital and competitive landscape,

ensuring that their products and services remain aligned with evolving consumer preferences.

4.5. Summary of Findings

The F&B industry in Vietnam is witnessing a transformative shift towards the integration of digital technologies in data collection and processing for product design and development. The current study investigated the current situation of adopting digital technologies in data collection and processing for product design and development among F&B enterprises in Vietnam. Data collected from the questionnaire and interviews reveals that currently digital technologies have been only adopted among large F&B enterprises in Vietnam. Furthermore, the effectiveness of digital transformation is not as high as expected. Concerning the factors influencing the adoption of digital technologies, the participants in the questionnaire and interview highlighted the importance of people, technology, business strategy and legal framework. Data analysis also reveal the great impacts of digital technologies on people's mindsets, improving performance, and enhancing labor efficiency, technology investments and upgrades, product development, and positive business outcomes, such as reduced costs, increased revenue, and improved brand reputation. Finally, the participants proposed measures such as employee training, leadership commitment and vision, effective use of collected and processed data and strategic adaptability to ensure the success of digital adoption.

4.6. Conclusion of Results

In conclusion, the adoption of digital technologies in data collection and processing for product design and development in F&B enterprises in Vietnam represents a significant and transformative shift in the industry (Vo et al., 2019). This trend is driven by a combination of factors, including human resources, strategies, technology, legal framework and so on (Dani, 2014; Dogan and Öztaysi, 2018; Thomson, 2022). Perzylo et al. (2021) explain that the impact of this digital transformation is notable, with F&B companies experiencing enhanced operation efficiency, employee performance, financial outcomes and greater market responsiveness. However, it is important to acknowledge that challenges such as data security and the need for workforce upskilling are inherent in this journey towards digitalization (Choi et al., 2017; Santos et al., 2020).

As the F&B industry in Vietnam continues to evolve, those enterprises that embrace and harness the power of digital technologies for data collection and processing in product design and development are likely to be better positioned for sustained growth, innovation, and competitiveness in both domestic and international markets.

CHAPTER V:
DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

In the ever-evolving landscape of digitalization within F&B enterprises in Vietnam, this chapter marks the culmination of an in-depth exploration into the impacts of adopting digital technologies on data collection, processing, and analysis (Vo et al., 2019). The researcher engages in a detailed and critical discussion of the research results, unpacking the insights gleaned from the investigation into the adoption of digital technologies in data collection, processing, and analysis within F&B businesses in Vietnam. Each research question serves as a thematic entry point, guiding the exploration into distinct facets of the digital landscape. Through a meticulous examination of the obtained results, the present study endeavors to unravel the complexities surrounding the extent of digital technology adoption, the influencing factors, the observed impacts, and the recommended strategies for ensuring success (Lee et al., 2015; Synnes & Welo, 2016; Schiffer & Wiendahl, 2019). This structured discussion not only synthesizes the empirical findings but also sets the stage for discerning the broader implications of digitalization in F&B enterprises in Vietnam.

5.1 Discussion of Results

5.1.1 Discussions of the extent of adoption of digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam

The comprehensive exploration into the adoption of digital technologies in data collection, processing, and analysis within the product/service design process of F&B businesses in Vietnam yields crucial insights. This section delves into the findings of Research Question

1, scrutinizing the extent of digital technology integration and its implications for product development. The study's significance lies not only in filling a critical literature gap but also in shedding light on the intricate dynamics of digitalization in the specific context of the Vietnamese F&B industry.

Importance of Customer Behavior Data in F&B Product Development

The unanimous consensus among participants on the paramount importance of customer behavior data in product development aligns with existing literature (Dogan & Öztaysi, 2018; Cachada et al., 2019). The affirmation by 100% of respondents regarding the significance of customer behavior data underscores its centrality in shaping product and service design. The nuanced breakdown of its importance across stages, as depicted in Figure 4.1, emphasizes its role in identifying unmet needs, prioritizing features, benchmarking against competitors, setting pricing strategies, and ensuring product quality (Schuh et al., 2017).

Previous studies have recognized the strategic role of customer behavior data in various industries (Dogan & Öztaysi, 2018), but the current study specifically contextualizes this significance within the F&B sector in Vietnam. The alignment of findings with existing literature strengthens the credibility of the results, establishing a foundation for the subsequent exploration of digital technology adoption (Schiffer & Wiendahl, 2019; Perzylo et al., 2021).

Methods of Collecting Customer Behavior Data: A Multifaceted Approach

The diverse array of methods employed by F&B businesses in Vietnam for collecting customer behavior data resonates with the multifaceted nature of the industry. The

combination of sales staff, agencies, distributors, events, customer responses, online channels, and insights from friends and colleagues reflects a strategic approach to gathering comprehensive insights (Lee et al., 2015; Santos et al., 2020). The prevalence of sales staff, agencies, and distributors as the most favored channel aligns with the B2B nature of F&B operations in Vietnam, a context-specific finding.

Interestingly, the study corroborates previous research by emphasizing the significance of online channels, including websites and E-commerce platforms (Dogan & Öztaysi, 2018). While digital channels constitute a smaller proportion in the current study, the acknowledgment of their increasing usage aligns with global trends in data collection (Yildrim & Demirbag, 2020). This alignment enhances the generalizability of findings beyond the Vietnamese context.

Challenges in Collecting Customer Behavior Data: A Complex Landscape

The challenges identified in the data collection process resonate with existing literature but offer nuanced insights into the specific challenges faced by F&B businesses in Vietnam. The complexity of channels of customer behavior spans emerges as a dominant challenge, echoing the intricate nature of consumer interactions in the F&B sector (Bechtold et al., 2014; Zapata et al., 2020). This aligns with Dogan and Öztaysi's (2018) recognition of the challenges posed by the multichannel nature of data collection in the digital age.

Moreover, the uncertainty in selecting data collection methods, while not a new challenge, gains prominence in the rapidly evolving technological landscape. This aligns with the acknowledgment of the need to stay updated on the latest data collection techniques (Dogan & Öztaysi, 2018; Buer et al., 2020), emphasizing the dynamic nature of data collection in

the F&B industry. Interestingly, the limited mention of cost as a challenge diverges from some previous studies (Cachada et al., 2019; Schiffer & Wiendahl, 2019; Perzylo et al., 2021), suggesting that in the Vietnamese F&B context, other challenges take precedence. This nuance contributes to a deeper understanding of the challenges specific to the industry.

Insights from Industry Professionals: A Real-world Validation

The insights gleaned from in-depth interviews with industry professionals serve as a crucial validation of the survey findings. The unanimous acknowledgment of the pivotal role of customer behavior data in product development resonates with the broader industry perspective (Schuh et al., 2017; Manavalan & Jayakrishna (2019). The participant testimonials not only reinforce the survey results but also provide qualitative depth, emphasizing the practical implications of leveraging customer insights in product development.

Moreover, the divergence in opinions regarding the extent of digitalization in data collection and processing adds layers of complexity. While some participants emphasize the widespread adoption of digital tools, others highlight limitations, particularly for smaller F&B enterprises. This nuanced perspective aligns with the evolving nature of digitalization trends and acknowledges the diverse landscape of technology adoption within the F&B sector in Vietnam (Vo et al., 2019).

Extent of Digital Technology Adoption: A Controversial Landscape

The exploration of the adoption of digital technologies in data collection and processing within F&B businesses in Vietnam reveals a controversial landscape. The survey results indicate a broad adoption of digital tools, with 80% of participants affirming the integration

of digital technologies in both data collection and processing. However, the interview insights introduce a layer of controversy, with some participants suggesting that digitalization is primarily prevalent among larger enterprises.

This controversy underscores the dynamic and evolving nature of digitalization in the F&B industry in Vietnam. The findings hint at a potential digital divide, where larger enterprises with greater resources are more adept at adopting digital technologies (Cachada˚ et al., 2019; Vo et al., 2019). This echoes previous research highlighting the influence of organizational size on digital technology adoption (Dogan & Öztaysi, 2018). The discrepancy in opinions between smaller and larger enterprises reflects the complex interplay of factors such as financial resources, revenues of scale, and strategic planning of Bosses.

Quality of Data Collection and Processing: A Mixed Picture

The evaluation of the quality of data collection and processing reveals a mixed picture. While more than half of the participants affirm the high quality of data collection (56.1%) and data processing (53.5%), a substantial proportion acknowledges room for improvement. This finding aligns with existing literature, which recognizes the challenges associated with ensuring the accuracy and reliability of data in the digital age (Cachada et al., 2019).

The acknowledgment of data quality as a potential area for enhancement emphasizes the need for continuous improvement in data collection and processing practices within the F&B sector in Vietnam. This aligns with the broader trend of organizations recognizing

the importance of data quality for informed decision-making and competitive advantage (Lee et al., 2015; Santos et al., 2020; Synnes & Welo, 2016).

In sum, the findings of Research Question 1 underscore the pivotal role of customer behavior data in shaping the product/service design process within F&B businesses in Vietnam. The alignment with existing literature provides a robust foundation for understanding the significance of customer insights in a context-specific manner. The multifaceted approach to data collection, coupled with the challenges identified, paints a complex picture of the data landscape within the Vietnamese F&B industry.

The controversy surrounding the extent of digital technology adoption and the mixed evaluation of data quality highlight the dynamic nature of the F&B sector's digital transformation. As Vietnam's F&B businesses navigate the digital future, the study's findings offer valuable insights for practitioners, policymakers, and researchers alike. The nuanced understanding of technology adoption, challenges, and the importance of data quality contributes to the broader discourse on digitalization in the F&B industry and provides a basis for future research avenues.

5.1.2 Discussion of factors determining the adoption of digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam

The findings of Research Question 2 shed light on the intricate factors that drive the adoption of digital technologies in data collection, processing, and analysis within the product/service design process of F&B businesses in Vietnam. The study delved into the perspectives of stakeholders, incorporating both quantitative and qualitative approaches

through questionnaires and interviews. The factors identified encompass People, Technology, Business Strategy, and the Legal Framework, collectively contributing to the adoption landscape. This discussion will expound on each factor, drawing parallels with existing literature to enrich the understanding of the dynamics at play.

People: The Human Element in Digital Adoption

The study unequivocally highlights the pivotal role of individuals in the successful implementation of digital technologies within F&B enterprises. Particularly, the emphasis on the role of people in decision-making and the assessment of data quality underscores the essential nature of human expertise in guiding technology adoption. These findings align with existing research that emphasizes the importance of human factors in technological transitions (Lorenzo et al., 2020). The convergence of viewpoints among respondents, as indicated by moderate standard deviations, reflects a consensus on the positive impact of people in these domains, emphasizing a unified acknowledgment of the human element's significance (Choi et al., 2017; Santos et al., 2020).

Leadership vision emerged as a recurrent theme, resonating with studies emphasizing the role of leadership in driving technology adoption (Avgerou, 2017). The study affirms that visionary leaders, through forward-thinking vision and strategic decision-making, act as catalysts for the success of digital initiatives in F&B enterprises. The insights gleaned from participants accentuate the multifaceted nature of leadership impact, encompassing communication, risk-taking, and innovation encouragement.

Technology: Ensuring Efficiency, Security, and Flexibility

It is stated by Perzylo et al. (2021) that the technology-related factors identified in the study-suitability, safety/security, efficiency, and flexibility-align with established literature on technology adoption in businesses. The emphasis on technology's pivotal role in streamlining data processes and safeguarding data integrity and security is in concordance with prior studies (Rogers, 2003; Davis, 1989). The robust mean scores for efficiency and safety/security underscore the critical nature of technology in enhancing operational efficacy while addressing concerns related to data protection.

Moreover, the emphasis on scalability and flexibility echoes the literature on the importance of adaptable technology solutions (Legris et al., 2003). The F&B industry's dynamic nature requires technologies that can evolve with business expansions and changing market conditions (Choi et al., 2017; Santos et al., 2020). The lower standard deviations in these factors suggest a consensus among respondents on the indispensable and positive impact of technology in these realms.

Business Strategy: Strategic Alignment for Technological Integration

Business strategy emerges as a formidable driving force in the adoption of digital technology for data collection and analysis, aligning with existing literature (Bharadwaj et al., 2013). The study highlights the impact of customer-centric strategies, operational excellence, resource allocation, and supply chain integration on technology adoption. The findings resonate with research emphasizing the integration of technology within broader business strategies to gain competitive advantages (Porter, 2001).

The varying standard deviations accompanying business strategy factors indicate diverse organizational perspectives, emphasizing the need for nuanced approaches in aligning

technology adoption with specific business strategies (Dogan and Öztaysi, 2018; Thomson, 2022). The study reaffirms that a strategic alignment between technology adoption and broader business goals is essential for optimizing the benefits of digital tools in the F&B industry.

Legal Framework: Navigating Legal Dimensions in Digital Adoption

The Legal Framework factor, while occupying a relatively less influential position, echoes existing literature highlighting the impact of legal considerations on technology adoption (Schultz et al., 2014). The introduction of data protection laws in Vietnam, similar to the General Data Protection Regulation (GDPR - that is a set of regulations by the European Union concerning the protection of personal data and privacy rights), underscores the global trend toward stringent regulations. The study affirms the necessity for F&B enterprises to navigate legal dimensions meticulously, ensuring compliance and respecting customer data privacy.

The lower mean scores for legal framework factors suggest that organizations may face challenges or uncertainties stemming from legal dimensions of digital technology adoption. The breadth of perspectives and experiences, as indicated by the standard deviations, emphasizes the complexity and diversity of considerations within legal frameworks.

The alignment of the study's findings with existing literature offers a holistic view of the factors influencing the adoption of digital technologies in F&B businesses in Vietnam (Buer et al., 2020; Vo et al., 2019). People, Technology, Business Strategy, and the Legal Framework collectively form a complex interplay, emphasizing the need for a

comprehensive and integrated approach. The study contributes to the existing body of knowledge by providing nuanced insights specific to the F&B industry in Vietnam.

In conclusion, the findings of Research Question 2 provide a comprehensive understanding of the factors influencing the adoption of digital technologies in F&B businesses in Vietnam. The study accentuates the pivotal role of People, Technology, Business Strategy, and the Legal Framework, each factor contributing uniquely to the adoption landscape. The parallels drawn with existing literature enrich the discussion, offering insights into the nuanced dynamics at play. Ultimately, this holistic understanding contributes valuable knowledge for F&B enterprises seeking to navigate the complexities of digital technology adoption in a dynamic industry landscape.

5.1.3 Discussion of the impacts of adopting digital technologies in data collection, processing and analysis for product/service design process within F&B businesses in Vietnam

Research Question 3 delves into the profound impacts of the adoption of digital technologies in data collection, processing, and analysis for the product/service design process within F&B businesses in Vietnam. The amalgamation of quantitative findings from the questionnaire and qualitative insights from interviews reveals a multifaceted transformation across various dimensions of these enterprises.

People: Cultural Shifts and Skill Enhancement

The adoption of digital technologies has triggered notable shifts in mindset within F&B enterprises. Employees are increasingly open to embracing digital tools and

methodologies, fostering a culture conducive to innovation (Dani, 2014; Thomson, 2022). Moreover, the integration of digital technologies has necessitated upskilling, leading to improved individual performance and adaptability across the workforce.

Technology: Strategic Investments and Upgrades

F&B enterprises in Vietnam are strategically investing in new technologies and upgrading existing systems. This commitment reflects a broader industry trend towards embracing and improving technology infrastructure. The proactive approach in adopting cutting-edge technologies positions these businesses as technological frontrunners in a competitive market (Zheng, 2020; Zapata et al., 2020).

Business Strategy: Aligning with Digital Dynamics

According to (Santos et al., 2020), the adoption of digital technologies is driving a notable shift in business strategies within F&B enterprises. This includes evolving towards a more data-driven approach, enabling more informed decision-making, and quick adaptation to changing market dynamics. The integration of digital capabilities into business strategies signifies a proactive response to the evolving digital landscape.

Product Strategy: Streamlining and Enhancing

Digital technology adoption is substantially impacting product strategy within F&B enterprises (Synnes & Welo, 2016; Schiffer & Wiendahl, 2019). It streamlines research and development processes, enabling faster time-to-market for new products. Additionally, it contributes to the development of products with better features, competitiveness, and an enhanced brand image (Dani, 2014; Thomson, 2022). The transformative role of digital

tools in shaping product strategies is evident in the industry's shift towards more agile and customer-centric approaches.

Business Results: Tangible Outcomes

The adoption of digital technologies is translating into positive business outcomes for F&B enterprises in Vietnam. Vo et al. (2019) state that there is a widespread realization of the benefits, including decreased operational and sales costs, increased sales revenue, and an improved brand name. These tangible outcomes underscore the transformative role of digital technologies in shaping the F&B industry, enhancing competitiveness, and driving efficiency across various business dimensions.

These findings align with and contribute to the broader landscape of research on digital technology adoption in various industries (Zheng, 2020; Zapata et al., 2020). The impact on employee mindset and performance resonates with studies emphasizing the cultural shifts required for successful digital transformation (Smith et al., 2018). The strategic investments and upgrades in technology align with literature highlighting the importance of technological competitiveness for long-term sustainability (Garcia and Lee, 2020).

The shift in business strategies towards data-driven approaches aligns with the evolving nature of business strategies in the digital age (Chen and Zhang, 2022). The transformative impact on product strategy, including streamlined development processes and enhanced features, resonates with research emphasizing the role of agility in product development through digital tools (Davis & Davis, 2018).

Furthermore, the positive business outcomes, such as decreased costs and increased revenue, echo broader studies on the financial benefits of digital technology adoption (Kim and Lee, 2021). The qualitative insights from interviews enrich our understanding, providing a nuanced view of how these impacts unfold at the managerial level, bridging the gap between theoretical discussions and practical implications.

Summing up, the comprehensive analysis of Research Question 3 underscores the transformative impact of adopting digital technologies in F&B businesses in Vietnam. The synthesis of quantitative and qualitative insights reveals a consistent positive influence across dimensions such as People, Technology, Business Strategy, Product Strategy, and Business Results. These findings align with and contribute to the existing body of literature that emphasizes the strategic importance of digital technologies in shaping the F&B industry. As F&B enterprises navigate the digital landscape, these insights provide a nuanced understanding of the multifaceted impacts, offering valuable guidance for strategic decision-making and further research endeavors in the evolving landscape of the F&B sector.

5.1.4 Discussion of measures adopted by F&B enterprises do to ensure the success of adoption digital technologies in data collection, processing and analysis for product/service design

Research Question 4 investigates the measures undertaken by Food and Beverage (F&B) enterprises in Vietnam to guarantee the success of adopting digital technologies in data collection, processing, and analysis for product and service design. This section delves into a comprehensive discussion without explicitly mentioning specific quantitative results,

offering insights into the strategic measures implemented by F&B enterprises and drawing connections to previous studies in the field.

People-Centric Strategies

Leadership Commitment and Change Management:

One prevalent theme emerging from the findings is the crucial role of leadershipcommitment in ensuring the success of digital technology adoption. This aligns with existing studies emphasizing the significance of top-down support for effective digital transformation (Bharadwaj et al., 2013; Zapata et al., 2020; Bechtold et al., 2014). Leaders not only set the vision but actively champion digital adoption, creating a culture of innovation within the organization. Studies, such as those by Avgerou (2017), assert that strong leadership is a driving force in navigating the complexities of digital transformation.

Workforce Training and Empowerment:

Another key aspect is the emphasis on employee training and empowerment. Beyond the provision of digital tools, F&B enterprises recognize the necessity of cultivating a digitally literate workforce (Buer et al., 2020; Dani, 2014). This aligns with research highlighting the importance of employee skills and adaptability in the digital era (Bhatt and Grover, 2015). Ongoing training programs are seen as instrumental in ensuring that employees can effectively utilize data analytics tools, aligning with broader discussions on the need for a digitally skilled workforce (Brynjolfsson and McAfee, 2014).

Employee Commitment and Motivation:

The commitment of employees to the digital transformation process is a recurring theme. Studies suggest that a committed workforce is more adaptable to technological changes

(Avgerou, 2017). F&B enterprises actively work on fostering a commitment to this initiative among their staff, recognizing that this commitment can lead to better adoption and integration of digital technologies into daily operations (Schiffer & Wiendahl, 2019; Perzylo et al., 2021). Employee motivation and commitment are crucial elements in the success of digital initiatives (Bharadwaj et al., 2013).

Attractive Labor Policies:

Recognizing the competitive nature of the industry, F&B enterprises focus on offering attractive labor policies to secure and retain skilled talent. This aligns with discussions on the importance of employee incentives in retaining top talent during digital transformation (Bhatt and Grover, 2015). The provision of favorable labor policies becomes integral to the success of digital technology adoption.

Business Strategy-Focused Approaches

Customer-Centric Strategies:

The findings highlight a strong focus on aligning products and services with customer demand. This customer-centric approach aligns with broader discussions on the importance of customer feedback and market responsiveness (Chaffey et al., 2016). Leveraging digital technologies for customer data analysis ensures that offerings are in sync with evolving market preferences. Studies by Laudon and Laudon (2016) emphasize the transformative potential of aligning business strategies with customer needs.

Competitive Pricing Strategies:

Maintaining a competitive price point is identified as a fundamental aspect of success. F&B enterprises leverage digital tools to analyze pricing strategies and optimize their offerings

for competitiveness. This resonates with research emphasizing the role of pricing strategies in remaining competitive in the market (Bharadwaj et al., 2013). Strategic pricing decisions are viewed as instrumental in the overall success of digital technology adoption.

Technological Modernization:

The adoption of modern technology is a central component of the strategies employed. F&B enterprises actively invest in and embrace modern technologies to enhance their data collection, processing, and analysis capabilities (Schuh et al., 2017; Manavalan and Jayakrishna, 2019). This aligns with the broader literature advocating for technological modernization for improved business outcomes (Chaffey et al., 2016). Technological modernization is positioned as a strategic imperative for F&B enterprises to stay competitive in the evolving digital landscape.

Public Relations (PR) Management:

The attention to Public Relations (PR) through digital technologies is another noteworthy strategy. Managing brand perception and trust through digital platforms is recognized as a crucial element in the success of F&B enterprises. This aligns with the growing recognition of the role of digital platforms in shaping brand perception (Smith and Zook, 2011). The strategic use of PR becomes integral to the success of digital technology adoption.

Strategic Sales Channel Selection:

The choice of sales channels is identified as crucial in the digital age. F&B enterprises are actively taking measures to select and optimize sales channels that are best suited for their target audience, leveraging data analysis for these decisions. This aligns with research emphasizing the importance of strategic sales channel selection in the digital era (Porter

and Heppelmann, 2014). Strategic decisions regarding sales channels are considered pivotal in the success of digital technology adoption.

The identified strategies align with a wealth of existing literature on digital technology adoption. Leadership commitment and change management are recurrent themes emphasizing the pivotal role of leadership in successful digital transformation (Bharadwaj et al., 2013; Avgerou, 2017). Employee training and empowerment align with research emphasizing the need for a digitally skilled workforce (Brynjolfsson and McAfee, 2014). The customer-centric approach aligns with discussions on the importance of customer feedback and market responsiveness (Laudon and Laudon, 2016; Chaffey et al., 2016).

The discussion underscores the multifaceted nature of strategies adopted by F&B enterprises in Vietnam to ensure the success of digital technology adoption. The convergence of people-centric and business strategy-focused approaches signifies the comprehensive nature of these strategies. As industries continue to grapple with the challenges and opportunities presented by digital transformation, the insights derived from these findings offer valuable implications for practitioners, policymakers, and researchers alike.

In conclusion, the strategies identified in this research illuminate the intricate dance between people-centric and business strategy-focused approaches in the digital transformation journey of F&B enterprises. The interplay of leadership commitment, workforce empowerment, customer-centric strategies, and technological modernization forms a holistic framework for success. The implications extend beyond the F&B sector,

offering insights into the broader landscape of digital transformation strategies applicable across industries.

5.2 Recommendations, Research Contributions, Limitations and Future Research

5.2.1 Recommendations

Based on my research problem, aims, and results, the following recommendations are made:

Firstly, to effectively design a product that resonates with customer needs and preferences, the Research and Development (R&D) department within the F&B industry should profoundly understand customer behavior. Ensuring the successful market launch of a product mandates that its characteristics are both distinctive and superior, grounded in the perceptions of the customer base (Moon et al., 2014). Thus, R&D departments must gather customer behavior data through marketing activities employing digital marketing tools. In contemporary times, the utilization of digital marketing for purchasing and product discovery is widespread, with billions of individuals engaging in online platforms (Warokka, 2020). Therefore, leveraging digital marketing tools to acquire customer data is essential.

Secondly, leaders of F&B enterprises should carefully consider the influential factors that contribute to the success of businesses when adopting digital technologies in collecting customer data regarding product design tailored to customer needs and wants. According to the result of the study, the people-centric factor is the most important factor in business operations. In case leader wants to transition to a new operation system; they should prioritize strategies for training their employees and ensuring comprehensive

communication across all their staff. In a study by Malcolm Patterson1 * (2004), the role of employees in business operations is substantial. Employees play a crucial role in various aspects of business operation including productivity; customer service; problem-solving; teamwork and company culture, etc. (Malcolm Patterson1 *, 2004).

Thirdly, F&B enterprises should consider the customer data collection and process method. In practice, all most of large companies have been utilizing digital technology for this purpose, but the collected data quality is not good. There are several reasons that lead to data unquality, including: customer behavior experience across various channels, difficulty in synchronizing disparate systems, and inadequacies in responding to customers' feedback, etc. There still is no yet method that assists product managers in learning from customer behavior or their feedback in real-time or the ideal of the customers into a continuous response loop remains absent (Fabijan et al., 2015). Therefore, managers of F&B enterprises should conscientiously consider the method of collecting and processing customer data before adopting digital technology in their business operation.

5.2.2. Research contributions

a. Contribution to knowledge:

As presented above, this study was conducted in Viet Nam among the F&B industry, thus the research finding contributes to the theoretical as follows:

- Supporting managers of the F&B industry with additional insight into the current level of digital technology adoption in collecting and processing customer data regarding product design to align with customer wants and needs. In another study, the author just focuses on specific application such as online ordering systems, inventory management, and how to interact with customers across digital platform (Huynh and Popova, 2023). The

study by Nguyen (2019) addressed that F&B enterprises in Viet Nam has been adopting digital technology in the food delivery chain and how to choose a platforms to make order easlier (Nguyen, 2019). In another study, the author just mentioned the role of technology in several stages of the F&B industry, including delivering, processing, and packaging (DemİR and Istanbullu DİNcer, 2020). Most studies just showed that F&B enterprises have been adopting digital technology in utilizing marketing, sales programs or inventory management. However, the result of this study addressed the current situation of how digital technologies are implemented in data collection and analysis and identified factors that are crucial to the success of digital transformation in F&B companies. This outcome will assist managers of F&B companies in efficiently devising plans for digital transformation.

- Enriching understanding of the importance of customer behavior/persona as well as identifying factors and their influence on the adoption of digital technology in collecting and processing customer data for managers of F&B enterprises. The study of the author group has evaluated the influencing of customer behavior factors making purchasing decisions (Tuan Duong Vu 1 et al., 2023). Customer acceptance is a crucial factor in awarding products proceduced from recycled materials (Polyportis et al., 2022). In addition, customer behavior is also evaluated as significant factor in building a loyalty/marketing program (Cooil et al., 2008). From the study of the researcher above, the findings of this research have filled a portion of the literature gap identified by other studies such as giving the full effectiveness of customer behavior on business operation.

b. **Contributions to business practices:**

- By combining data collection through in-depth interviews with F&B company managers in Vietnam and surveys of F&B company employees in Vietnam, the researcher conducted hypothesis testing to identify factors influencing the adoption of digitalization in collecting and processing customer data to develop products tailored to customer needs. The research results provide suggestions for F&B managers in Vietnam to devise digital transformation strategies appropriate to their company's performance, aiming to achieve business objectives. To determine numerous factors that affect the adoption of digital technologies that assist managers or related stakeholders of F&B companies in building an effective technology plan (Smith et. al. 2008).
- The study findings also aid managers of F&B in Viet Nam in developing sustainably when they have an in-depth perspective on human factors within the organization. The human factor is an important factor in business operations, it is considered like a certain risk (Mikulic and Stefanic, 2018). In reality, managers recognize the importance of this and make efforts to provide their employees with thorough skills training before implementing new technologies in their business operations (Mikulic and Stefanic, 2018).

5.2.3 Limitations and Future Research

With reference to the previous section about the limitation of the study, future research with a larger population, such as a more sampling size, might explore the utilization of different single or multiple digital theories across various industries to ascertain and showcase their efficacy.

Additionally, researchers could delve into applying combined digitalized and digitalization theories to gauge their effectiveness in gathering, processing, and analyzing data for designing products and services tailored to customers' needs.

5.3 Conclusion

In the context of Vietnam's economy in recent times, the significant role of the F&B (Food and Beverage) sector has been consistently affirmed. The research aims achieved include: “i” most participants agree that the customer behavior is an important factor in collecting customer data process as well as designing product alinge with market demand (the first survey question’s result). Bloch (1995) showed that customer behavior and consumer psychology be an important factor in designing product form. This research was conducted to assist managers of F&B businesses in recognizing the importance of customer data, a crucial factor influencing the intention to accept and use products and services of F&B businesses in Vietnam. “ii” Through in-depth interviews, the study has also identified factors influencing the digitalization of data collection for product development of F&B businesses. In order to develop a comprehensive digital strategy, the business has to be analyzed and build several scenarios and its future objective, including vision, mission, and business strategy as well as methods to implement that align it with the broader goals of the organization (Tidd, 2021). “iii” the research explored and explained the impacts and influences of digitalization in data collection and processing for product design for F&B businesses in Vietnam. The integration of digital technology into the operations of a Food and Beverage (F&B) enterprise diminishes the reliance on human resources, thereby enabling the company to function autonomously irrespective of employee presence, ensuring operational continuity across various scenarios (Kosior, 2022). Finally, managers

of F&B businesses in Vietnam have gained a deeper insight into digitalization to ensure the successful application of technology in data collection and processing for product development, meeting business development strategies domestically and in international markets. The article of Kosior (2022) also addressed that EU institutions emphasize the important role of digital technologies in the sustainable development of the European economy. Furthermore, in their pursuit of maintaining competitiveness and adapting to market dynamics, companies endeavor to adopt a multitude of solutions aimed at enhancing their operational management capabilities (Kosior, 2022). According to another author's viewpoint, he showed that for companies operating in the F&B industry to foster sustainable business growth, it is imperative for them to overhaul their technological infrastructure, aligning it with revised visions, cultural shifts, and comprehensive employee training initiatives (Birkie, 2015).

To contribute to the realization of socio-economic development goals in the F&B sector, the government's digital policies are increasingly strengthened, and conditions are created by providing funding for F&B enterprises to invest in digital technology, as well as policies regarding citizen data or support for online sales channels. To indeed promote and facilitate a clear understanding among businesses of the importance of customer data in building products and services to meet customer needs anytime, anywhere, by age group, region, and area, the government has organized numerous workshops and awareness programs on the application of digitalization in collecting and processing customer data for F&B enterprises in Vietnam. Therefore, researching digitalization in the F&B industry in Vietnam is crucial, helping F&B enterprises in Vietnam anticipate customer purchasing behaviors, as well as the intentions and preferences of customers regarding those enterprises' products.

The researcher began the study by first getting a lay of the ground via information collecting, which would be useful in the methodological approach to solving the organizational issues. In the formal research study with a quantitative research sample of about 120 people, of which about 80 responded, the study used SPSS and AMOS software to perform Cronbach's analysis, and EFA analysis to select measurement scales in the proposed research model to ensure high reliability. Based on the information collected, a client satisfaction survey was conducted by the researcher.

In conclusion, the purpose of this study is not aimed to come up with any new theory nor attempt to generalize the findings about the method of gathering and processing data in designing products in F&B Viet Nam. The study has provided more insight and support on the inter-relationship among collecting and processing customers on designing products tailored to customers' demands. Therefore, the prime objective of this research study is considerably achieved, and hopefully the implications of the findings and discussions covering the related theories and practices would be able to contribute to the relevant academic fields and practical business in Viet Nam.

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APPENDIX A

Interview Consent Form

Research project title: Digitalization in the food and beverage industry of Viet Nam

Research investigator: Do Thi Hoa

Research Participants name:

I. Terms & conditions

Thank you for agreeing to be interviewed as part of the above research project. Ethical procedures for academic research require that interviewees explicitly agree to being interviewed and how the information contained in their interview will be used. This consent form is necessary for us to ensure that you understand the purpose of your involvement and that you agree to the conditions of your participation. Would you therefore read the accompanying information sheet and then sign this form to certify that you approve the following:

- The interview will be recorded and a transcript will be produced
- You will be sent the transcript and given the opportunity to correct any factual errors
- The transcript of the interview will be analysed by (name of the researcher) as research investigator
- Access to the interview transcript will be limited to (name of the researcher) and academic colleagues and researchers with whom he might collaborate as part of the research process
- Any summary interview content, or direct quotations from the interview, that are made available through academic publication or other academic outlets will be anonymized so that you cannot be identified, and care will be taken to ensure that other information in the interview that could identify yourself is not revealed
- The actual recording will be (kept or destroyed state what will happen)
- Any variation of the conditions above will only occur with your further explicit approval Or a quotation agreement could be incorporated into the interview agreement

Quotation Agreement

I also understand that my words may be quoted directly. With regards to being quoted, please initial next to any of the statements that you agree with:

	I wish to review the notes, transcripts, or other data collected during the research pertaining to my participation.
	I agree to be quoted directly.
	I agree to be quoted directly if my name is not published and a made-up name (pseudonym) is used.
	I agree that the researchers may publish documents that contain quotations by me.

All or part of the content of your interview may be used;

- In academic papers, policy papers or news articles
- We may produce such as spoken presentations

By signing this form I agree that; I am voluntarily taking part in this project. I understand that I don't have to take part, and I can stop the interview at any time;

1. The transcribed interview or extracts from it may be used as described above;
2. I have read the Information sheet;
3. I don't expect to receive any benefit or payment for my participation;
4. I can request a copy of the transcript of my interview and may make edits I feel necessary to ensure the effectiveness of any agreement made about confidentiality;
5. I have been able to ask any questions I might have, and I understand that I am free to contact the researcher with any questions I may have in the future.

II. **Research questions**

1. To which extent are digital technologies adopted in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam?

Answer:

2. What are the factors determining the adoption of digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam?

Answer:

3. What are the impacts of digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam?

Anwser:

4. What should F&B enterprises do to ensure the success of adoption digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam?

Anwser:

_____

Printed Name

_____ _____

Participants Signature **Date**

_____ _____

Researchers Signature Date

APPENDIX B

INTERVIEW TRANSCRIPTS

I. List of interviewers

1. Tran Viet Anh – Chairman of Fleur De Lys Hospitality - travian@gmail.com
2. Duong Van Lien – IT Operation Manager of Nestle Viet Nam
3. Thai Nhu Hiep – Founder coffee ; Chairman Vinh Hiep Limited Company cum Vice Chairman of Viet Nam coffee Association; cum the founder of L'amant Café
4. Nguyen Thi Hoa – Marketing Director – CP CN & ĐT Zeta Group
5. Nguyen Xuan Khoa – Head of IT TH Group
6. Ly Trương Hau – CEO of Trung Anh food Ltd., - khangproql@gmail.com
7. Duong Van Huy – Production Director of Nutifood VN
8. Nguyen Van Tho – Head of Product Deparment – THFC (Via Email)
9. Đang Thi Thanh, Vice of Director - Trang An Sweets Joint Stock Company
10. Le Van Thanh, Business Director of North - Kido Group
11. Le Anh Tuan, Business Director – Viet Nam Red Bull Joint Stock Company
12. Do Cong Chinh, Business Director - Sagota Hung Yen Joint Stock Company
13. Mr HA, Digital Transformation Director - Golden Gate Restaurant Group
14. Mr Hiep – CTO of MUSITO Company
15. Mr Hung – CEO - LTTP Phu Tho Joint Stock Company

II. List of interview Questions

1, To which extent are digital technologies adopted in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam?

2, What are the factors determining the adoption of digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam?

3, What are the impacts of digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam?

4, What should F&B enterprises do to ensure the success of adoption digital technologies in data collection, processing and analysis regarding product/service design process within F&B businesses in Vietnam?

III. Interview transcripts (Researcher translated into English language)

A: Researcher

B: Interviewer

1. **Do Cong Chinh, Business Director of Hung Yen Sagota Beer Company**

A: Alo

B: Yes, I am

A: Good morning Anh, I am Hoa**,** a doctoral candidate at the SSBM University in Switzerland. Currently, I am engaged in a research project centered around the digital transformation within the F&B industry in Vietnam. Could you please share some information that regarded in my title study?

B: Ok

A: According to you, which extent are digital technology adopted in the process of collection, processing and analysis customer data regarding product/services design within F&B industry in Viet Nam?

B: In market, there are some big companies that invested in digitalized like Sai Gon beer company. For FMCG industry, there is the first company that is Unilever, and then

Vinamilk. Small & Medium companies like my company still not yes invested in digitalized to collect and process customer data regrading product/service design.

A: So, Do you think that we need to invest in digital technology regarding collecting customer behavior data that is necessary, isn't it?

B: I think it is. Because it helps businesses synchronize all customer databases, including both inside and outside of the company, and then synchronize them into the company's software system. This assists leaders in seeing how their customer data is and viewing it in real-time. In the past, companies used manual methods to collect and process customer data, leading to updated databases that were not recorded into their system immediately or could even be missed. But now, they have been using digitalized tools to fulfill orders, ensuring that customer data cannot be missed. It is necessary to control, maintain, and expand their customer segments.

A: In your opinion, which factors impact the adoption of digital technology?

B: There are some factors like: Firstly, to invest in digital technology systems, enterprises must have enough funds. However, SMEs often lack the necessary financial resources to invest. Secondly, technology performance requires training for staff. Thirdly, companies need to recruit talented employees who have knowledge, skills, and proficiency in technology.

A: Do you believe that factors such as the need for employee training, sufficient financial resources for businesses, and attractive labor policies including incentives and talent attraction strategies must be more appealing than those of other companies when investing in digital technology?.

B: It means that when an enterprise adopts digital technology in their business, staff must change their mindset from simply working on time to being more efficient and precise in

their tasks. Therefore, only quality/high-performance employees who can adapt to this working environment will succeed.

A: When an enterprise wants to build a product in line with customers' needs, which factors will help them succeed in adopting digital technology for collecting and analyzing customer data?

B: You mean, you want to ask about adopting digital?

A: Business aiming to invest in digital technology to collect customer behavior data needs to establish databases that will enable them to develop products in line with customer demand. As mentioned earlier, when you visit a customer site, you understand what customers want; for example, some may prefer products with more sugar, while others may prefer products with less sugar. By gathering necessary information from customer demand, you can then send it to related departments for researching customer needs and designing suitable products. Therefore, according to you, if a business wants to invest in technology to collect customer behavior data, what should they do to achieve success?

B: To invest in a product, the first step is to gather and analyze digital data to develop the product in line with customer. So, the current situation is that we are using what's called consumer habits, evaluating based on those habits, and then providing feedback to leadership based on these consumer habits, along with competition analysis, and then create a new product from above information. But in reality, it isn’t accurate, and this is traditional methods when the technology still not yet developed up to now. However, nowadays, people updated digitize in their life activities, and the enterprise used digital technology to collect customer behavior they know how their customer habit or behavior is? for example, marketing/product department will know what young people are using or what their consumer habit daily? Sometimes, we may not fully provide it to related department, but when we used the digital technology tool, we can fully understand the

trend of consumer immediately and update in our system data in real-time. For a product to be successful for the first time, it must have many factors. Firstly, it must be new, unique, for example. Considering consumer habits and then quality.

A: So, what you're sharing now are the factors needed to succeed in investing in digital technology for collecting data and analysis to tailor products with customer needs or succeed in the market. They need to gather customer behavior data by demographics. Do you believe age plays an important role?

B: Exactly. I think the age that plays an important role because nowadays we're practically consuming based on the trends of young people, ranging from how many to how many. For example, in my beer industry, young people from 18 to 35, for instance. For instance, those who are 18, Gen Z, they use technology and social media extensively, and when such a large influence spreads, it naturally affects other consumption behaviors.

A: Could you please share what difficulties are your company facing?

B: Regarding difficulties, there are so many difficulties. Specifically in my beer sector and drinks industry, firstly, the economy is facing challenges, and people have less disposable income. Previously, when people used to go to restaurants more often lead to the sales in those establishments increased more and now, they will not go to restaurant less than. Secondly, the karaoke system is heavily regulated, with many fire safety and security measures, which indirectly affects sales through those channels. With people having less money to spend at restaurants and karaoke being restricted by the government, it impacts our sales. Thirdly, Decree 100 regarding alcohol concentration has a significant impact lead to people don’t want to go to restaurants.

A: So, it can be understood that the FMCG sector, especially the beer and alcohol sector, is heavily influenced by government policies and decrees, such as regulations on alcohol

concentration and karaoke activities. Therefore, it can be concluded that the business activities of your company are significantly affected by government policies, is it right?

B: Yes,

A: Thank you so much for your time and your answers.

2. Mr Ha, Digitalize Transformation Director, Golden Gate Restaurant Group

A: Hello Anh, I would like to start our conservation please! With your transformation role, Could you share the extent of digital technology adoption in collecting, processing and analysis customer data regarding products and services design in F&B industry in Viet Nam?

B: For us, we're implementing it 100%. This means we're leveraging technology extensively. Most of our operations already use POS systems, and we've even developed our own software, SOCO, which is used to generate orders and collect customer data. While I can't compare extensively with other

businesses, I can say that we utilize it fully. From the moment a customer steps into our restaurant to placing an order until they leave, all processes are digitally integrated.

A: So, you believe that your company has applied digitization in collecting data from the beginning to the end of a transaction with customers, right?

B: Yes, That's quite common. Because the software used by all F&B outlets, they installed POS software in almost their entirely, from scanning CODE to billing. I think this is very common among businesses in Vietnam.

A: So, the level of technology application here, as I understood, can be said to be almost entirely digitizing the entire process from engaging with customers to when they start using your services until finish. In this case, could you share whether the data that your company, specifically, and businesses in the retail chain in general, have collected through this

technology application has been effectively utilized? Have your company used this data to design products better suited to customer needs?

B: We have the Golden Spoon app, which serves as a customer data platform. So, when customers check in and make payments through the app, we can track their frequency, meaning how often they visit. Based on this, we can assess the effectiveness of marketing campaigns or new sale programs, gather feedback on new dishes, and determine the popularity of certain menu items. This data allows us to make informed decisions and business plan for the future.

A: So, from what I understand, digitizing the data collection process at your company to serve product improvement as well as your dishes and services is being applied relatively effectively, correct?

B: Exactly.

A: In your assessment, what factors influence this digitization process?

B: The technology trend. In the past, for example, paying was very difficult. Now, I need to do is to scan a QR code, and the payment is done instantly. It saves a lot of time for customers to pay, so the technology trend is an inevitable trend.

A: So, according to you, the first factor impact digitalization process is technology trend and business must apply the technology trend in collecting customer data it is right

B: Yes, any enterprise that has a long-term vision aims to save a significant amount on operational costs such as labor and investment when they apply new technology. This helps the company control mistakes better than manual tools operated by people. If the business adopts new technology that assists in reducing risks as well as the aforementioned costs, it's beneficial for them.

A: So, in your opinion, the people factor, does it impact the digitalization process?

B: Yes, the impact of people is significant. When a business wants to implement digitalization in its technology systems, its employees must be trained and change their mindset to understand the new changes in working style. Usually, people are accustomed to working in a certain way and have old habits, so when a business applies new technology in its operations, employees may face several difficulties. However, with proper training, they can adapt to the changes quickly, leading to a smoother technology implementation process.

A: Yes I do agree. In my opinion, the people factor is so important. When employes was trained in fully knowledge and they also change mindset leading to the technology system or business operation will be runed smoothly and efficiently.

B: So, the desire is to digitize more so that instead of humans changing, the results of their work will be simpler and more efficient. Therefore, when tasks are digitized, their productivity will be higher.

A: Do you believe that business strategy affects the process of applying digitization?

B: Business strategy is a core strategy of enterprises. As you mentioned about trends, its strategy also follows trends, and this digitization helps in making decisions quickly and efficiently. For example, in the past, creating a comprehensive report took a lot of time, but once digitized, all I need to do is enter a category, and it provides the result instantly.

A: Yes, its exactly. These can be considered as the positive impacts of the digitization process on a business's outcomes. So, in your opinion, what is the biggest impact, the greatest benefit of the digitization process for a business? In other words, how does the digitization process, after being applied to the data collection process to build products, impact your company's business operations?.

B: It brings profit, you know. When digitization is done well, it saves resources, and ultimately, the final purpose is still profit. Digitization help business increases their profits.

A: So, you believe that the biggest impact of applying digitization is reducing costs for the business and thereby increasing the profits of the business, right?

B: That's correct, yes. It reduces many costs. For example, costs related to personnel and product costs. Thanks to that, it increases profits because ultimately, a business operates to make a profit.

A: Yes sir. do you believe that implementing digitization impacts changing the mindset as well as changing the mindset of people, specifically employees who carry out tasks in the business?.

B: It brings about effective changes in mindset for employees. They have to adhere to the digitization processes, which means their mindset has to change accordingly. When you accept digitization, you have to follow the system's processes. You can't adhere to manual operating procedures; you have to follow the system's processes. So, people have to be more self-disciplined, leading to a change in mindset.

A: So, in your opinion, what should F&B businesses in Vietnam do to succeed in implementing digitization? For example, what does your company need to do to successfully apply digitization in the data collection process, resulting in better products and services and higher profits?

B: The mindset of the leadership, those who dare to think about and apply digitization, is the first factor. Because investing in digitization requires a lot of money, and many people cannot imagine the results it will bring. Therefore, the mindset of the leadership as well as the team is crucial.

A: Exactly. So, in your opinion, the mindset of top leadership needs to permeate throughout the organization, and it requires effective communication from top to bottom to ensure that those executing understand and implement correctly, right?

B: Yes, It is very important and it must be called the culture of enterprise.

A: Yes sir. It mean that, it must become the culture of business, then employee will change their mindset as well as their working habit.

B: That's right, because it brings about significant changes. It affects the relationship between people. You're in charge of the digitization aspect at the company, so you understand that there are many challenging issues. Because when communication hasn't reached the lower levels, there are still many people who are confused and resistant. That means they have to do something new, so it's very difficult. Later on, when everyone is running efficiently and seeing the results, they will realize that they are doing the right thing, that adhering to digitization processes saves a lot of costs. So, I see that without proper communication, they won't be able to successfully implement it, and there will always be resistance.

A: Yes, that's correct. Anh Ha, I understand that some digitization processes lead to downsizing staff. Do you think this is one of the challenges of implementing digitization?

B: This question is similar to what we just implemented at our company. Actually, digitization leading to staff reduction, it is not correct. It's because digitization helps businesses expand their business areas, so it's not about losing jobs but about transitioning them. When a business expands, they will have more selections and development. They will have increased income. For example, before digitization, we needed two people for one job with a salary of 20 million for both, but when digitization is applied, only one person is needed with a salary of 15 million, and the other person will be transferred to another department that the company has expanded. So, saying that digitization leads to staff reduction is not reasonable.

A: So, digitization will directly impact business operations by influencing the expansion of the business activities. And when expanding business activities, it means that we need to hire more staff, right? And it will support the issue of personnel rotation from one

department to another. This means that we utilize existing personnel to develop and screen personnel for various processes and digital technology projects, correct?

B: That's right. And when technology is applied, productivity will be ensured. As a result, businesses will pay wages more accurately and efficiently. When technology is applied, there is no idle time or leisure because everything is measured. Especially in the F&B industry, I don't know if your research delves into this, but there are tools related to the menu and KBF (Kitchen Bar Food) system, so when orders are placed in the system, it will show the time it takes for the food to be prepared, measuring the speed at which tasks are performed and how long it takes for the food to be served.

A: So, it can be said that digitization supports businesses in all processes, thereby increasing labor productivity and providing a fair way to measure the effectiveness of each individual's work, right?

B: Exactly,

A: So, do you think that digitization can be affected by the standardization of processes? Because if we digitize a certain process but we don't standardize and synchronize the processes, it will lead to fragmentation. So, do you think that's a difficulty of the digitization process? Because if we synchronize from the beginning, it may be affected by the investment capital. I also know that some businesses choose to implement digitization gradually, so do you think that affects the business?

B: This issue is also the challenge that we are currently facing in our field. It aligns with the nature of our work. In fact, most businesses are moving towards and implementing partial digitization. This means they do not grasp the overall picture because essentially, we've invested in a software development team that can only meet specific aspects of the desired digitization process. We need a department for synchronization. This means we need experienced individuals, often referred to as a committee, to develop procedures that

align with each part of this digitization process. For example, regarding food weight, we need someone to develop a procedure for estimating surplus food quantities, another procedure for how employees can adapt to this digitization, and another for customer orders to make it suitable. It must have procedures tailored to fit. We have to adjust the process to fit the schedule and each part of the desired digitization process.

A: So according to what you're doing, there will be difficulties if you apply digitization uniformly from start to finish immediately. Instead, you'll do it step by step, and for each part, you'll build a procedure to ensure that those parts align with the subsequent ones, correct?

B: Exactly.

A: So the first thing your company needs to do is build an overall process, then you'll apply it step by step according to that overall process. That way, you'll gradually upgrade and digitize, right?

B: However, the overall process, when digitized, needs to be logical, and the digitization process itself may change. That means when you write an overall process, you may consider it comprehensive, but in reality, there may still be some margin of error in its operation. Therefore, when implementing, adjustments are still necessary.

A: Yes sir, I do agree. The overall process when applied in practice, may undergo changes to adapt, isn't it?

B: Yes, it must change to adapt the change of daily business operation.

A: So, the suitable in applying new technology that is very important isn’t it?

B: Exactly, the technology is served people, if the technology is so difficult then it will not be applied in business.

A: Yes sir, Thank you so much and I hope I can reach you again in my study.

3. Mr Hiep – CTO MUSITO

A: Hi anh Hiep, I am Hoa and student of SSBM. I have been studying the digitalization project in F&B in Viet Nam. Can I interview you as under some research questions?

B: Uh ok.

A: The first question, I'd like to ask you, is currently, what level of digital technology application is the process of collecting customer data for product development in the F&B industry at?

B: F&B in Viet Nam isn't it?

A: Yes Sir,

B: For the F&B industry, in which I've been involved before, such as products like consumer snacks and candies, for medium and large enterprises, most of them have already implemented digitalization in their operations, especially in sales activities. However, activities such as collecting actual customer data at the current moment are just starting to be deployed, about 1-2 years ago, due to the nature of this model for F&B businesses in the Vietnamese market, which is predominantly B2B. For example, F&B businesses typically go through distributors such as convenience stores, commonly known as outlets, or B2C sales channels such as selling in supermarkets. For some large companies like Vinamilk, about 10 years ago, they also implemented B2C sales systems, meaning they sold through showrooms and franchised stores to customers. For this form, they would use POS systems, meaning retail points, to collect customer information. And some other large companies like Masan previously distributed tools to retail points to collect customer information, but it wasn't very feasible. These outlets would use tools such as phones where customers would participate in membership programs at the outlets; however, they didn't bring much value. In my opinion, this is a limitation of this industry because they invest a

lot of money in this activity, but in reality, they still don't truly know who their customers are.

A: So, do you think that customer data collection in some F&B businesses that invest in technology is sufficient and is the data of good quality?

B: In my opinion, the data collection is not yet complete. Due to the nature of sales channels in the F&B industry, they don't directly sell to consumers (B2C). Therefore, the customer data collection is not quite sufficient because to gather customer data comprehensively, one must first understand customer behaviors, their activities from advertising that lead them to the stores to make purchases. It's essential to measure the conversion rate from online to offline channel, meaning running digital channels to lead customers to the stores or directly place orders through the website. Only then can comprehensive customer information be obtained, from pre-purchase behaviors to order formation, as a real customer of the company. Thus, currently, I evaluates that it's not yet sufficient.

A: So, do you think customers are experiencing too many channels, such as online or offline channels? Is this leading to difficulties in collecting customer data for F&B businesses?

B: Ah, I believes that it's more related to customer behavior. Because for fast-moving consumer goods industries, the habit has always been for customers to go to grocery stores to buy items quickly because of their immediate needs. Therefore, brands and stakeholders cannot collect customer data at these supermarkets. As for convenience stores and outlets, they also implement programs to collect customer data. However, the barrier for these outlets is that they are not proficient in technology. The reality is that collecting customer data in this way doesn't bring much value. So, currently, this activity is not successful. Regarding purchasing behavior on online channels in the F&B industry, it's actually not

significant, while this activity represents a very small portion of the entire customer base of an F&B enterprise.

A: After asking and researching some businesses, I also found that the information you provided is entirely based on the reality of the issues that F&B businesses are facing. Indeed, F&B businesses are using a lot of channels, so customer behavior spans across multiple channels, and outlets or supermarkets don't gather much data. This is also a problem for F&B businesses. In your opinion, what factors impact the digitalization process for collecting customer data?

B: According to me, firstly, to collect customer data, it's essential to analyze the touchpoints (sale-point) where customers can interact to purchase products. These touchpoints need to be identified, and technological solutions need to be deployed at these touchpoints to gather customer data. As i mentioned, we can control our own touchpoints, but we can't gather data from others' touchpoints, which is a barrier. This barrier isn't about technology but about implementing technology at those touchpoints. Then, to effectively collect customer information, businesses need to start by changing customer behavior. This means creating a system where customers purchase from a particular company at various touchpoints. They make purchases, earn points, and can redeem those points at selling points not necessarily owned by that company. This way, customer data related to the customer experience can be collected.

Secondly, for businesses with significant product influence, they can collect customer data by collaborating with major retailers such as supermarket chains. For example, companies like Massan are implementing this concept at Winmart, where they use loyalty programs for point redemption, potentially enabling them to gather customer data.

A: The factors influencing the application of digitalization for collecting customer data are indeed key points in the customer data collection process isn’t it?

B: Exactly.

A: According to you, after adopting the digitalization in collecting customer, how does it impact their business operation?

B: Firstly, it helps them understand their customers persona. This means that once they obtain customer information, they have a clear understanding of their customer base. With this customer persona, they can then focus on marketing activities related to those customer segments, resulting in marketing effectiveness and cost reduction. That's the first factor. The second factor is understanding the needs and frequency of customers in each area, meaning the purchasing behavior at each touchpoint. From there, they can develop effective sales strategies for each region or touchpoint. The third factor is knowing the customer experience, serving customers well, and understanding their needs, which equates to creating a better customer experience, increasing customer loyalty, leading them to recommend their products to friends and family, and increasing the frequency of repeat purchases.

A: Yes exactly, Its called the repurchase of customer for their product/service. Do you think the digitalization that impact human of enterprise?

B: It has a significant impact because it changes a lot in decision-making. Firstly, regarding activities related to digital marketing, in order to analyze customer behavior and understand their customer persona, the employee who involved in digital marketing need to have deep knowledge. In current time, before adopting the digitalization, they only are marketers and implement their work simply such as evaluating advertising activities and determine their effectiveness. Now, they need to classify customers and develop strategies in automatically to reach customers and measure the effectiveness of those efforts to understand customer persona. This means a significant mindset shift from being a digital marketer who runs ads and measures their effectiveness to someone who must now classify and rank customers.

Because customers already exist, they need to be classified. It's necessary to analyze customer behavior at each touchpoint to understand which touchpoints are effective for continuing marketing activities there.

The third, aspect is understanding customer persona. For example, from the moment a customer clicks on an ad, during that process, what behaviors does the customer exhibit, and how do those behaviors contribute to their customer persona? Previously, it was known that the customer was male, aged 25-30, worked in an office, and had a certain income. Before, that was enough, but now the customer persona will also include specific customer behaviors. This is for marketing activities. For operation activities, it will naturally change significantly. It helps businesses plan based on data. Understanding customers in specific areas helps determine the effectiveness of promotional programs in those areas. That is, measuring each program's effectiveness based on data. Because the system tracks these activities, with that data, automatic data analysis tools can suggest effective marketing programs. When demand in each area and market can be predicted well, it helps in planning effective selling plans. From there, it influences production and procurement activities, making them much more efficient in the future.

A: There are several factors that influence the success of digitization in collecting and processing customer data. According to you, what are they?

B: I think one of the key factors is the data itself because what we collect is data. As I mentioned, the barrier lies in the implementation. If we implement efficiently, we will collect strong customer data.

A: For example, its needed a secure technology and do you think the technology is an important factor isn’t it?

B: In this regard, technology plays an extremely important role as it is a necessary condition for success. When we identify touchpoints and apply technology, it runs. What is that technology, that solution, and what is the approach of that technology? For example, if you build an app where customers download it, register, and earn points, that's also a form of technology. However, if you only build it at that level, success may not be achieved. But if you build upon it, for example, by integrating it into the logistics process so that customers can earn points by shopping at supermarkets, it becomes more successful. For instance, when you go to a supermarket, you only need to take a picture of the receipt, and it automatically detects the company's products, how many points the customer earns, and these points can be redeemed elsewhere. Therefore, when building a solution, it should make payment for customers as easy and convenient as possible and bring value to customers. Only then can it be successfully applied.

A: So, we could understand that the technology is so important in business activities. Because, we can not be success if we do not have technology.

B: Exactly,

A: Absolutely, humans are indeed another crucial factor. For successfully implementing digitization, personnel need to have sufficient performance . Do you think these factors can change?

B: It's extremely influential indeed. Because technology is a tool, and the tool is ultimately the key. We need to figure out what data and processes we need to collect and how we deploy that data. When implementing that technology, we need to shape it entirely. For example, if we want to collect customer information at points of sale, customers can scan the QR code of the product, so in production, have all products been labeled with QR codes

or not? Sometimes, it leads to changes in the operations of departments like purchasing or production in the end. To reach that final step, we have to imagine all those steps beforehand, so when technology is applied, it's accurate and effective. And the second thing, as you mentioned, when applying technology, it has the ability to change processes. Previously, processes without technology and data collection only had 2 steps, but now, there might be 5-6 steps. This way, there will be data at each step. It helps people analyze data more deeply and gain insights into the data, so people need to have a mindset about technology to successfully carry out digital transformation.

A: We're talking about the story of those who implement, or we could say, the business practitioners. In your opinion, does this digitization impact the business strategy of the enterprise? Do the intentions, understanding, desires, and purposes of Vietnamese F&B businesses affect this process?

B: In my opinion, the boss should have their own vision for their company, and each managerial level should implement this vision accordingly. Therefore, they should have advisors who can advise on steps or processes to achieve the boss's vision. So, I think the vision of the boss, and whether this vision/strategy can be realized or not, depends on the advice of the advisors.

A: So, we agree that the key success factors here are human factors. And the humans here are the advisors, the implementers, and those who provide direct guidance, not necessarily from the perspective of the owner. In that case, do you believe that another factor influencing success is capital?

B: Of course, it has a significant impact. To implement IT solutions successfully, a company aiming for successful digital transformation should allocate at least 20-30% of total revenue to IT costs in the first 2-3 years. For example, if the revenue reaches several trillion VND, 20%-30% of revenue is substantial, allowing the company to invest in

technology in large scale. However, if the revenue is only tens of billion VND, then 20-30% is relatively small, and its scale will correspond to the company's size.

A: I do agree with you, there are so many factors that impact the success of company not only from people, capital also make the success of a company. All your sharing is so deeply. I think you have been working in the F&B for long time.

B: I worked at some F&B companies and as a advisors for Massan that help me have experience and knowledge about this industry.

A: Thank you so much!

4. Mr Nguyen Ngoc Hung– CEO of Phu Tho LTTTP Company

A: Good morning Mr Hung, I am Hoa and a student at SSBM. I have been studying in the digitalization in F&B industry in Viet Nam. According to you, the level of digitization related to the process of collecting and processing customer data regarding product development in the F&B industry in Vietnam is currently being applied to what extent?

B: Actually, in the field of digitization within F&B businesses in Vietnam, they apply it relatively well and thoroughly. Of course, it varies among different enterprises, but in my company, we've been applying digital technology for a long time. As for other businesses, I'm not aware of their specific practices, but generally speaking, most companies in this industry utilize technology very effectively.

A: Could you share for me, your company have been using digital technology to collect or process customer data?

B: Both, currently, the market and consumer information are all digitized for better assessment, such as expanding production, for example. Of course, at this stage, the F&B industry is more challenging than in previous years.

A: Do you think that customer data related to customer experience, especially after Covid, when customer use more purchasing channels, like online channel, their experience is spread across multiple channels, so for the F&B industry, collecting data may be quite challenging, right?

B: Of course, the impact is much greater than past time. Currently, customer information security is very chaotic. The level of control is not good. Customer information is often disclosed by several parties. Therefore, consumers are also very afraid of information leakage, so collecting information faces many obstacles, especially after COVID-19.

A: According to you, what solution help customer feel secure when providing their information during purchase?

B: Firstly, there is the administrative aspect. For example, now we have the national ID card (CCCD), and its information is relatively open, so better security management is needed. For instance, in a phone call like the one I'm having with you, for someone with malicious intent, information security could be compromised. Another example is when someone wants to use a certain service, like advertising or something similar, it's very difficult in terms of management because truth and falsehood are intertwined.

A: So in your opinion, what factors directly impact the digitization process in collecting and processing customer-related data? Here, we're talking about the digitalization process in collecting and processing customer data to develop products that meet current market demands. So, in your view, what factors related to businesses or the market directly influence this digitization process?

B: Firstly, it's about the mindset of today's consumers, along with the Vietnamese government's open policies and widespread digitization, even reaching remote areas where people use smartphones. In this scenario, we have an advantage. For instance, if we implement a digitization program online, it's affected by people's understanding of

information security and the high rates of deception. Additionally, for businesses with malicious intent, such as exploiting customer information to sell to third parties, that's also a factor. Thirdly, information leaks from banking systems or retail systems pose another danger.

A: Yes, it seems that security is the primary concern here. Regarding the IT aspects, they indeed have a direct impact on the digitization process. Investing in a specific procedure for data collection is necessary to ensure safety for both businesses and consumers. This involves building robust IT systems with high flexibility and security to safely collect, store, and process customer data. Additionally, training employees on information security measures is also an integral part of this process.

B: That's certainly necessary, but in my opinion, the most crucial thing is to raise users' awareness. For example, if people have certain knowledge, they'll be less likely to be deceived. All information from Facebook or Zalo can be used for deception. Therefore, there are two things to do: ensuring security and raising users' awareness.

A: The second factor, you mean, need to raise consumer’s awareness. Do you think is this the Government’s role?

B: That's right, it's crucial because it's related to communication abilities on television, newspapers, and even network systems, which are very important factors. Currently, there's a very useful channel, which is the phone number texting system that sends warnings to the public. Whether it's from the police or the Ministry of Industry and Trade, that's very beneficial.

A: So, as I understood that there are three factors influencing the digitization process of data collection. Firstly, it's the secure IT system of the company itself, secondly, it's the awareness of consumers—they need to be vigilant when providing information to any party, and thirdly factor is the crucial role of dissemination to raise public awareness about

providing their information. Do you think that personnel within the company itself is also a determining factor?

B: Actually, the personnel within our company, like all humans, have their ups and downs. However, for the most of them, they are trained in basic skills regarding that matter. That's also a part of reducing risks in the digitization process. When a business trains its internal skills, I think that aspect will be further promoted.

A: So, in your opinion, what do companies need to do to succeed in data collection? Because, as you mentioned, despite having digitization and technology implemented for collecting customer data, the customer data is going through numerous channels, including both online and offline. They might go through online channels to place orders or they might visit stores directly to make purchases, and this wide-ranging usage affects the application of technology in data collection. Therefore, what factors, in your view, help build a more successful digitization for customer data collection?

B: Firstly, it's the consistency of company leadership because the strategic direction regarding data collection methods, as you mentioned, involves two main channels: online and offline. Currently, in terms of search and collection methods, online is faster and cheaper. Offline collection requires significantly more funding. So, nowadays, the focus is mainly on online methods. However, for accurate data, offline methods are superior. More importantly, it depends on each company's approach. For my company, online channels dominate because we need certain metrics or indices, and online channels are much faster and more efficient than offline ones. Another crucial aspect of data collection depends on each company. For my company, it's the consistent direction from company leadership to departmental units. It could involve hiring an independent unit to assist with part of the customer data collection process.

A: Yes, exactly. What you believes is the consistency or what is also referred to as a coherent strategy, which needs to flow consistently from the top down, from company leadership to those who execute it, along with specialized personnel below. You also believes that capital is quite important, isn't that right?

B: The capital is very important. Company need to have big fund to invest in digitalization technology.

A: Yes, I think enterprise need time to evaluate the efficiency of technology investment.

B: Its fine.

A: You believes that for Vietnamese businesses, especially those in the F&B sector, they would benefit from special capital policies provided by the government or some organization to support them, wouldn't they?

B: Of course. The issue of capital is not only relevant to F&B businesses but also to all businesses aiming for digitization. In our case, there is support from the government. When a business proposes such a plan, they need a significant amount of capital to invest in transitioning to digital platforms for customer data collection.

A: Could you share the impact of digitalization in collecting and processing customer data regarding product/service design?

B: Actually, compared to before, there have been significant changes. Firstly, it saves manpower. With access to information, implementing sales strategies saves costs in terms of personnel and finances. We have enough data and metrics to analyze and assess customers' needs, especially in different regions and for different customer segments. That's regarding costs. Secondly, it affects management and operation. Thirdly, it significantly enhances the surplus value of the business, which is very beneficial.

A: So, according to you, the impacts are on the human aspect; we'll enhance the skills of our personnel through digitization. Secondly, it improves business efficiency by reducing

operational costs significantly. Naturally, when costs are reduced, it directly impacts revenue and profit. It corresponds to an increase. But do you think that the company's image, its brand, is correspondingly enhanced?

B: Of course, when the value of company that will increase, the image of company will be increase more.

A: Do you want to share several difficulties of F&B business?

B: Actually, the competition among F&B businesses is very high nowadays. Firstly, there's competition with many foreign businesses. Secondly, there's the acquisition of Vietnamese businesses by large foreign enterprises. Thirdly, domestic businesses are facing a shortage of capital. So, in the long run, large foreign corporations have an advantage over Vietnamese businesses.

A: Your insights as the CEO of LTTP Phu Tho Company are very much in line with the expectations of the research process. They are comprehensive and profound. Thank you, and permission to use the quotes in the article.

5. Duong Van Huy – Production Director of Nutifood VN

A: To save time, I'd like to ask a few questions related to my research topic. I'm Hoa, a research student working on digitization in Vietnamese F&B businesses. I'd like to ask a few questions. In your opinion, how prevalent is digitization in the process of collecting and processing customer data for product development purposes in the Vietnamese F&B industry?

B: Do you want to ask for overall industries?

A: I wana asking about F&B industry.

B: You're right. Currently, only about 10-15% are effectively applying it. I think all businesses are investing in it, but the issue lies in its exploitation and utilization. Take software, for example. In reality, leaders want to digitize their businesses, but it ends up

being only halfway. Nowadays, almost all businesses are only halfway digitized. So sometimes, they invest in software but don't fully utilize or exploit all its features. For instance, if a software has 10 features, they might only use 1-2. Or they might just do simple tasks without fully exploring its capabilities.

A: According to your assessment, enterprises haven't embraced the role of technology because they don't realize its importance, or do they believe that data collection and processing don't require investment?

B: I think, they think that it is not nessessary investment. If their awaereness is important factor to collect customer data regarding product tailor with customer need, they will invest it into their system. I think, this is lead's mindset.

A: So, in the context of F&B enterprises in Vietnam, the primary approach to data collection and processing for product development is still predominantly manual and traditional, rather than integrating technology into the data collection process from customer behavior analysis and subsequent research, correct? It's more like observing how competitors operate or noticing customer desires or feedback externally, then refining one's own products accordingly, isn't it?

B: Yes.

A: In your opinion, what factors influence the adoption of these technologies? For example, as you just mentioned, they are applying them incompletely or not thoroughly. So, what factors have influenced them?

B: As per I said, this is vision of leaders. Acctually, almost of leades who is the talent person but in traditional midset. There is only leaders of FDI or leaders who is not onwer of business, they will have a insight digitalization.

A: So, I understood that, the main factor is people isn't it?

B: Exactly, the vision of leader is the most important.

A: Do you think capital is an important factor? I believe some businesses don't have enough money, leading to a lack of investment in technology. In your view, are other factors such as capital and business strategy impacting investment in technology?

B: In Vietnam, there's a saying that "hardship fosters wisdom." However, in business, we have a smart business plan and make a return after specific time. When they can figure out that calculation, I don't think calling for capital would be difficult.

A: Yes Sir, I am a banker and do agree with you, if business could make a specific project and benefit, institutues will finance a loan for them.

B: Unless you can't evaluate properly. You buy it, and the company spends a lot of money, but can't utilize that technology. So, the company wouldn't recoup the capital. Then, how can you borrow? So, it becomes difficult again, and at that point, it's changed to being about capital. For example, tens of billions are spent, right? Then it's changed to "I don't have money so I can't digitize." But that's not really the case. If you can prove what you'll gain after the investment, people will invest in it. If applying it brings something to the company, then you have to create a project. At that point, capital isn't the issue anymore.

A: It's reasonable to consider factors such as the competence and culture of employees. For instance, if the company's direction is focused on investing in technology but the lower-level employees lack the necessary skills or the organizational culture doesn't foster readiness, then it could indeed be a significant factor impacting success.

B: Certainly, it's a significant factor. Therefore, company’s leaders must understand this issue first before effectively communicating it with determination down the hierarchy. Only then can lower-level employees grasp the importance, and they can further transmit this understanding. Subsequently, the entire enterprise comprehends the importance, enabling focused execution and eventual success. If doubts linger even at the leadership level, those doubts will likely cascade down, hindering the potential for success.

A: According to you, I understood that, the influenced factor is not only awareness of employees but also the vision of leaders isn’t this right?

B: Yes,

A: So, we can understood that the vision of boss is so important factor and serving it as the key factor throughout the digital transformation process as well as business operation.

B: Yes,

A: In case, a business applied the digital technology in collecting and processing customer data process. In your view, how dose it impact their business or employees?

B: I think it's multi-factors. As mentioned earlier, applying this from the top down is crucial, but it's not always fully exploited at lower levels. Therefore, the analysis needs to flow from middle management to senior leadership, not just the top. Utilizing data and analyzing it to draw insights, such as customer preferences or changes in market trends, allows for proposing business strategies to senior leadership, whether in product development or management and production processes. This means it's utilized throughout the supply chain management from start to finish. Middlemen must also have the vision and dedication to leverage these insights to achieve results. Merely being determined to build, with many factories built and operational systems running smoothly, but with the lower-level employees unable to keep up, is like burning money. This also requires favorable circumstances. When all businesses are growing, investing in systems, and hiring new forward-thinking individuals, everything progresses. However, if the human infrastructure lags behind, then that effort may not be suitable.

A: So, do you think the policies of Geoverment that impact the digital technology of adoption in F&B industry isn’t that?

B: In honestly speaking to you, Government only plays a role in setting direction and comunication and we should not expect any support from Government.

A: I think so, Government sets the direction for business, they must act on their own.

B: Acctually, if business want to have a special loan from Government they must wait for long time or have a good relationship. So, business never depends on that support.

A: Do you think the legal framework that pose any difficulty for business?

B: I have never approaced it but I think it take time to have it.

A: Yes sir, this is an administrative procedure.

B: Are you working in banking? When you present a project and this is potentia project, I think, banker will understand that project quickly. If Government finance for that project, maybe getting several % of project value but business have to take time for waiting.

A: When I surveyed F&B businesses in Vietnam, I found that the majority of large enterprises in the top 500 are mostly Forein Direct Institutes (FDI), while the rest are small and medium-sized enterprises (SMEs). The F&B sector is one that directly impacts people's daily lives, as its products are essential. However, many SMEs in manufacturing primarily rely on traditional methods, such as mimicking competitors or following the production methods of foreign companies. There's little room for innovation. I believe consumer behavior is crucial as it directly influences businesses. Understanding how customers consume and their preferences is vital. Collecting such information is not easy; it's quite challenging, especially for businesses that haven't realized the benefits of technology and long-term advantages. I wonder if you agree with my perspective?

B: Yes, when business awared that benefit, then they will try to invest in digital technology to get success.

A: Have ever seen one business they collected customer data but they have not yet processed them into quality data regarding product design?

B: You're right, I've encountered many cases like that. It must be acknowledged that some businesses have a lot of data; they purchase extensive datasets but don't utilize them

effectively. I've worked with Vietnamese businesses that acquire vast amounts of data but don't know what to do with it. There needs to be synchronization. As you know, a business has multiple departments, so if there's only one person handling data, it won't solve much. Those who truly understand data can make meaningful proposals. Sometimes, people assume that if a market is growing and if they do a certain thing, they'll surely succeed, but that's not always the case. Markets have certain thresholds; if you enter at the wrong time, you might fail. Therefore, linking with the market is crucial. Just analyzing data won't necessarily solve anything. That's why now I see the value in Chat GPT, right? You ask it, and it can provide you with a lot of numbers, but what are those numbers for? Do you understand their significance and what to do with them? That's what matters."

A: Absolutely. Additionally, the suitability of applying that data to one's own business is also crucial, isn't it? For example, one business may find it suitable to apply certain data, while another may have different requirements. It has to be tailored. It depends on various factors such as the leadership's direction, the CEO's strategy, and the company culture. These factors directly impact the success of technology implementation. We still have to affirm that the human factor remains the most important in all processes. Could you share with me some challenges faced by F&B businesses in Vietnam regarding data collection and processing through digitization?

B: As you said, the vision and dedication of leadership are extremely important. I consider myself lucky to work with individuals who possess both. It's akin to having a coach in a football match. Digitization is similar; you want to digitize, but for what purpose? It's the same with football. What statistics do you want for your players, for your opponents, and can you interpret those figures? Only then can you devise appropriate strategies and organize your team effectively, leading to victory. In my business, there are indeed many

talented individuals, but it's the overall vision that's crucial for reaching higher levels. It's about building a team. Personally, I've always believed that people are the most important. I really admire someone like Park Hang Seo, for example. When he first arrived, he emphasized the importance of people. It's still the same people, but he instilled spirit and he's the one who wins. With those same people falling into someone else's hands, they wouldn't be successful

A: Absolutely. I think you've articulated it perfectly. While my research focuses solely on digitization, I completely agree that everything is ultimately based on people because people play a guiding role throughout the entire process. Whether it's digitization or not, it's still just machinery, and machinery is developed by people. It serves humans rather than humans serving it. So, ultimately, it still has to come from people. And you mentioned something very important: vision and dedication. That's right. For F&B businesses, their products directly relate to human health, so if business owners have both vision and dedication, the products they produce will inherently serve the community and contribute to sustainable development, wouldn't you agree?

B: Surely, these produts will meet with customer demand and the market, they will not design products those are not needed by the market and customers.

A: Thank you so much. Your information is so interesting for my study.

6. Nguyen Xuan Khoa – Head of IT TH Group

A: Good morning Mr. Khoa

B: Good morning.

A: Thank you very much for your time to participate in my interview. As you know, I am Hoa – a student of … of Switzerland. I have been studying the digitalization of F&B

companies of Vietnam. Thank you so much. And now I would like to ask you some questions in my dissertation.

B: It's my pleasure.

A: Thanks so much. The first question is Could you let me know which extent of digital technologies adoption for data collection, processing and analysis to build and develop products at F&B businesses of Vietnam?

B: Ok, In the F&B and in the FMCG from my point of view the technology adoption in Vietnam is not mature because of the nature of business. Nowadays, the main distribution channel is still B2B. We deliver goods to the customers through the networks, the retailers. We find not much technology adoption over there. We have some end customer technology support like POS or payment technologies like banking transfer or something like that. But the ability to capture the feedback from the customer is very low as well as customer behaviors as I mean the data is also low as well. We somehow have information from E-commerce where the customers buy our goods through the apps or our websites. And we also have very big role from the marketplace from Tiki, Lazada and Shopee. With these platforms we can capture customer behaviors and it is the best way to gain the feedbacks from the customers about goods, about what they claim and what they like. And I think with those information we can somehow understand the feelings and thinking of customers about the products. But the contribution of these channels is still very low in the market where we have of the products are distributed through channels where we cannot have direct from the customers. Nowadays, like our company whenever we want to have this kind of information we need to do marketing campaign. We have to design some marketing campaigns to get customers' feedbacks. In that way the amount of data and the quality of data is not much. And the ability to consolidate and analyze the model is also limited. It is like this from my point of view, as an IT.

A: Thanks. As my knowledge, you are the Head of IT of TH Group.

B: Actually, I am IT Director of TH Group.

A: Yes, a very hard position in the F&B of Vietnam as my knowledge. With the second question, can you share something about what are the factors of digital technologies when they adopt in processing and analyzing customer data to build and develop products?

B: Ok, so.

A: I mean there are some factors determining the success of digitalization such as people, technology, funds, or business strategy something like that.

B: I have to said that this is a very difficult question. Because to have data analysis or the results of data to become information to support the products, we have to come back to the beginning process of data. In the data processing, we have data generating, then collecting, then organizing, and then data analyzing. Therefore, we have four steps. And each step requires the factors as you say from technology, to people and investment of course. And we have challenges.

A: Can you say details of challenges. What challenges? Can you say something.

B: Ok. We will say about technology first. Because we don't have a high level of technology adoption in the retail area we have challenge in data generating and collecting. If you want to capture customer feedbacks or customer behaviors directly when they have the first touchpoints of our products, we have no way to have their information directly. That is the challenge We don't have technology presence in the selling points, in the points of sales I mean. And that is the one. And the customers in general in Vietnam they don't have the habit to use the technology.

A: Yes, Exactly.

B: When you need some water or some milk for the child, what you you do? You will use the mobile app or you use the website to order it or just simply go to the retail points and

pay the cash. Therefore, the manufacturers don't have any chance to capture the information. So it is one of the challenges. And about methodology as a maker we don't the understanding and we don't know how the methodology is used to capture the information from the customers. Therefore, there are many consultancy firms they come and advise us implementing with the main ideas to get those kinds of information. In any cases, we always surprise. That means we don't have the knowhow and the knowledge of this area so every comes to us is new. So we don't have the methodology to do something. So how can we do it.

A: I think your answer focuses on the methodology as a very important factor, right? So do you think we need to train people about giving a good methodology. Do you think we need to train? Because as I know when the company wants to train the staff I think the company should invest in training methodology programs. I mean your company has to pay some money, right?

B: I agree that we should invest. I have several chances to work with team marketing in CDP projects (customers data platforms) exactly your topic. And with that chance I have feeling that we don't know how. We don't have the process to capture the information. We don't have the clear criteria to clean the data. And we don't have clear ideas about how to enrich the data, how to analyze and what is the analysis model to apply on the data to gain something. So that is the challenges from the methodology from the technology support, the people and also the budget. We need huge investment for the technology to implement data collection and processing. And it is not something easy.

A: Do you think that business strategy is an important factor?

B: Yes

A: Can you explain in more details about it? I mean what impacts of business strategy?

B: In the F&B and FMCG, understanding the customers is the key. People always say about 4Cs or customer centric and customer understanding is always the key point. So we always talk about this and we know exactly what we need. And we have to design our strategy with specific objectives.

A: I mean according to you your company should focus on building the strategy first or paying researching the customers. I mean which is the first?

B: The strategy first, always. We can start with very simple things the simple definition and then we come to the plan. So the strategy first. But how we can define it.

A: Yes, I think the strategy first and it impacts everything. When your company has the strong strategy it can support your decision of investment in anything. And for the third question, I would like to ask you what are the impacts of digital technologies in data collecting, processing and analyzing to build and develop products in the F&B companies in Vietnam? I assumed when your company invested in digital technologies in collecting and processing customer data to build products, according to you what are the impacts of this?

B: So you mean the impacts of the investment in digital technologies in customer information capturing right? I do believe that it have positive impacts.

A: For example? Can you give some examples of positive impacts.

B: Ok if we can understand the feeling of the customers about our products especially how they feel satisfied. We can rely on the data. We capture the data, right? To understand the feeling of the customers. We can a higher level of belief in the information. And we can give decision on it. And if we have strong confidence about our understanding we know how to improve our products. We know how to invest in goods then we can make the decisions. For example, we have milk with sugar. In the past, we know that the customers did not like milk with too much sugar. But things can change. We have the understanding

of how low sugar is enough. So we need to have this understanding and somehow based on the feedbacks of the customers not only with TH products but with other F&B products, from different groups of customers the youngers, the old ones from the office customers to the students. Then we have a clearer understanding for decision making, the level of sugar for example. Everyone says we need less sugar but how less is enough. Let's imagine that we have the ability to capture that information from the customers with our products with the technologies, for example capture information of customer behaviors from the website even in the traditional markets to know their thinking about our products. And we know how to enrich the data with the information of customer behaviors, then we have some good analysis model to apply. And this is a good side. And we can also base on the information to create other products. Not only with the existing products but also with new products. Good for the customers and also good for us.

A: It is a great answer for me up to now. And the last question for you, according to you what should F&B enterprises do to ensure the success of adopting digital technologies in data collection, processing, and analysis to build and develop products? I mean what our company should do to ensure the success?

B: before we make any investment, we have to define the success keys for that investment. And it is always a very hard question to answer. Come back to your question about the topic about data analysis for product development in the F&B. I think it have some keys. The first is it can help us to capture information. It helps to capture enough information. Not only the information but also our target information for example online or offline information to capture. And then we have to capture it in time. The delays cannot be too long. The delays should be short. We should not have it too late. And the second is the investment roadmap. When we invest in technologies and have a lot of information coming

in the same time. We don't know how to use it. So the investment will be wasteful. So I can say that the investment roadmap should align with the maturity in terms of data analysis and also in terms of R&D. We understand the customers but the R&D does not know how to make the information in R&D process to develop the products. Then, the R&D knows how to make product lines but the whole supply chain does not support this. So it can become an issue, and disadvantage. So it should be aligned with the maturity of the roadmap. And the budget.

A: Exactly. Budget is very important, right?

B: The investment budget needs to be aligned with the business.

A: How about the people? Do you think that your company needs to train them?

B: We said about the success?

A: Yes, the success. People is the factor because if your staff cannot adapt to the technologies, they cannot implement well.

B: We have to define how the changes in people can confirm the success. We have to think about how people enter the project and how they are when they exit projects. And when the technologies are implemented how they will be. For the success definition of the project, the adoption of technologies should align with our current situation. If we apply something that are too high with the current technology maturity and people, then it is not a success. So the technology application should be suitable for the people, for our company, our customers, our partners as the retailers. If we bring something very expensive but it is too high we cannot use it for everyone. And when the technologies are implemented we will see how the people and market improve their technology skills. That is one of the investment target.

A; I think your answer is very concrete. I appreciate your answers and thank you so much for your time to participate in my interview.

B: Thank you for coming to you. When you think that I can support you, it is my pleasure.

7. Tran Viet Anh – Chairman of Fleur De Lys Hospitality - travian@gmail.com

A: Good morning Anh. Could you please share detail about the first basic step that regarding collecting customer data?

B: A simple example is a coffee restaurant where people collect phone numbers of customers and then use loyalty cards. However, these steps are all very basic, based on the data collected, then converted into secondary data, and transformed into care regimes, such as every time there is a promotion. Because there are different types of customers, some may not like receiving intrusive information like that. It means we collect data, but then we have to filter it out before using it.

A: Yes! According to what you shared, it seems that the current level of digital technology application is not fully serving the product development process; it's more at the stage of collecting data for use in some promotional programs for F&B businesses isn't it?

B: Currently, the data collection process indeed requires a clear plan. For example, once we've collected the data, what do we do next? The strategies of F&B companies, in general, are still very rudimentary. We simply instruct employees to collect data, then issue vouchers to give for customers without a comprehensive strategy. Many restaurants, after receiving customer feedback, tend to conceal negative feedback rather than address it. In Vietnam, for instance, the first step is often to hide negative feedback, and the next step might be to block the page rather than accepting constructive criticism.

A: According to your sharing, I understood that, the collection customer data that is not served product development. Can you share some factors that impact the digitalization technology of adopting in collection, prosessing customer data regarding product design?

B: According to me, there are two factors. Firstly, it's the strategy or orientation of each company. In the F&B industry, there are many companies of small to medium scale, so they tend to use digital transformation for the comprehensive development of the business

less. However, there are numerous startup companies which have not enough capital. In such cases, they may not prioritize the development of digital techonology. Secondly, it's the consumer behavior in Vietnam. People are more concerned about the quality of the product rather than the accompanying services.

A: According to you, how does the digitalization transformation impact people? Could you please share some influences?

B: Currently, technology affects all fields in the world, and the F&B industry is a part of that, with its own peculiarities. For instance, in terms of human emotion, even if we use a robot in order to make the order for customer instead of human in the future, it won't be able to convey emotions the way humans do. I believe that in the long run, technology cannot replace humans. Therefore, the impact of technology on F&B companies is not a cause for concern. In my opinion, technology mainly influences F&B companies by streamlining payment processes and calculations.

A: Yes, the application of digital technology in data collection does impact human factors, but primarily, human involvement remains crucial because F&B products are very specific, requiring human intervention in various stages of product development.

B: Yes, exactly, my opinion is that product development that base on some factors. The machine can not collect the emotion of human and that only is collected by human.

A: So, do you think it impact business result?

B: Yes it do, it impact the payment, marketing, for instant, we use marketing channels, such as digital marketing (social network). When we implement the marketing well, we can reach so many customers.

A: So, I think, Technology's impact on humans is felt to some extent, but its influence on business strategy is relatively significant. From communication methods to payment systems, technology affects both short-term and long-term aspects of business operations.

B: We must follow the transformation trend but there defferent strategies bwetten companies.

A: As I known, you are the big leader of group and your group have been developing in several fields in Viet Nam, so you can share what the business do to achive the success when adopt digital technology in their collection and processing customer data process don't they?

B: We must take data collection seriously, considering it crucial and conducting it with integrity. When building a coffee chain, for example, we need to identify the core market first, then proceed to collect data, that mean, we must shape the right and long-term strategy. Currently, the Vietnamese government has a clear roadmap for digital transformation. Everyone must recognize this as a crucial step, often the most crucial one, vital to the survival of businesses.

A: Yes Sir, we think that customer data is so important for business and they is awarenessed it . Could you share sulotions to assist enterprises

B: Currently, the Vietnamese government is implementing a roadmap for digital development, making it a state requirement for all businesses to adopt technology. For instance, the implementation of electronic invoice will significantly impact the mindset of F&B companies. In such a market environment, larger enterprises are swiftly transitioning to digitalization, setting a precedent for smaller businesses. Therefore, if business don't follow with transformation trend, they will be falied in their business operation. Communication and media play vital roles in this transformation.

A: Thank you for your interesting answers, it will help to inplement our subject fuluently.

8. Duong Van Lien – IT Operation Manager of Nestle Viet Nam

A: Hello anh, I would like to ask you some research questions as per I said you before.

B: Ok Hoa,

A: According to what Mr. Lap shared, you has many years of experience as a manager, could you please share with me the current level of digital technology application in the process of collecting and processing customer data among F&B companies in Vietnam for the purpose of product development?

B: If we're talking about general businesses, I haven't conducted a clear survey. However, in the F&B company where I working, the current trend seems to be towards big data. Therefore, the collection of big data from customers and using it to support digital transformation and business operations is becoming a important work. I see it as a new trend that many companies are much investing among F&B companies. My current company is even establishing a dedicated department for this purpose.

A: So, you said your company invested a reaseacrh and development department which is responsible for designing products base on customer data collected.

B: Yes, my company also hired the third party who provide the report of market research.

A: So, according to you, what factors impact digitalization technology of adoption in collecting, processing and analys process regarding product design?

B: The difficulties in implementing digital technology lie, firstly, in the level of technological proficiency. While there have been many advantages and advancements in technology, sometimes the information gathered from customers does not accurately reflect reality. This discrepancy can lead to inaccurate decision-making based on the provided information. Secondly, the data sources we collect can encounter obstacles during the data processing stage. Thirdly, during the initial implementation phase, there may be resistance when persuading the decision-making group.

A: Yes, that means the factors you mentioned. Firstly, the quality of the collected data is crucial. Secondly, you brought up a factor related to persuading decision-makers within a specific company. It means how convincing our collected data is for decision-makers to trust it needs to be accurate and used correctly, right?

B: Exactly,

A: In my view, the maker will be people factor, so do you think the capital that impact digital technology of adoption?

B: Are your talking about the fee for investing in technology are not you?

A: Yes Sir,

B: Having that with me, actually, they must pay fee for one user who used data. Therefore, when one's data is more abundant, the investmeant level increases. Consequently, without sufficient budget for investing, it's challenging to obtain reliable data to make accurate business decisions.

A: Yes, that's correct. Capital is indeed a very important factor. The initial capital amount, if not estimated appropriately, can significantly impact both the process and the quality of the data collected. If the initial investment is too low, the technology used for data collection may not be suitable. Conversely, if the investment is too high without a specific timeframe, it can also affect the company's strategy to some extent.

B: Exactly, the effectiveness here won't be high. It means that with too little data, it's not convincing enough to make decisions, and with too much data that leads to redundancy, resulting in inefficient use of the budget, which in turn may not get approved in the budget cycle plan.

A: Yes Sir, as per your sharing, Nestle is the global company and the big international company in Viet nam. Your company also adopted digital technology in collecting and processing customer regarding product design. Could you share how it impact your company business operation?

B: The impact here, as we assess it, is indeed predominantly positive. In this era of Industry 4.0 and even 5.0, where social media and social platforms greatly facilitate information gathering and customer outreach, businesses can quickly and easily obtain feedback and insights from customers, rather than relying on traditional methods. However, Nestle, being a large company, is currently obligated to comply with consumer data protection requirements. With the upcoming global data protection laws set to be enacted in Vietnam, Nestle will face significant challenges in implementing data collection and protection solutions. Particularly in Vietnam, the forthcoming data protection law will impose numerous standards requiring businesses to invest in building systems and commit to not disclosing consumer data externally. For Nestle, this presents a considerable challenge.

A: Yes, indeed, the legal framework during the process of digitizing data has a significant impact on compliance. This legal framework isn't just governed by Vietnamese laws but also by the regulations of your company's conglomerate. The primary concern you're noticing is how to influence the issue of securing customer data, specifically how to ensure its protection post-collection. Securing customer data poses a substantial challenge for all companies, and undoubtedly, for a leading company like yours, compliance needs to be even more stringent and absolute compared to smaller-scale enterprises. So, what solutions can be proposed to address this data enforcement issue?

B: Currently, Nestle has established certain standards for data security globally, which are mandatory for all markets where Nestle operates. Additionally, Nestle is committed to complying with the laws of each respective country. Therefore, our company has two main standard policies to apply, and we will require the adoption of the higher standard. We also have a standard, ISO 27001, which is based on information technology security protection standards. This helps the company establish a set of standards to control the security of general information data and customer information data in the digital transformation field specifically.

A: Products from Nestle that are manufactured and sold in markets where data collection and processing through digital technology are implemented. According to you, are there any different bewtwen current products and previous ones?

B: This question, I could not answer you because I do not have enough information to answer.

A: Yes Sir, this question is suitable for R&D departments. In your opinion, what should F&B enterprises do to successfully integrate digital technology into their data collection process for product development? Some businesses have already applied technology to automate data collection and management, then utilized this data to develop products. However, the challenge lies in ensuring that this process achieves the desired goals. What steps should they take to achieve success?

B: I understand that personalization is currently a significant trend, and focusing on it can help companies meet most consumer demands, ultimately leading to successful business operations. Therefore, businesses need to gather information about customers, markets, and their strategies to meet market needs. This is a general principle, but the specific implementation may vary for each market and product. In my view, customer data is becoming increasingly important for all businesses, not just F&B enterprises. Specifically, in the F&B industry, where consumer tastes and preferences change rapidly, collecting information to understand consumption trends is crucial. This allows companies to provide products that meet customer preferences, leading to customer satisfaction and improved business efficiency.

A: Absolutely. We all acknowledge the importance of customer data in successfully introducing products to the market and ensuring their alignment with market needs. The success of products in the market often stems from the quality of the collected data, how it is gathered, and its digitization to make it actionable. I believe that currently, this poses a significant challenge or obstacle for many companies.

B: Exactly, because the usefulness of the data we collect and how we process it ultimately determines whether it provides us with valuable insights to make informed decisions. This depends on various factors, particularly the method and quality of the collected data.

A: Yes, so the collected method that is created by people and adjuted in order to suit business operation at any given time.

B: Exactly, but in reality, within a company, each method tends to yield a specific level of effectiveness, and the information generated by these methods needs to be processed to align with the data source. Therefore, digitization entails converting stored information into digital format so that we can utilize that data source quickly in the future. The method through which this information is obtained is just the means of data collection.

A: Thank you so much for your time, exspecially your interesting anwsers that will help me insigh digitalization, then can make the soloutions for business in F&B industry.

B: Thank you Ms Hoa spent an oppoturnity to answer your reseach questions.

9. Nguyễn Thị Hoa – Marketing Director – Cty CP CN & ĐT Zeta Group

B: Alo

A: Alo? Firstly, based on your experience and the current F&B market in Vietnam, how extensively do you think digital technology is being applied in the process of data collection and processing to serve the purpose of product development? In your opinion, how much have businesses in Vietnam adopted digital technology for this purpose?

B: Are you hear me clearly?

A: Yes I do

B: In my opinion, the level of digitization varies across different types of establishments within the F&B sector in Vietnam. It's likely that various types of restaurants and eateries will have different levels of digital adoption. Since your focus is on the restaurant sector, it's true that there would be a significant emphasis on digitization within that segment

A: You're focusing on businesses beyond just restaurants, including those involved in manufacturing products serving beverages, food, and consumer goods. Within this scope, restaurants represent one aspect of the chain.

B: So, we need to separate into several customer segments.

A: Yes,

B: Certainly, there's a distinct difference in the level of digitization across various segments within the F&B industry, such as production, commercialization, and service-oriented businesses. Drawing from my experience working with diverse entities, including food production plants, trading companies, and restaurants, I can observe that in terms of the manufacturing segment, particularly within F&B factories in Vietnam, the level of digitization still varies. While the world is progressing towards Industry 4.0, in Vietnam, many facilities are yet to even fully embrace Industry 1.0 or 2.0. Some FDI-backed factories inherit advanced digital technologies from their parent companies, enabling them to have sophisticated digital systems. However, when it comes to domestic facilities, they often lag behind compared to their foreign counterparts. For instance, during visits to

renowned beverage production plants in Vietnam, I've witnessed machinery that has been in use for decades. It's quite challenging to achieve digitization when relying on outdated equipment. So, it's essential for these facilities to upgrade their technology to keep pace with global standards.

A: Yes,

B: For the largest factories in Southeast Asia, even their digitization efforts face challenges, extending down to their production floors. Regarding digitization in office environments, I believe that FDI-backed enterprises tend to be more advanced compared to domestic ones. They often keep up with external technological trends and advancements, ensuring that their digital infrastructure aligns with the latest technologies being utilized elsewhere

A: Yes, based on your insights, it seems that the primary adopters of technology are FDI enterprises, benefiting from technology transfer from their parent companies abroad. As for domestic F&B enterprises in Vietnam, they are also in the process of adopting new technologies, which can be considered as being in the early stages of formation and implementation, right?

B: That's correct and among them, there are relatively progressive enterprises. However, we must also distinguish between large enterprises and small and medium-sized enterprises (SMEs) in Vietnam. Large enterprises in Vietnam are indeed very conscious about digitizing their data and processes to optimize production resources and operational costs. They are proactive and effective in their digital adoption.

A: Yes, when it comes to the F&B industry in Vietnam, we can indeed categorize it into two groups: the enterprises within the F500 and small and medium-sized enterprises (SMEs). It's true that based on my experience in surveying some enterprises, SMEs, especially, have a relatively rudimentary level of technology adoption, particularly in digital technologies. In your opinion, what factors influence the adoption of technology in this context?

B: In my opinion, the most critical factor is the mindset of the management, the leaders of the company. If the top executives have a mindset about digital management, understand

the importance of digital transformation and its impact on management, financial matters, processes, and people-related issues, then they will be determined to apply technology effectively. These companies will apply technology very well, even though they may face many challenges in the initial stages. The most important thing, in my view, is the mindset of the leaders and the mindset of the implementers. Sometimes, leaders are eager to implement new technologies, but their employees may not be ready or may resist due to difficulties or other reasons. Generally, in areas like factories or especially in the F&B sector, the educational level of the workforce is not particularly high. Therefore, it can be difficult for them to adopt technology, change old habits, or move towards a more visionary management approach. It's challenging for individuals with lower educational backgrounds, such as workers or service staff, to adapt to technological changes or adopt advanced management perspectives. Another important factor is the suitability of the technology. The suitability of technology is demonstrated by whether it meets their needs. Sometimes, the knowledge and mindset of the company's leaders are excellent, but they may lack access to suitable technologies tailored to their requirements. As a result, many attempts at digital transformation may fail.

A: Exactly. We are discussing the relevance of technology in relation to the alignment with mindset and human capability of leaders.

B: I mean, we are referring to the compatibility of technology, meaning the suitability of specific technological products or solutions. In some cases, despite the willingness of leaders to change and transition, when they begin using certain products, they may find them too basic or lacking in meeting key requirements of their enterprise. Often, the challenges and needs of each enterprise vary, and a product may only partially fulfill their needs or may not align with the specific requirements of other enterprises. As a result, they may encounter obstacles in their digital transformation or in integrating technology into their business management processes.

A: Yes, that's correct. I undertood that, you are indeed discussing the outcomes of implementing digital transformation. Could you pleas addressing the impact of digital transformation on enterprises?

B: Actually, most enterprises, when they have successfully implemented either all or a certain segment of digital management, applying technology within it and achieving some successful outcomes, they all recognize its impact. Firstly, they save on manpower, costs, and time. These are tangible benefits that they can see and hear. However, it takes some time for them to apply this technology to the practical production or operation of the enterprise. In general, there are many enterprises that I've observed apply technology, but they fail. Why? It's because of the three reasons I mentioned earlier: firstly, the mindset of the leaders, secondly, the mindset of the implementers, and thirdly, the compatibility of the technology. And there's another factor, which is the organizational structure or, let's say, the... I'm not sure how to describe it. That's the aspect where many enterprises or leaders encounter obstacles when it comes to downsizing staff. Because applying digital transformation or technology into practice will inevitably help enterprises save costs on human resources. Machines can process tasks without the need for a dedicated data entry clerk or manual operators. So, many enterprises face the challenge of how to reorganize their workforce, leading to hesitation or even postponement in implementation. I see this as a quite common impact.

A: According to you, these influences, do they help product’s feature tailor with customer demand?

B: Absolutely. One of the primary tasks of a business analyst is to thoroughly understand the workflow and operations of future product users. They not only need to understand how users currently interact with the product but also analyze how technology impacts these workflows and how they can be improved for user convenience. Therefore, data collection, deep dive into business analysis, and analyzing both current and future business processes under the influence of technology are crucially important tasks when developing a product.

A: In your view, the digital technology that help business can collect clean data can’t them?

B: I believe technology aids businesses in collecting data more efficiently; however, whether this data is clean or not depends on the quality of the input and the resulting output.

A: Exactly Miss Hoa,

B: The cleaner the input data, the cleaner the output data after filtering. Conversely, if the input contains a lot of noise, technology must work harder to filter out the finer data, although it may still be contaminated with some impurities. Therefore, I believe technology only addresses part of the solution; it speeds up processes and data processing compared to human capabilities. Sometimes, it can be overwhelming for humans to scrutinize data for anomalies, but machines or technology can handle this task efficiently. However, as I mentioned, the quality of the input data ultimately determines the cleanliness of the final filtered data. As for the specifics, I'm not familiar with the data filtering technology used by your team, so I can't provide detailed insights into its operations.

A: Yes, in your view, what should business do to achieve the success in adopting of digital technology in collecting, processing and analysis data?

B: As i mentioned to you, the two most important factors are the mindset of leaders and the mindset of implementers. To successfully apply them, I think the most crucial aspect still comes from the leaders. People's mindset clarity is one thing; next, they must be resolute and decisive in implementation. Sometimes, flexibility and adaptability are also required when changing the corporate culture to adopt technology. They themselves must consider whether their corporate culture will change when they apply such technology or will they use that cultural factor to persuade and train employees on how to apply the technology? This process is one where the corporate culture can excel if they have built a good one.

A: So, the crux of the matter is very important, which relates to the human factor, and the humans here we are referring to are the ones at the top of the enterprise, or what we call their business direction strategies. And from this strategy, they will break down into smaller parts the tasks, the things to do, to make it successful, right? For example, the first task related to the implementers is the staff, the employees, they will have to be trained, perhaps they have to accept changes in staff, or job loss, or changes in culture to apply this new technology, right?

B: Yes, I see the first crucial thing is the mindset of the leaders, they will have to think about how the processes will change when applying technology. They will have to envision scenarios, sometimes they may have to redo their entire process, apply technology where necessary, then they will communicate, they will establish regulations within the company and provide training guidance for employees, then, to encourage employees, they have to introduce incentive programs, rewards, and sanctions. They have to integrate all of these factors in order to achieve success.

A: Yes, I completely agree with your insights and perspective. Indeed, the mindset of leaders is incredibly crucial. Just like in our organization, we are currently undergoing digital transformation, and if the leadership's mindset is determined and consistent from top to bottom, it will create a culture, an environment, especially for those at lower levels, where they will work more smoothly throughout the process.

B: Actually, it's not that the implementers are hesitant or resistant to change. It's just like the typical mindset of a child - when they find something difficult, they tend to get discouraged. So, the key is to make them feel that it's not difficult, then they will encounter fewer challenges.

A: Yes, that's a method of leadership, isn't it? (B: that's right). Human factors are crucial in any task, even when incorporating digital technology. While technology may play a part, there are still many areas where human input is essential. If the role of humans isn't emphasized, any form of implementation, no matter how advanced the technology, is likely to fail, right?

B: That's right. Actually, I don't know what the future holds, but at the current moment, regardless of how advanced technology becomes, humans are still necessary. Take, for example, a South Korean factory that has nearly fully adopted digital technology. Previously, let's say they had four workers on a production line. After implementing digitalization, they may only need one worker for four production lines. However, regardless of this automation, they still need humans. They still need at least one worker

there because they can't afford to have no human supervision. Even though machines are becoming incredibly smart, they still can't match the flexibility of humans.

A: Yes Miss Hoa, In my view, the machine is a standard process wihout flexible but people can work in flexible environment to solve complex problems.

B: Exactly,

A: Your anwsers are so intersting. Thank so much for your time and support

A: You are well come.

10. Ly Truong Hau – CEO of Trung Anh food Ltd., - khangproql@gmail.com

A: Good morning Mr Hau, I am Hoa and a student of SSBM, I have been studdying in digital technology in Viet Nam F&B. Could I aske you some research questions?

B: Ok, you are wellcome.

A: According to you, what extent are digital technology of adoption in collecting, processing and process data regarding product design in Viet Nam F&B industry?

B: In general, the F&B industry in Vietnam is undergoing a significant transformation. The application of digital technology in areas such as sales and customer feedback is both a trend and a necessary requirement for F&B businesses to maintain their position in the market. However, it must be acknowledged that the level of digital technology adoption in the F&B industry in Vietnam is not high, especially among small and medium-sized enterprises. Many of these businesses face difficulties in investing in and implementing digital technology systems due to resource and knowledge limitations. Nevertheless, these companies are well aware of the benefits that digital technology can bring to the production and development of their products. They are actively researching and experimenting with digital technology solutions that can be flexibly and effectively integrated into their processes. For example, the use of basic information management systems has already improved the tracking of raw materials and production process management. Despite the relatively low adoption rate, F&B businesses in Vietnam are striving to ensure that digital

technology becomes an integral part of their development strategy, helping to enhance product quality and optimize production processes efficiently.

A: Based on the information you provided, it seems that the current level of technology implementation in F&B industry is around 30-40%. What are factors impacting this digital technology process?

B: The factors influencing the adoption of digital technology are quite broad. There are some key impacting the process. Firstly, financial resources are a significant challenge. Investing in technology sometimes requires substantial expenditure and a long-term plan for return on investment. This poses a challenge for small and medium-sized enterprises like ours, where financial resources may be limited. Secondly, there is a challenge in training personnel. Transitioning to digital technology sometimes requires deep knowledge and technical skills that current personnel may not possess. Training employees to use and manage new systems also requires time and resources. Lastly, difficulty in integrating current systems and processes with new technology is also a challenge. Sometimes, the transition requires flexibility and willingness to change established workflows. However, we see these challenges as opportunities for development and productivity enhancement. We are continuing to invest and make efforts to overcome these limitations, ensuring that we can maximize the benefits that digital technology brings to our food industry.

A: You mentioned about people factor, could you share more?

B: Firstly, regarding the aspect of personnel, this is a crucial aspect of every business, and Trung Anh Food Ltd is no exception. We place great importance on the development and enhancement of our workforce's skills. We understand that to effectively implement digital technology, we need a knowledgeable and skilled team. Therefore, we have implemented training programs related to digital technology and information management to enhance our employees' capabilities. This not only helps them understand the new workflow better but also enables them to apply that knowledge to their daily tasks. Additionally, we have created a flexible work environment and encourage creativity. This empowers employees to experiment and apply new technological solutions to their daily work confidently. We

also place a significant emphasis on building a positive and supportive work community. Collaboration and knowledge-sharing among departments and levels within the organization are key to quickly adapting to technological changes. Overall, people are our most valuable resource, and we are committed to investing in the development and skill-building of our workforce to effectively achieve our digital technology implementation goals.

A: You mean, the vision of leader is crucial factor such as business strategy

B: Exactly

A: Firstly, it's about the customers, meaning that we rely on their requirements to determine how to tailor the transformation of our company accordingly. Secondly, it's based on the needs of the business itself, meaning that the business defines what requirements are necessary to develop its operations. Then, we can formulate a digital transformation strategy accordingly. Similarly, you mentioned the influence of individuals, the executives who implement strategies within the company, and how the business owners devise appropriate digital investment strategies, right?

B: Yes,

A: In your view, when the business applyied digital technology in collecting, processing customer data regarding product design. How does it impact business operation?

B: Integrating digitization into the customer data collection process plays a crucial role in the development of F&B businesses in Vietnam. This brings about many positive impacts on both production and marketing processes. Firstly, through digitized customer data, F&B enterprises can better understand the needs and desires of their customers. This enables the optimization of products, from adjusting ingredients to packaging specifications, to accurately meet customer expectations. Secondly, utilizing digitized data provides detailed insights into consumer trends and shopping behaviors. Businesses can quickly adapt and innovate to respond to market dynamics, from creating new products to more effective marketing strategies. Thirdly, the digitization process helps optimize supply chain and inventory management, minimizing waste and enhancing efficiency. This allows F&B

businesses, both large and small, to reduce costs, increase competitiveness, and deliver better value to customers.

Finally, digitization opens up new opportunities for market access and advertising through online channels. This expands the reach of businesses, attracts new customers, and fosters a flexible business environment. In summary, digitizing the customer data collection process is not only an effective tool but also a key to unlocking new opportunities and comprehensive improvement for F&B businesses in Vietnam.

A: I do agree with you. So, you think the business need what to do to achieve the success in applying digital technology?

B: To ensure the success of digitizing the customer data collection process in the F&B industry in Vietnam, businesses can implement several specific strategies. One of the most crucial steps is to build a robust and flexible data collection system. Businesses should utilize modern technologies such as information management systems, mobile applications, and e-commerce platforms to track customer information. For example, using a mobile app to collect reviews and feedback from customers after each transaction. Integrating artificial intelligence (AI) and data analytics helps businesses better understand the market and consumer behavior. For instance, using AI to predict customer shopping trends can help businesses adjust menus or pricing strategies quickly. It's essential to establish a close customer interaction strategy. This includes using data to personalize shopping experiences and create special promotions for different target groups. An F&B business can use data to identify and serve customer groups requesting organic products, low-fat options, or even dietary preferences. Encouraging interaction through social media

channels is a vital strategy. Businesses can use data from online reviews, comments, and feedback to improve product and service quality. For example, a restaurant can respond to customer feedback on Facebook or Instagram to enhance interior design or menu offerings. Additionally, ensuring safety and legal compliance when handling customer data is crucial. This helps build trust from customers and avoids privacy risks. Businesses need to ensure they have strong security measures and comply with data protection regulations. Finally, to maximize the benefits of digitizing the data collection process, businesses need to regularly update their strategies to reflect changes in the market and consumer trends. This requires flexibility and adaptability, helping F&B businesses not only maintain but also strengthen their position in the competitive market.

A: Thank you so much for your time and answers.

11. Đang Thi Thanh, Deputy of Purchasing Department, Tran An Bank Keo Company

A: Good evening Miss Thanh. Thank you so much for your acceptance

B: Ok Hoa,

A: Could you please share some of your opinions on whether F&B companies in Vietnam are currently using digital technology for data collection and processing to serve the purpose of product development to meet customer needs?"

B: F&B companies encompass various sectors. However, in my industry, which focuses solely on confectionery production, I would evaluate based on that sector. The utilization of digital technology in this sector is relatively low, not high. Especially for large companies with foreign investment, I'm not very clear on how they apply and operate digital technology. But generally, for state-owned enterprises, and privately-owned enterprises, the use of digital technology for data collection to develop products is almost negligible. Product development mostly relies on the expertise of individuals, often introduced from various production lines, and then investments are made based on that

experience to create products. There is minimal reliance on data collection for product development, from what I've observed.

A: Yes, according to my assessment, F&B companies in the confectionery sector, for the most part, have not yet utilized technology to gather customer data based on their consumption behavior for the purpose of developing suitable products. Currently, the way they develop products for the market heavily relies on the strategy of the company's leaders or owners. They may draw inspiration from competitors, individuals within their organization, or feedback they receive.

B: From suppliers of machinery and equipment, or through overseas visits where one may observe products that could potentially be applied in Vietnam, companies can gather insights. However, I understand that companies seldom invest in research and development process.

A: According to your perspective, have they been employing this design methodology to develop products that align with customer demands?

B: Actually, it's quite difficult to say because when companies introduce a product to the market, it's based on their personal experiences and assessments. But in the Vietnamese confectionery industry, for example, I've noticed it's been a cycle of ups and downs. Many production lines remain idle. For instance, in my own company, the situation is similar. Some production lines brought in are highly successful, while others remain idle shortly after deployment, proving unsuitable. Perhaps they might be suitable for a certain market but not for Vietnam. Ultimately, it comes down to the evaluation of company leaders, which I believe is somewhat subjective. It's been a fluctuating journey, especially in the Vietnamese market. I've seen even some fairly large companies face similar situations. Some production lines fail, while others succeed. For example, our company once invested in a pineapple cake production line, which is a highly popular product in Taiwan. However, in Vietnam, where pineapples are abundant and inexpensive, it's not a favored product among Vietnamese consumers.

A: So, do you think this happened because of a lack of information gathered from customers, right? The development and introduction of the product to the market are led by someone who applies a foreign production line. The foreign country is selling this product well, and they bought the production line to manufacture it in Vietnam. However, they haven't conducted any research on Vietnamese customers, have they?

B: Mostly, it's based on experience rather than research because, in reality, the cost of gathering and conducting research is very high. And that budget is very difficult for some industries. For example, the confectionery industry in Vietnam doesn't generate enough profit to invest in professional research and development. Most businesses don't have that budget. So, they don't do it. Similarly, in my company, research and development work is based on experience, and the R&D team relies on their own experience and the existing production chain, rather than any specific research.

A: As per your mentioned, there are two factors, first: vision of leader and second: capital?

B: It's not just about the lack of funds, but also the investment in digitalization to gather information and develop products is non-existent. In a business, capital is one concept, while the funds for digitization and measurement processes are not available for investment. For instance, a company might research or purchase a production line for 1 billion, but the research costs might escalate to 2 billion, for example, so that particular business wouldn't proceed with it.

A: It means that here you are talking about the considerable investment required for such endeavors, so businesses, especially those in the confectionery industry in Vietnam, are cautious, and some may not even have the resources to allocate to these areas. So, do you think that businesses willing to invest in digitizing data collection processes would produce products that meet customer needs? Do you believe that if they're willing to invest, their products would truly align with customer needs, or would it still be a hit-or-miss scenario as you've described?

B: Actually, having data would definitely improve the prospects of investment. Consequently, the success rate would be higher because it would align more closely with

customer needs. Of course, the success of a product doesn't solely depend on collecting data about it; there are many other factors at play. However, with better input information, the success rate tends to improve, and investment decisions become more accurate. It's clear that information contributes significantly to the success of a new product. Nevertheless, predicting the success of a production line is quite challenging because success depends on numerous factors. Even if a production line yields a highly suitable product at a given time, various influences can affect its performance during production.

A: According to you, there are so many influence factors such as input, material, operation, people, and even the bussiness strategy of boss. Could you share more the impact of people?

B: Of course, human factors have a significant impact. When introducing a production line, for instance, the question arises: can the workforce adapt to it? Especially in today's confectionery industry, where manual labor predominates, automation is relatively low. And that's not even considering the quality of the machinery we import.

A: According to my evaluation, there are indeed numerous factors influencing the success of digitization for gathering and processing customer data. Firstly, it comes down to the issue of funding, whether businesses are willing and able to invest. Secondly, it involves human factors. Here, I consider the capabilities and qualifications of the workforce to be crucial in adopting digitization. Thirdly, the input materials also play a significant role in influencing the final product.

B: Exactly.

A: Yes, the input materials often depend on import recourses. Let's assume that your company or confectionery businesses, in general, have implemented technology for data collection to develop products. If they have done so, according to you, how does it impact their business operations, specifically, what are the effects?

B: Absolutely, digitizing data collection not only helps align products with consumer needs but also improves the analysis of information related to the success or failure of products. In business management, having such information is undoubtedly beneficial. It's better than

having nothing, isn't it? If all decisions are based solely on intuition or personal experience, how can they be as effective as when supported by data analysis? Having numerical data for analysis certainly enhances decision-making processes and increases the likelihood of success.

A: I completely agree with your observations and the insights shared. Your research findings align with my views on the state of digitization in F&B businesses in Vietnam, particularly in the confectionery sector. It's evident that digitization is more prevalent among FDI (Foreign Direct Investment) enterprises, especially in the beverage sector, where it's extensively used for collecting and processing customer data to inform product design.

However, the conclusion drawn that most domestic F&B enterprises in Vietnam have yet to proactively embrace digitization in their operations resonates with the reasons I've outlined. Firstly, it's due to the business strategies of the owners, and secondly, the lack of financial resources allocated for developing digital activities poses a significant obstacle for Vietnamese enterprises. Your insights provide valuable confirmation of the challenges and opportunities surrounding digitization in the F&B industry in Vietnam. Thank you for sharing your research findings!

B: In fact, the business landscape in Vietnam still lags behind some other countries. More developed nations bring their established strategies and mindsets when entering Vietnam, benefiting from a foundation already in place. However, Vietnam started from a centrally planned economy and transitioned, so its business mindset and foundations are still influenced by the past. This affects various aspects, including marketing activities such as market research and the adoption of digital technology for customer data collection to develop new products. This situation isn't unique to just the confectionery industry; it's prevalent across most Vietnamese businesses.

A: So, in terms of mindset and strategy, most F&B businesses in Vietnam primarily rely on traditional thinking. This means they base their approaches on how competitors are

performing and how the market is evolving, rather than relying on analytical thinking or analyzing data collected about the market and customers.

B: I think, technology will not difficult to collect and analysis data more than peole. Because, people have an emotion but technology operates without them.

A: Do you think that if F&B in Viet Nam use traditional method to collect and analys customer to design products, they will be failed in their business operation?

B: Indeed, the situation seems to be deteriorating. With the reduction in import taxes for confectionery products entering Vietnam, there's been a significant influx of foreign confectionery products flooding the market, often at competitive prices. Consequently, Vietnamese confectionery businesses face fierce competition and struggle to maintain their market share. For instance, in recent years, my company has refrained from investing in new production lines.

A: So, you can envision a rather challenging future, right? If Vietnamese businesses continue to rely on traditional methods to develop and introduce products to the market, it's likely that their market share will diminish over time. Do you think the market share will shrink further, and do you believe that one day, F&B businesses will have to yield their place to foreign enterprises?

B: Predicting the distant future is indeed challenging. Who knows, maybe in 1-2 years, Vietnamese businesses will experience significant leaps in development. Certainly, taking action is better than doing nothing. However, the reality is that Vietnamese confectionery businesses are currently facing numerous difficulties when competing with foreign enterprises. Yet, it's evident that Vietnamese businesses have not yet made significant strides to address this situation. The same applies to my company. Looking at financial reports, it's noticeable that F&B businesses haven't seen much growth in revenue.

A: So, this is a very challenging issue, isn't it? When I go to the supermarket, I mainly see products from foreign companies, while Vietnamese companies are not as prominent. And Vietnamese people seem to prefer foreign confectionery products.

B: Part of it is due to a preference for foreign goods. For example, confectionery products from Malaysia, Indonesia, or Thailand may not be very exciting, but Vietnamese people still enjoy them. Another issue is that urban areas have better access to these products, whereas rural areas have less access. Therefore, Vietnamese companies still have opportunities in those areas.

A: So, as you shared, I feel like there's still a niche market somewhere. The niche market lies in rural areas. So, if F&B companies in general, and confectionery companies in particular, recognize the importance of developing products based on data collected from digital technology, they will have better opportunities to cater to consumer needs, right?

B: In short, they will invest in the right direction. Simply put, when you have knowledge, you'll invest in the right direction. Which market needs what product? If you're competing in urban markets, what products do you need? If you're competing in rural markets, what products do you need? What are the characteristics of the target audience so you can have a corresponding approach and invest in the market more reasonably?

A: Your answers are very helpful for me. In reality, we focus on the current situation of F&B businesses to understand the difficulties, and from there, we can come up with solutions. If any businesses have already fully invested in digitization, then it wouldn't be the problem I'm researching, right?

B: Most businesses in Vietnam are lacking in that aspect.

A: I conducted a survey at F&B businesses, and mostly, they haven't invested in digitization, or if they have, it's only superficial. That means they've invested, but it hasn't been effective.

B: If there are, then probably large enterprises, like dairy companies. They have significant capabilities and profits, so they can invest in digitization. However, the profit margin in the confectionery industry is very low. Just investing in a small marketing program is already a headache. One thing affects another. Moreover, regulatory agencies don't provide any support or programs with tangible figures for us to use.

A: You're talking about the government's policies, meaning there's no support for digitization in businesses, right?

B: That's correct. For example, if this sector needs certain information, the relevant government departments don't provide any support.

A: So, businesses are left to fend for themselves, right? Lastly, could I have your full name, your company's information, and your position, please?B: Đặng Thị Thanh. Phó phòng vật tư Công ty tràng an

A: Thank you so much for your time and your answers.

12. Le Van Thanh, North Business Director, KIDO Group

A: Hi Anh Thanh. Could I interview you somes reasearch questions?

B: Ok Hoa

A: With extensive experience in business management, would you share the F&B enterprises in Vietnam have been implementing digitalization in collecting customer behavior data to serve product development?

B: From the perspective of our business, the products we are currently marketing are only beginning to approach digitalization. As for system management, we also utilize software and technology apps to integrate into our business operations and management.

A: Uhm, so from the perspective of a business manager like you, when a product hits the market, do you pay attention to consumer behavior?

B: Absolutely, yes.

A: Then, how do you collect consumer behavior data?

B: Consumer behavior? I think that's something that someone from the marketing department would be more adept at handling, don't you agree? Research on consumer behavior falls within the marketing department's realm, while I'm more concerned with the sales aspect. That is, the distribution channels act as intermediaries. Consumer behavior is

something that marketing professionals are more deeply involved with. They conduct studies on consumer behavior as part of their marketing activities. As for us in sales, we don't delve too deeply into that area.

A: So, could you share with me about the channels that you are selling through, like stores or retail points, do they provide any feedback on your products? And when you receive it, do you listen and use that information to relay back to the product development team?

B: Uhmm. Definitely, Actually, customer information, especially from those who sell our products, essentially comes from consumer opinions. Eventually, this feedback makes its way back to us. Certainly, in the process of working and interacting with the sales points, we will collect this information to provide feedback to relevant departments such as marketing, to make appropriate adjustments and develop products that align more closely with consumer desires and needs.

A: So, what are the methods you currently use for collecting and receiving information? I mean, do you use an app or some software, or do you receive feedback directly through face-to-face communication, emails, or through events that you organize?

B: Uhm, currently, we tend to gather such information mainly when launching new products or organizing a program. And, as for the sales department, we lean a bit more towards direct customer consultations, rather than using any app or software.

A: So, if I understand correctly, the method you're using to receive customer feedback is still traditional, where you listen to them directly. For example, you meet them, they provide feedback, and you then relay this information to another department for them to research and develop suitable products, right? Do you think it would be necessary, someday, for your company to support an app or technology application to help you receive information online to avoid time delays?

B: I think it's definitely going to happen in the future, it's just a matter of sooner or later. Currently, if there's a day the app fails, we'd be like blind people, without any data or information to manage. If we don't have such an app, we are currently losing three to four layers just to receive customer information.

A: So, you believe that the application of technology in managing your business or in receiving customer information is very important. It allows you to get immediate information, benefiting your side in terms of real-time. Do you think human factors influence the adoption of this technology? For example, when your side adopts this technology to directly receive information from customers, what do you think are the critical factors for further success? According to you, which factors are most important to achieve the best efficiency?

B: I believe there are two important factors. First is the continuous improvement of technology, and second is the human aspect.

A: Could you explain further why you chose the human factor as an important element affecting future development?

B: In our current system, all activities of the external team are fully managed by us. However, during the operation control process, whether management levels utilize all the data and resources from the app or not is crucial. If they don’t make full use of it, it means the staff is not working at full capacity and not optimizing efficiency, leading to undesirable results. That’s the human factor. As for technology, I’ve already mentioned that to you before.

A: Exactly, so we can understand that the human factor is critical to the success of digitalization in a company's processes, right?

B: Actually, it's not that it's meaningless, but the policies we've implemented are somewhat ineffective, not fully optimized. Surely, without the app, our work wouldn't be as efficient, but having it without knowing how to use it means we can't fully optimize its benefits.

A: Do you think there's a need for training people?

B: Training is definitely needed, but with our current operational system, training sessions happen weekly. At the management level, we almost act like trainers, and alongside, we have field practices to make things more comprehensible for everyone.

A: As a business manager, especially for a product like ice cream, which is perishable, are you worried about competition from both domestic and international competitors? And if so, do you think there needs to be improvements in how you compete, since, as far as I know, Vietnam already has quite a few good producers?

B: To share with you, we are proud to say that we have a very skilled team. Almost all new products are successful and warmly welcomed by customers, and we have been maintaining a very good life cycle, holding 45% of the total ice cream market share in the country. With such a skilled team and products that truly understand Vietnamese consumers and the market, current competitors exist but aren't strong enough to worry us. However, for sure, in the future, if we refuse to innovate or change, the scenario of competitors growing stronger could indeed happen.

A: So, does your R&D team ever read and consider customer feedback?

B: Of course, they do.

A: I understand that your R&D team also collects information directly from customer interactions to listen to their opinions, right? How important do you think it is to invest in technology in terms of budget?

B: I believe it's necessary. Our company is a leader in applying technology to management and sales systems. Whether it's R&D, marketing, or any department, when technology benefits the company, our owner is ready to invest.

A: So, it can be said that the business strategies of the leaders of a company also recognize the importance of investing in technology for the company's business operations. Could you share your perspective on the F&B sector, particularly how they are developing their products?

B: Uhm, sorry, as I mentioned at the beginning, I haven't looked into this much, so I don't have an answer to share with you.

A: The information you've shared has been very helpful to me. May I include your answers in my thesis, and may I translate them into English?

B: No problem, I'm okay with that.

A: Thank you so much.

13. Nguyễn Văn Thọ – TP Sản phẩm – THFC (Via Email)

14. Thai Nhu Hiep – Nhà sáng lập café ; Chủ tịch HĐTV Cty TNHH Vĩnh Hiệp kiêm Phó chủ tịch hiệp hội Café Caacao Việt Nam; kiêm Nhà sáng lập L'amant Café

A: Alo

B: Yes

A: Hello, Let me introduce myself briefly. I am currently researching the digitization of the F&B sector in Vietnam, focusing primarily on digitizing data collection processes to serve the purpose of developing food and beverage products in Vietnam. I would like to ask you a few questions related to my topic.

B: Uh. Go ahead and ask.

A: Firstly, as the leader of a very large and famous company in Vietnam, could Mr. Hiep share some knowledge about the extent of digital technology application by Vietnamese F&B businesses in the process of data collection and management for the purpose of product development? How are they currently applying technology?

B: Uhm. Generally speaking, it depends on the specific food sector. Specifically for the coffee industry, which I am part of, the digital transformation and data collection in the F&B sector are very cyclical for each group. In my coffee sector, it's no longer just about producing clean products but it's about offering a service that carries the responsibility of digital transformation. A product that embodies digital responsibility starts from a specific region, and this involves several aspects. First, it must incorporate digital transformation in terms of employing or not employing child labor, transitioning from inorganic to organic agricultural inputs, and gender equality in coffee cultivation. Data collection now starts from the input materials, which are related to carbon emissions and carbon certifications on coffee packages. It is calculated from the input stages, from a garden where how many coffee plants are grown, how many intercropped plants per coffee plant, the optimal

amount of water usage for coffee, the amount of organic fertilizer used, and all this data is collected through an app on a phone. The first producer must update all this data on the software, on the app that the company has provided to the farmer. It's very specific about carbon, fertilizer, water quantity, and the number of plants, ... So from the beginning, this data is digitized and sent back to a factory and from there it is transported using vehicles powered by clean energy or fossil fuels. The packaging for the dry product must be certified for carbon certification, when packed with the materials to be transported to the factories, and the factory will process it through many stages to clean the coffee. They will calculate the carbon emissions for the coffee package as positive or negative from these stages. Usually, if the carbon emission is positive, the factory uses electric energy. But when electricity powers machines through technology like electric motors converted by inverters, whether it emits carbon or not, if it's positive, we must use the negative data from production to calculate whether a product's emissions are positive or negative. Regarding the use of child labor, agricultural inputs, gender equality, or water usage, each garden will provide its own answer and data. And when the product reaches the factory and is transported to the cold storage for fermentation, the cold storage currently uses clean energy and the materials in the cold storage are clean or will cause carbon emissions, all of which must be considered. During the three months of fermentation, how much electric energy is used to maintain the coffee packages, and which country's technology the factory uses, and whether those technologies have been certified for carbon emissions. If not, we will not use them. If the machines have been certified for carbon emissions, we must trace the origin of the machinery and technology used to finally certify the coffee package. And from the beginning of labor usage, whether by manual technology or EOM technology, we also have to continue the digital transformation to bring out a responsibility related to emissions and to the coffee package, from the initial raw materials to the final calculation, making a coffee package with a net-zero emission index.Conversely, now when we export this coffee package to another country, if it's positive in emissions, we are obliged to buy back European emission allowances to offset this package. If it's negative, we get to add or

sell the coffee package in the emission index, allowing us to increase the value of the final coffee production stage. I've explained it like this, do you understand?

A: Yes, I've understood that as well. So, based on what you've shared, my understanding is that the level of technology application here can be considered advanced, covering a full process from input selection to achieving standard quality output, while also ensuring environmental sustainability, right? But could you share more about whether this level of technology application is only being applied by large companies like yours, or is it applied across all coffee production companies specifically, and food and beverage production companies in general? Are they already implementing such standardized technology processes, or is it only the large companies that are applying them for now?

B: It means that companies currently exporting to markets including the European market must fully apply digital transformation from the very origin of the raw product to the final product by the deadline of December 30, 2024, mostly for the European markets. For other markets like the US or Japan, it is not yet mandatory. For example, tracing the origin of the product from farmers, such as the map of the raw material area, the geographical indication of the raw material area, will be handled by the local authorities of the raw material region. The tracing of origins and statistics of the planting area map will be conducted by a global organization specialized for buyers, and the buyers will apply it to the sellers (like in our case). As for the part from the factory to the final product, we have to hire someone to develop the software for us.

A: So, what you're sharing is that businesses exporting to the European market, like yours, have already applied technology in digitizing the process of data collection and processing to develop products, right? The goal is to ensure that the output products necessarily meet the quality standards of the markets you are exporting to, correct?

B: It's no longer just about quality because once you meet the digital transformation requirements, quality is no longer an issue. For instance, the input must use a minimum percentage of biochar, not chemical charcoal; the water used must be controlled, and so on.

For example, you might not be able to control how much water is used for your coffee plants, how many liters of water are used, and in what manner. You might not know exactly how much water a plant absorbs to be sufficient, and how much is necessary for the plant to maintain its moisture level. Then, there's specific technology developed by a specialist for this purpose, sold to businesses so they can manage their orchards.

A: Understood that, you mean, if business applied standard technology like Eropean's requirement, we could adapt the quality of product of international.

B: But this technology requires completion from the Vietnamese government and the EU partners. There must be a dataset provided for us to implement the process according to that data. Regarding the Vietnamese government, it should support businesses first in terms of planning and investment, particularly in mastering land funds, including both forested and deforested land for coffee cultivation; the Ministry of Natural Resources and Environment must be involved, and the forestry sector must also participate because many local governments need to act on the areas that businesses currently have. All become an interaction of the Vietnamese government according to the data provided by the EU, and we apply it so they will operate according to the exact data provided by the EU to determine which areas are safe and which are not. For example, Brazil or Colombia, which have vast fertile fields, are easier to manage. In our case, where someone has 1 hectare and another has 5 sao, it will be very difficult to transition due to financial issues and the challenge of verifying land ownership and conducting soil quality checks to see if it meets the conditions for coffee cultivation. If you've given me the precise indices and data, then I'm sure you will proceed.

A: So, what you've shared means that I understand the role of agencies in Vietnam as well as the role of foreign entities, primarily European associations, is very important. Specifically, they need to support businesses in matters related to determining, monitoring, and ensuring that the input quality meets the technology standards you have applied to produce standard products, right?

B: Yes, indeed. You must use technology because you cannot do everything manually.

A: Yes, exactly! But, according to you, this applies to products that we export to demanding markets like Europe, for example. But for businesses that produce for the domestic market only, how do they apply technology in collecting data to develop their products? For instance, in collecting data from customers, how are they applying their current technology for businesses that manufacture and distribute domestically?

B: I'm talking about data collection in a chain. For the domestic consumer goods sector in Vietnam, the level of digital transformation for small and medium-sized enterprises (SMEs) is still very low. Because firstly, some businesses partner with banks for support in data collection. Secondly, banks have products that utilize payment processes. For example, if I build a coffee chain, I want to digitize and collect data from customers who drink this coffee, customers scan on the coffee package to know who produced this coffee, from which raw material area and who grew it, then this part largely splits into many different groups but it also depends on different sectors. The coffee industry mostly relies on banks that are currently digitizing for data collection to identify customers for a trusted chain so that they can lend products for payments related to that chain to be linked with the bank, and we also get support from the bank with the available data provided by the bank. However, ultimately, for the domestic market, digital transformation and customer and product information collection for consumers are still very low, they only use the most optimized software for payments, bank linking, customer reviews, and feedback on satisfaction after consumption, and data on thanking customers for using the product. Those are just basic, whereas deeper insights into products for consumers require those in charge of the chain to digitize that data for what? To calculate the cost of services, office expenses, salaries, other costs... almost all of that data is good, currently used abroad, they don't need to manage people anymore, and the habit of using this data by Vietnamese people is still low. We usually, when spending money, prefer to sit in one place to be served, so sometimes the culture of Vietnamese people doesn't need data. But for capitalism, if you drink a cup of coffee, you must order, pay, serve yourself, and scan the code on that coffee cup, it will transfer all the data to your phone, if you're satisfied, you'll

indicate so, before you leave, they also calculate the time to send a thank you and interact through software if you're not satisfied.

A: So, according to you, the factor related to consumer behavior also significantly impacts the application of technology, right?

B: Correct, it determines whether the consumer culture supports digital transformation. The café owner wants it, but the consumer, especially in Hanoi, does not (sometimes they want staff to take orders and even pay in cash instead of using a card), which makes digital transformation difficult for that F&B channel. Ultimately, it's about human culture, wanting to change to a smart technology imposed by humans, but to succeed, it starts with consumer participation to make digital transformation transparent. But sometimes, the owner's behavior is irresponsible due to tax issues, so there is no societal responsibility, and tax evasion should not happen. So, in Vietnam, we need to have this mindset to operate the F&B digital transformation channel. If so, then ordinary services that satisfy customers, like buying a phone, are just common. But understanding and recognizing whether the coffee is drinkable and whether I am willing to pay that amount for the coffee is an issue.

A: Exactly. So, customer behavior is really important, impacting the digital adoption by F&B businesses, right? If their behavior creates favorable conditions, businesses will adopt digital solutions. Conversely, if their behavior, as you shared, is just to sit and be served, then there won't be much action or desire among businesses to undergo digital transformation and digitalization, right? So, according to you, when businesses, for instance like yours, have adopted digitalization in collecting data and product tracking, how does this digital shift impact your business operations and the F&B industry in Vietnam in general?

B: Speaking of the impact on a large and prominent business like mine, it's very effective and beneficial for a company's operation and brings a lot of advantages in changing the culture of a business chain. Instead of scheming and plotting to evade taxes, this becomes a part of the business culture for owners to recognize their responsibilities to this country. We need to think about our responsibilities as Vietnamese citizens on this territory to build

our country. Typically, the culture abroad is like that; transparency in taxes, revenue, and a comfortable culture is needed. A digital shift is necessary to eradicate old-fashioned cultures. To break through, owners need the wisdom to transcend beyond money to take on more responsibilities.

A: You're talking about sustainable development, right?

B: Sustainable development is an issue where not a single link can be missing. It's closely related to digital transformation, but ultimately, it's necessary to develop a digital product that small and medium-sized enterprises (SMEs) can access. Currently, large enterprises have managed to do this because they have risk management in their industry sectors, and they allocate profits to manage digital transformation within their companies. This is very difficult for SMEs, even though they are very eager.

Many countries are now investing in technology for manufacturing and business enterprises related to consumer goods. They almost always have an application product for SMEs. After this product is developed and launched into the market, they earn from it, and all SMEs are ready to change towards digital transformation, and consumer behavior gradually changes as they see new and innovative things. Finances also decide the consumers and the owners of these chains. If there is a product supporting digital transformation that earns money by being sold on the market, it will surely be sold, and people will be satisfied with this product.

A: So, what you're sharing is that the impact on businesses concerns financial policies from banks and the government. They should consider having support funds for SMEs in the F&B market, a sort of investment capital for them to implement digitalization of data collection and processing to serve the construction of products that are suitable for the market and customers, right?

B: Exactly. It's not difficult. Digital technology is created by humans, so in the process of development, enterprises will also understand what to write to make it easiest for consumers to understand and suitable for their business without being overly complicated.

Now, if you go abroad and order a coffee, they give you a QR code. You'll be curious, scan it, and get information related to the coffee that consumers can grasp. In Vietnam, we haven't been able to do this because our production is fragmented, not concentrated, and the cost for digital transformation is very high. If we had such a fund and allocated it to F&B businesses, then when you sell a product, I would collect money from you for that product, making digital transformation more convenient. Then, consumers would feel more comfortable. However, consumers need to change their behavior and cultural practices. There needs to be a mindset of self-service.

A: So, what you're sharing here is that a very important factor influencing this digitalization process comes from two aspects. The first aspect is the consumer behavior itself; the consumption culture needs to change to be appropriate. The second aspect is about policy, meaning that the state policy also needs to adjust. I'm not just talking about private banks since they are also businesses, but from the government's perspective, or even state-owned banks, the role of the bank is very important. There should be policies related to credit support, special incentives for digital transformation. Exactly, I completely agree with your viewpoint on this sector. Then, in your opinion, what do Vietnamese F&B businesses need to do to ensure success in implementing digitalization in data collection and development? Because, as you shared, many businesses are fragmented in applying this technology.

B: First, the culture of the enterprise must be clean, meaning it must be responsible to the country, the industry, and the consumers. Most of them do not want to make their digitalization transparent. Their core issue is twofold: wanting to do it but not having the money, and having the money but fearing taxes. All operate according to its value chain, but there are products that are tax-deductible and supported by the state. For example, in countries like the UK, if your coffee has sugar, you will be taxed very high, conversely, if it doesn't have sugar, you will be supported very high. It means they have pre-calculated the safety and health protection for their people. Japan does the same, they advise and support restaurants that want to make a soup pot to use vegetable water like corn or something, then they will support and promote it to avoid the use of fats that can affect health, and if fat is used, they will tax that product high. Regarding food safety, we are

currently too poor, we just need to have food, we'll worry about death later. When rich, then afraid of death, then need to control the source of what you put in. Just like playing with branded goods, the price is no longer important to them, they just need it to be a reputable brand, and when they own that item, they are also reputable. It's the same with the F&B channel.

A: So, for businesses to succeed, according to you, do company leaders need to have the right business strategy orientation, or do they need to mobilize capital or train their employees? What do they need to do to ensure the success of their digitalization process in collecting data from their products?

B: All businesses know what to do, but whether they do it is another matter. When they do undertake these processes, they might encounter issues they can't resolve. Consumers also want this, but financial and economic difficulties mean they are not yet ready. If they want to proceed, everything must be synchronized based on transparency and culture. Every step will have a consultant to support and write as you wish, but it must be transparent. The two decisive factors for digital transformation in the F&B sector are self-awareness, decision-making, understanding tax incentives, tax deductions, and balancing one thing with another to ensure full transparency.

A: Transparency is the keyword that leads to success for F&B businesses moving towards digitalization, right?

B: Correct. They know it costs money but it will be beneficial for the future in terms of service, culture, operation, and corporate responsibility to society and the country. Owners need to take great responsibility for their brand and country. They need to determine whether their brand is progressing or regressing. All businesses know what to do, but there are things they don't do due to objective reasons. Equality in everything.

A: I fully agree with your insights that businesses aiming for success in digitizing their operations, especially in data collection and processing from their products, firstly need transparency in their business practices. Particularly, business owners must possess

integrity and vision, along with a responsibility towards society and the national community. Only then will they be ready to invest in and introduce products that align with consumer health, right? The benefits of this approach are numerous, as you mentioned, with one of the greatest benefits being the enhancement of the national product's image and brand, correct? This perspective, I believe, is currently held by large enterprises like yours. In contrast, most small to medium-sized businesses are still preoccupied with their day-to-day financial concerns, so it's likely that small F&B enterprises have never linked their responsibilities to the development or prosperity of a country, right? Only large enterprises like yours are doing this because you are developing for the nation, for the people, and brands like Vietnamese coffee, not just focusing on making money. The money is there to cover the daily operational costs and employee salaries, right?

B: The pursuit of profit is linked to intelligence. Without intelligence, we rely on sheer hard work and tears to make money. But when we have enough wealth, intelligence takes over, and earning money becomes a secondary concern. You then focus on how to add value to a product for a country and ensure consumer health, which in turn, brightens your intelligence. For small and medium-sized enterprises in the money-making phase, their intelligence is not yet unleashed.

A: May I have your permission to translate some of your responses into English for my study? Your insights are profoundly macro-level, especially coming from the owner of a major, clean coffee production enterprise in Vietnam today. Would you agree to this?

B: Ok, no problem.

A: Could you please tell me how I should mention your name, including your role and the company name?

B: I am the founder of Lan Anh Coffee, Chairman of Vĩnh Hiệp Co., Ltd., and Vice-chairman of the Vietnam Cocoa and Coffee Association.

A: Thank you very much, Sir. Goodbye.

APPENDIX C

SURVEY QUESTIONS

Dear Sir/Madam,

I extend my greetings to you all. I am Do Thi Hoa, a doctoral candidate at the SSBM University in Switzerland. Currently, I am engaged in a research project centered around the digital transformation within the F&B industry in Vietnam. I kindly request a small portion of your valuable time to assist me in completing the following research questionnaire. Every opinion you provide holds immense significance and relevance to my research endeavor. I assure you that all information shared will be treated as confidential and will solely be utilized for research purposes. Should you have any inquiries regarding this survey, please feel free to contact me: Do Thi Hoa, email: flowerdo80@gmail.com.

I sincerely appreciate your invaluable assistance.

Warm regards,

Do Thi Hoa

The survey questions includes two parts such as:

The part I: The survey information and assessment about factors that influence on the consumer behavior

The part II: The survey information and assessment about factors that influence on the role of digitalization in data collection and processing to build products

THE PART I: TO DETERMINE THE CONSUMER BEHAVIOR Please provide your opinion on each of question as follow agree level 1. Strongly agree = 5; 2. Agree = 4; 3. Neither agree nor disagree = 3; 4. Disagree = 2; 5. Strong disagree = 1						
Signed	**Factors**	**Strongly agree**	**Agree**	**Neither agree nor disagree**	**Disagree**	**Strong disagree**
Do you think that consumer behavior is an important factor in building products and services?						
CB1	Yes	5	4	3	2	1
CB2	No	5	4	3	2	1
In the research and development process, the consumer behavior plays the most important role in which stage?						
RD1	Research	5	4	3	2	1

RD2	Proposed the feature of products	5	4	3	2	1
RD3	Comparison with competitors	5	4	3	2	1
RD4	Price of products	5	4	3	2	1
RD5	Product quality	5	4	3	2	1
RD6	All	5	4	3	2	1
How is your company currently collecting customer behavior data?						
CBD1	By sale staffs, agencies, distributors	5	4	3	2	1
CBD2	Events	5	4	3	2	1
CBD3	Response of customers	5	4	3	2	1
CBD4	Online channel	5	4	3	2	1
CBD5	All	5	4	3	2	1
What are the challenges in the process of collecting customer data?						
CCD1	Customer behavior spans across multiple channels and locations	5	4	3	2	1
CCD2	Uncertainty in collecting data through which methods	5	4	3	2	1
CCD3	Collected a little customer data	5	4	3	2	1
CCD4	All	5	4	3	2	1
Which method of product development has been using in your company?						
MRD1	Applying similar to the competitor's product	5	4	3	2	1
MRD2	To study competitor's product and advantage of your company	5	4	3	2	1
MRD3	Base on customer demand by collecting information by offline channels	5	4	3	2	1
MRD4	To use the digital marketing tool to collect and analysis	5	4	3	2	1
MRD5	All	5	4	3	2	1
PART II: TO DETERMINE THE ROLE OF DIGITALIZATION IN DATA COLLECTION AND PROCESSING TO BUILD PRODUCTS						
Which job tasks in the process of collecting and processing customer behavior data have been digitized						
DCP1	Collect	5	4	3	2	1
DCP2	Process	5	4	3	2	1
DCP3	Both	5	4	3	2	1
DCP4	Not yet used	5	4	3	2	1
DCP5	Other	5	4	3	2	1

How do you evaluate the process of data collection and processing for product development in your company, and how is it digitized?						
DPD1	Collect data process is full and high quality	5	4	3	2	1
DPD2	Collect data process is not full	5	4	3	2	1
DPD3	Collect data process is not quality	5	4	3	2	1
DPD4	Processing data is full and high quality	5	4	3	2	1
DPD5	Processing data is not full	5	4	3	2	1
DPD6	Processing data is not quality	5	4	3	2	1
To determine the impact of digitizing the data collection and processing process on building and developing products within your company						
1. People						
IDRDP1	Change mindset	5	4	3	2	1
IDRDP2	Improve performance	5	4	3	2	1
IDRDP3	Enhancing labor efficiency	5	4	3	2	1
2. Technology						
IDRDT1	Invest on the new technology	5	4	3	2	1
IDRDT2	Upgrade	5	4	3	2	1
3. The business strategy						
IDRDB1	Change the business strategy	5	4	3	2	1
IDRDB2	Enhancing efficiency	5	4	3	2	1
4. Product strategy						
IDRDPD1	Shorter research time	5	4	3	2	1
IDRDPD2	Shorter development time	5	4	3	2	1
IDRDPD3	Better features	5	4	3	2	1
IDRDPD4	Better competitiveness	5	4	3	2	1
IDRDPD5	Better image	5	4	3	2	1
5. Business result						

IDRD BR1	Decrease operation cost	5	4	3	2	1
IDRD BR2	Decrease sale cost	5	4	3	2	1
IDRD BR3	Increase sale revenue	5	4	3	2	1
IDRD BR4	Improve brand name	5	4	3	2	1
To determine the factors influencing digitization in the process of data collection and processing for product development.						
1. People						
FDRD P1	Build the plan	5	4	3	2	1
FDRD P2	Access and analysis the quality	5	4	3	2	1
FDRD P3	Make the desicion	5	4	3	2	1
2. Technology						
FDRD T1	The suitability of technology	5	4	3	2	1
FDRD T2	Security & safety	5	4	3	2	1
FDRD T3	Efficiency	5	4	3	2	1
3. The business strategy						
FDRD BS1	Determine aim and priority	5	4	3	2	1
FDRD BS2	Data manage & analysis method	5	4	3	2	1
FDRD BS3	Processing	5	4	3	2	1
FDRD BS4	Product development plan	5	4	3	2	1
4. Legal framework						
FDRD LF1	Implement easily	5	4	3	2	1
FDRD LF2	Implement difficult	5	4	3	2	1
Evaluation of the necessary factors for success when implementing digitization in data collection and processing for product building						
1. People						
DFSP1	Adequate staffing	5	4	3	2	1
DFSP2	High performance	5	4	3	2	1

DFSP3	Commitment	5	4	3	2	1
DFSP4	Attractive labor policy	5	4	3	2	1
2. The business strategy						
DFSBS1	Product in line with customer demand	5	4	3	2	1
DFSBS2	Competitive price	5	4	3	2	1
DFSBS3	Modern technology	5	4	3	2	1
DFSBS4	Focus on PR	5	4	3	2	1
DFSBS5	Suitable sale channels	5	4	3	2	1
Can you share more about the challenges in the digital transformation process for companies?						

Pleas provide your information such as: Your full name, Company name, email address, and telephone number
Your Name:
Your company name:
Your email address:
Your telephone number:

Thank and Best Regard

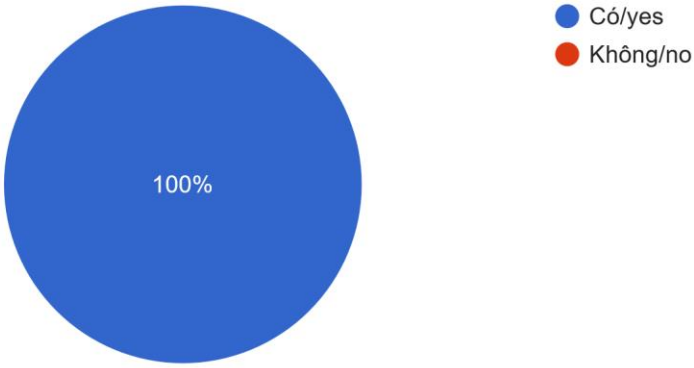
APPENDIX D

INDIVIDUAL RESPONDENT RESULTS

Câu 1: Anh chị có cho rằng hành vi tiêu dùng của khách hàng là yếu tố quan trọng trong việc xây dựng sản phẩm, dịch vụ?
Do you think that consumer behavior is an important factor in building products and services?

Copy

86 responses



Câu 2: Đối với quy trình nghiên cứu, và phát triển sản phẩm thì hành vi tiêu dùng của khách hàng đóng vai trò quan trọng nhất ở bước nào?
In the research and development process, the consumer behavior plays the most important role in which stage?

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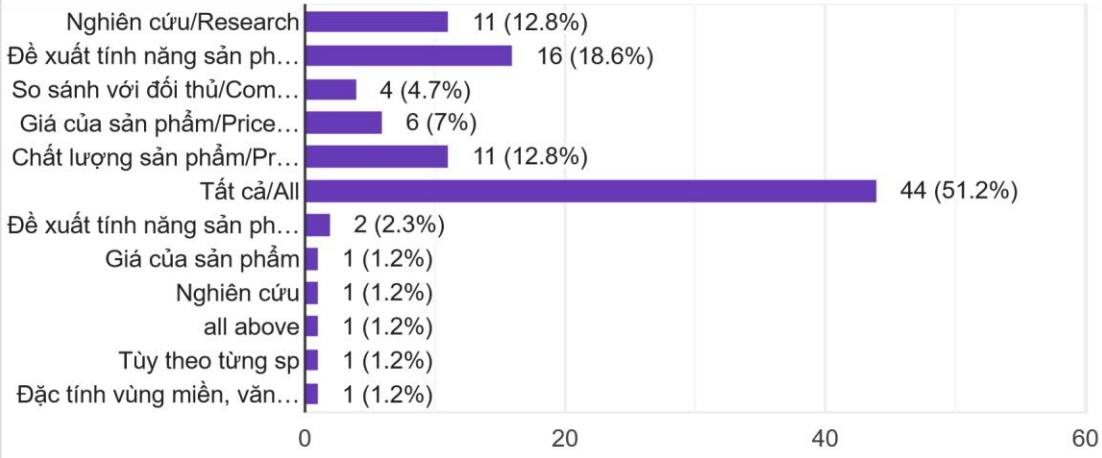
86 responses



Câu 3: Công ty Anh Chị hiện đang thu thập dữ liệu hành vi khách hàng bằng cách nào?

How is your company currently collecting customer behavior data?

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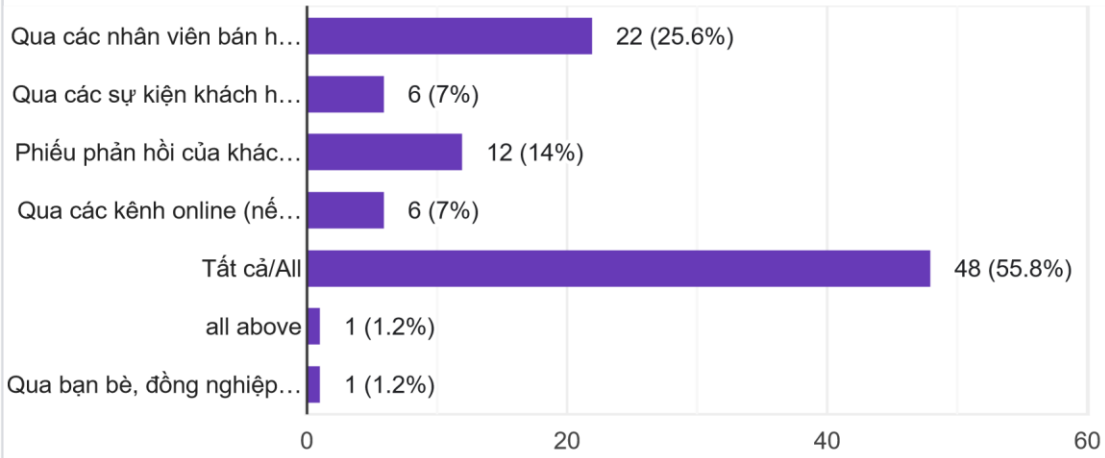
86 responses



Câu 4: Các khó khăn trong quá trình thu thập dữ liệu khách hàng là gì?

What are the challenges in the process of collecting customer data?

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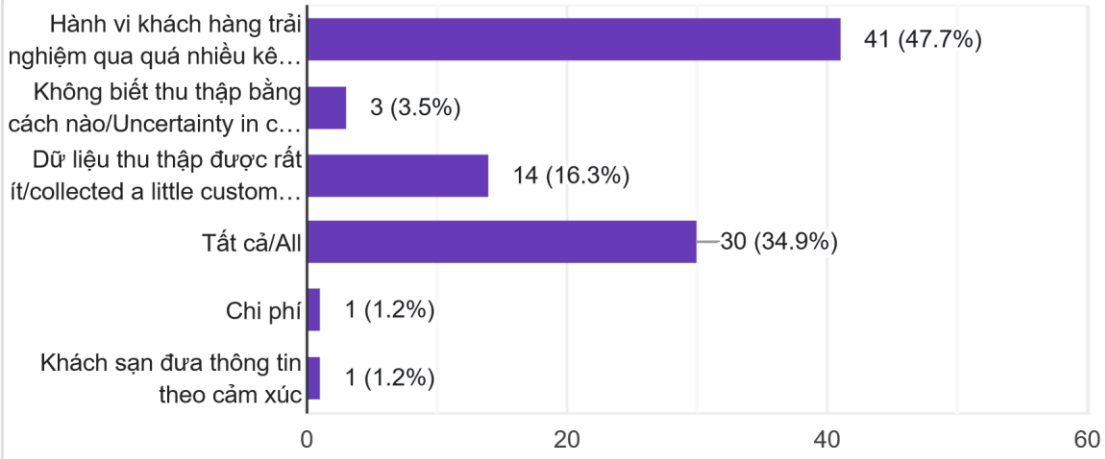
86 responses



Câu 5: Công ty anh chị hiện tại đang phát triển sản phẩm theo phương pháp nào?
Which method of product development has been using in your company?

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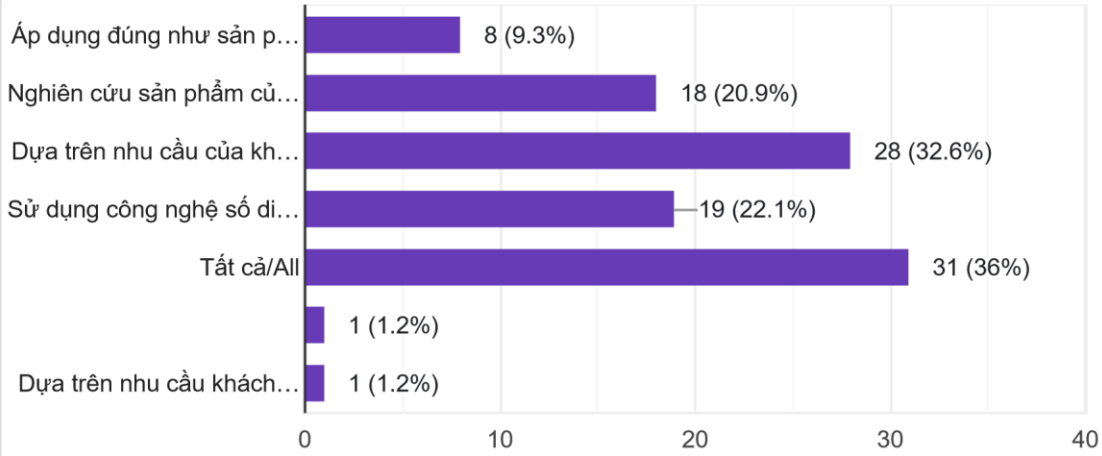
86 responses



PHẦN 2: ĐÁNH GIÁ VAI TRÒ CỦA SỐ HOÁ TRONG THU THẬP VÀ XỬ LÝ DỮ LIỆU ĐỂ XÂY DỰNG SẢN PHẨM.
TO DETERMINE THE ROLE OF DIGITALIZATION IN DATA COLLECTION AND PROCESSING TO BUILD PRODUCTS

Câu 6: Hạng mục công việc nào trong quy trình thu thập và xử lý dữ liệu hành vi khách hàng đã áp dụng số hóa?
Which job tasks in the process of collecting and processing customer behavior data have been digitized?

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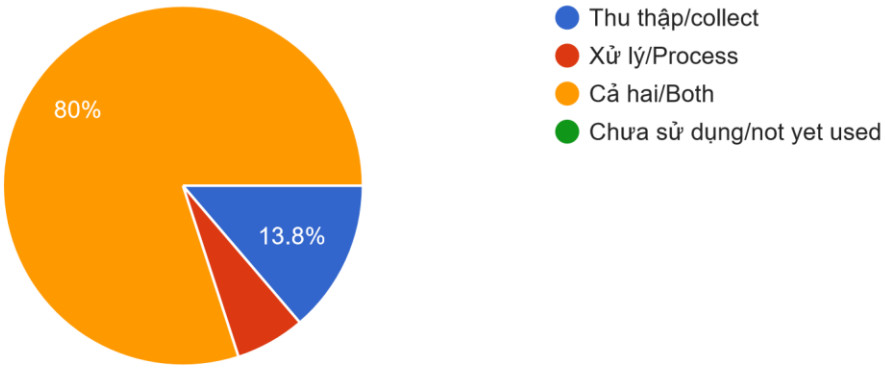
80 responses



Câu 7: Quy trình số hóa thu thập và xử lý dữ liệu để xây dựng và phát triển sản phẩm, Anh chị đánh giá như thế nào?
How do you evaluate the process of data collection and processing for product development in your company, and how is it digitized?

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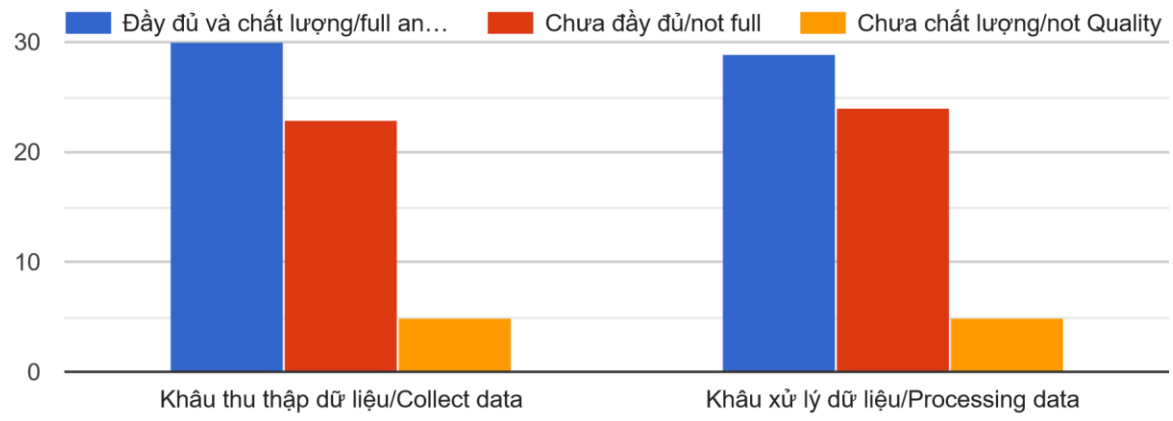

Câu 8: Đánh giá tác động của số hóa quy trình thu thập và xử lý dữ liệu để xây dựng và phát triển sản phẩm trong công ty anh chị
To determine the impact of digitizing the data collection and processing process on building and developing products within your company

Con người/People

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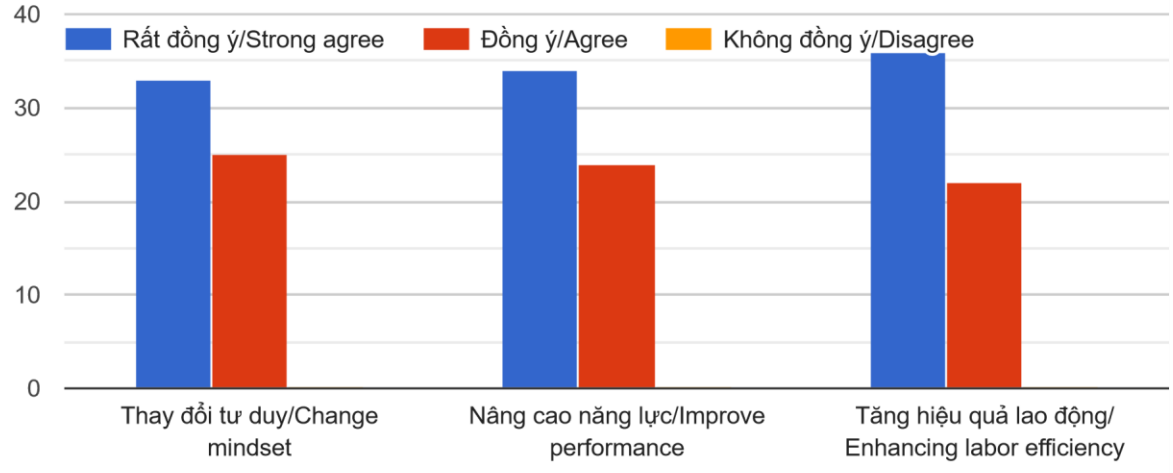

Công nghệ/Technology

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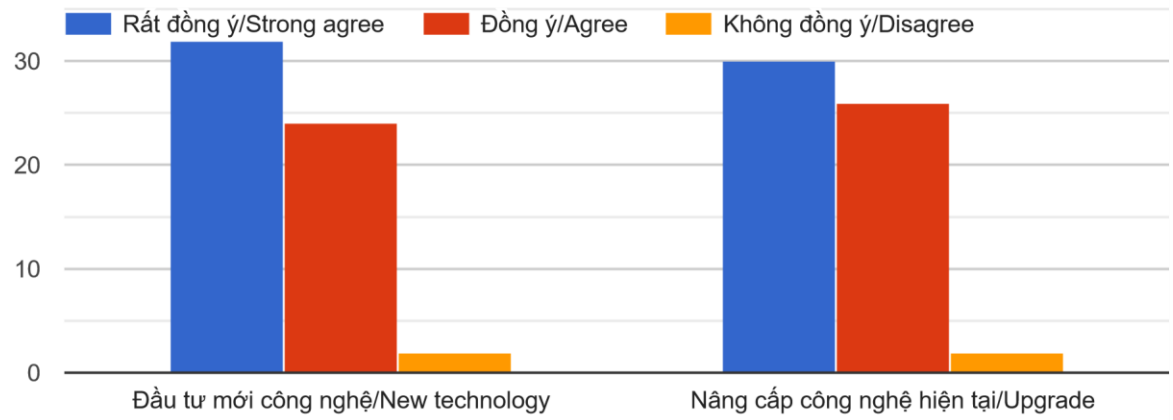

Chiến lược kinh doanh/Business strategy

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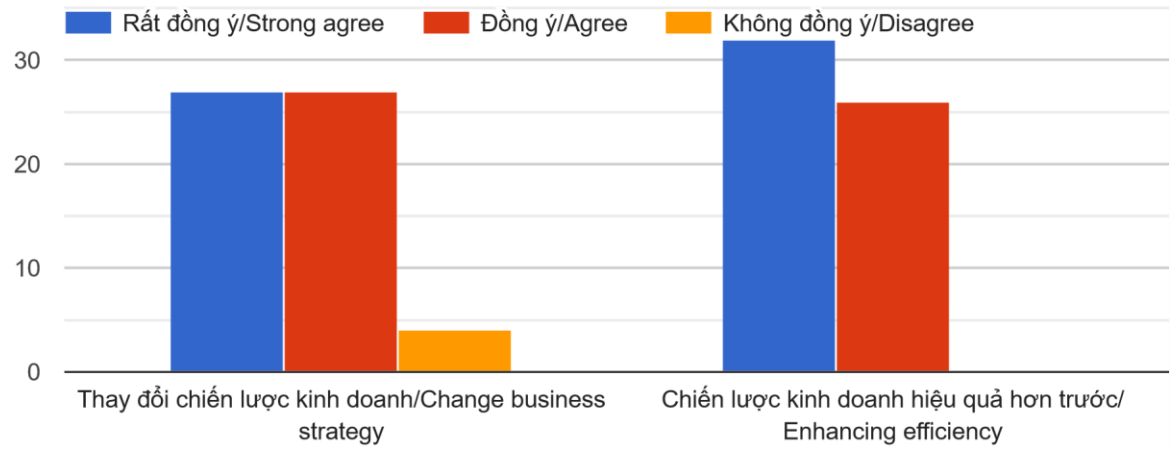

Chiến lược sản phẩm/Product strategy

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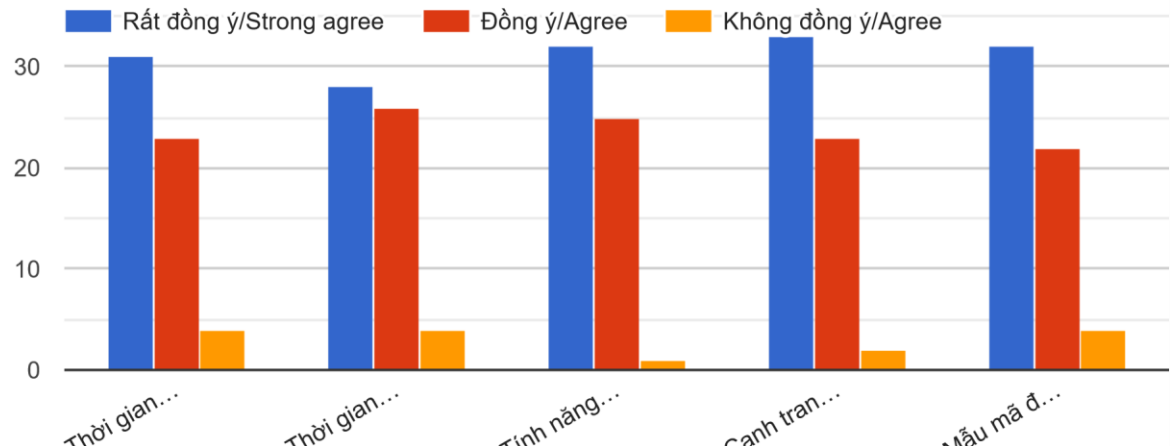

Hiệu quả kinh doanh/Business result

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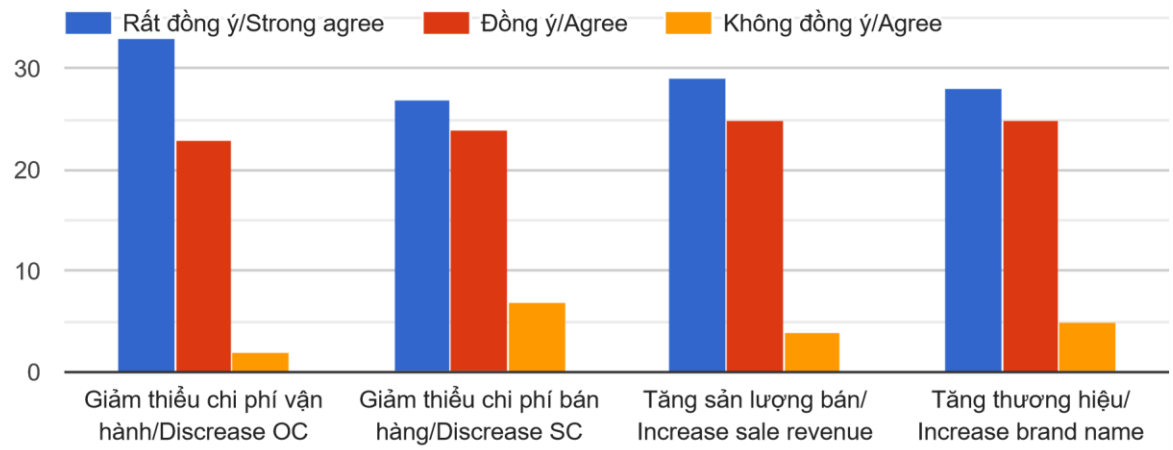

Câu 9: Đánh giá các nhân tố ảnh hưởng đến số hóa trong quá trình thu thập và xử lý dữ liệu để phục vụ xây dựng sản phẩm.

To determine the factors influencing digitization in the process of data collection and processing for product development.

Con người/People

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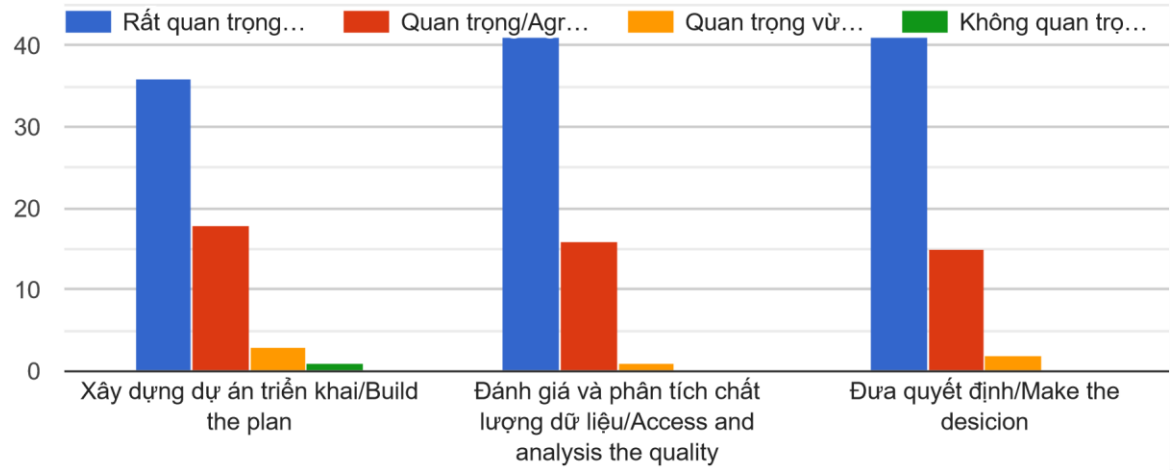

Công nghệ/Technology

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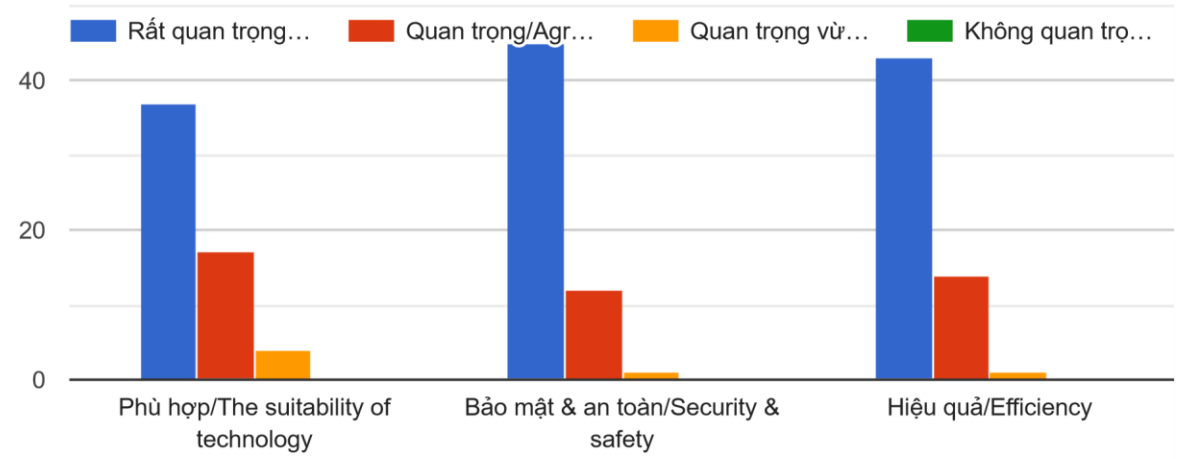

Chiến lược kinh doanh/Business strategy

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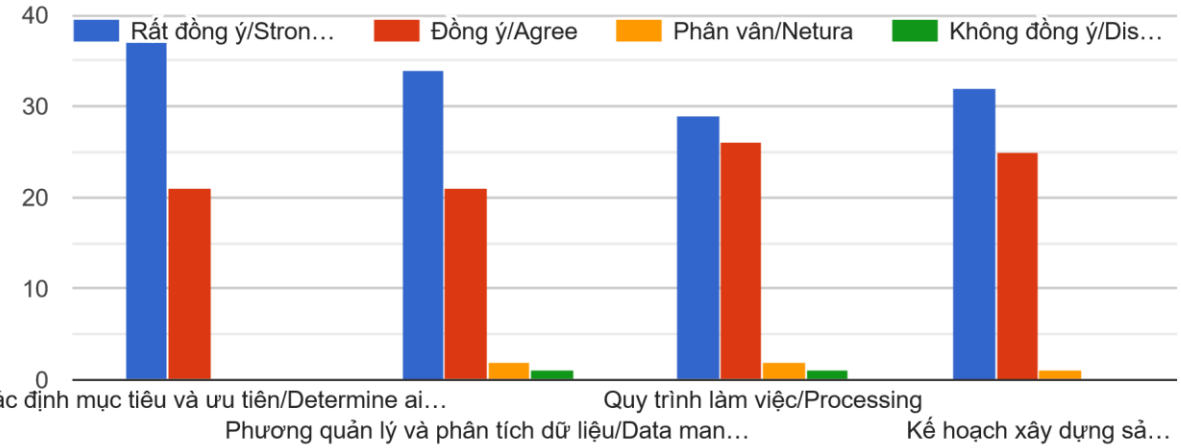

Khung pháp lý/Legal framework

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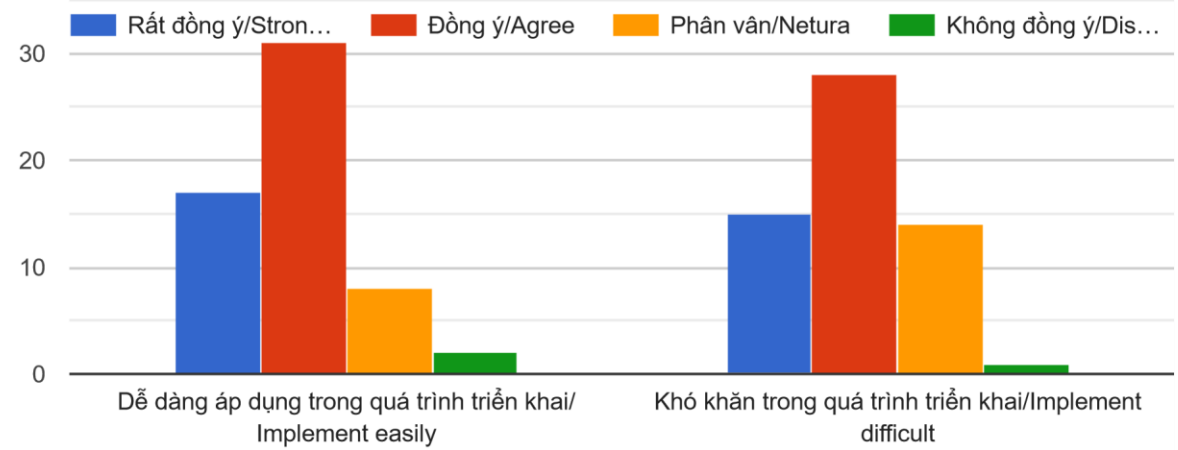

Câu 10: Đánh giá các yếu tố cần thiết để thành công khi áp dụng số hoá trong thu thập và xử lý dữ liệu để xây dựng sản phẩm

Evaluation of the necessary factors for success when implementing digitization in data collection and processing for product building

Con người/People

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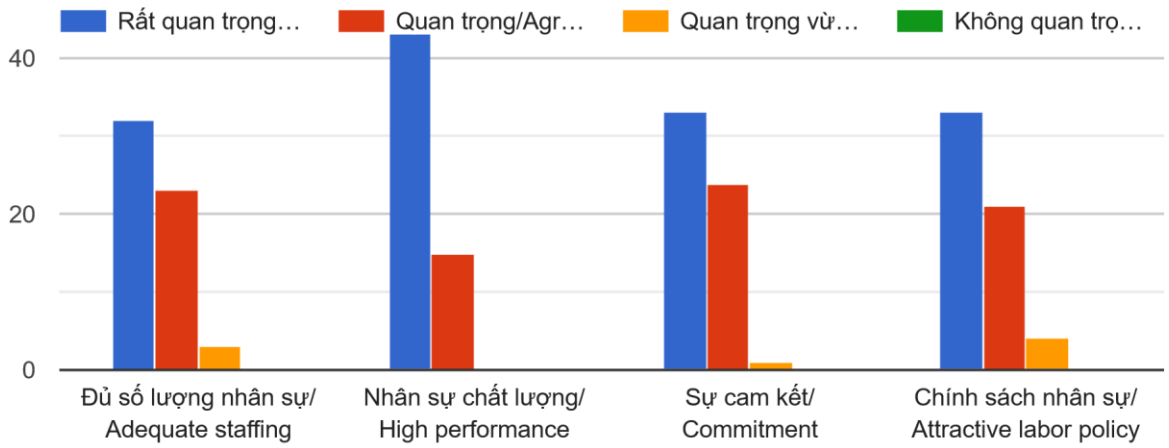

Chiến lược kinh doanh/Business strategy

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