Influence of FinTech Products and Services on the Efficiency of Supply Chain Management of e-Commerce Business in Quezon City

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Abstract- The primary goal of this study is to examine how employees and business managers perceive the impact of FinTech products and services on supply chain management efficiency in Quezon City, Philippines. The study included ten (10) managers and thirty (30) employees from four e-Commerce companies in Quezon City. Respondents were asked to assess FinTech products and services in terms of blockchain, data management, mobile expertise, security and data privacy, user retention and experience. In terms of blockchain, data management, mobile and tech expertise, security and data privacy, and user retention and experience, there is no significant difference among respondents grouped by profile. In addition, in terms of delivery, forecasting accuracy, inventory investment and efficiency, lead time, and late backlog, FinTech products and services have a significant impact on e-Commerce business as viewed by the respondents, however, there is no significant difference in perceived impact of FinTech products and services when grouped by profile. When grouped according to profile, a significant difference between the relationship of FinTech products and services and supply chain management was found, establishing impact of FinTech products and services.

Index Terms- e-Commerce Business, Efficiency, FinTech Products and Services, Supply Chain Management

I. INTRODUCTION

E-Commerce has transformed how businesses conduct their daily operations, and it is constantly bringing new options to the forefront. According to one study, 76 percent of consumers believe that marketing has changed more in the last few years than in the previous fifty. There are three types of e-Commerce: business-to business (B2B), business-to-consumer (B2C), and consumer-to consumer (C2C) (Leung & Ma, 2020; Song, 2015).

Business owners are moving into e-Commerce because it allows them to reach new customers beyond their existing customer base (Li &Chen, 2021; Ramadan et al. 2021; Maaya et al. 2020). After 20 months, the best e-Commerce companies generate more than half of their total revenue from repeat customers, according to a recent study. Customer loyalty is the result of many important factors, including customer experience, product selection, pricing, brand, and marketing (Li &Chen, 2021; Ramadan et al. 2021; Maaya et al. 2020). Despite the Covid19 pandemic, online retail sales have steadily increased, with e-Commerce penetration reaching 21.3 percent in 2020, up from 15.8 percent in 2019 and 14.3 percent in 2018 (Li &Chen, 2021; Ramadan et al. 2021; Maaya et al. 2020). It is expected that e-commerce purchases will increase from 14.1 percent to 22 percent by 2023 (Li &Chen, 2021; Ramadan et al. 2021; Maaya et al. 2020). These projections are extremely optimistic, indicating that e-Commerce as a business has yet to reach its full potential.

Meanwhile, e-Commerce in the Philippines is expected to surpass $12 billion in sales by 2025, up from $500 million in 2015 (Sanchez, 2020). In 2019, it already made $3 billion. When compared to 2019, growth in terms of the number of buyers and the peso value of purchases has already doubled in the first six months of 2020 (Sanchez, 2020).

While many have shied away from the high rates and congested sites in the major central business districts in Metro Manila, many companies are attracted to investing in Quezon City office and commercial spaces for their business needs.

After all, investment and trade promotion consultancy AsiaBiz Strategy has recognized Quezon City as one of the top 10 Asian Cities of the Future in 2015, alongside Hong Kong, Singapore and Taipei. Also, Quezon City ranked in the categories of having the best economic potential, best human resources, cost effectiveness and quality of life.

The highly urbanized Quezon City boasts of having the country's largest service economy. With more than 58,000 registered businesses within its boundaries and a variety of integrated residential and commercial spaces under its belt, the city is building a haven for Filipinos who would like to have the convenience of having to study and work in the city where they live (quezoncity.gov.ph).

Small to medium-sized businesses, primarily engaged in the distribution of completed goods and the provision of basic services, continue to dominate the City's economy. From 2008 to 2013, the number of registered firms increased, with the latest

overall count at 64,515, including 13,417 new enterprises and 51,098 renewals (quezoncity.gov.ph).

In 2013, the Industry sector accounted for 6.12 percent of the total 3,497 registered firms. Manufacturing (e.g., printing/publishing, assembly of motor vehicles, fabrication of metal, steel, and aluminum products, etc.) accounted for 2,233 establishments (3.46 percent); Construction (e.g., construction of buildings, site preparation & development, Architectural and Engineering works, etc.) accounted for 1,709 establishments (2.65 percent); and Electric, Gas, and Water Supply (e.g., construction of buildings, site preparation & development, Architectural and Engineering works, etc.) (quezoncity.gov.ph).

According to 2013 data (quezoncity.gov.ph), the Services sector accounted for 93.88 percent of all registered enterprises. The Wholesale/Retail Trade, which accounted for 27,922 enterprises or 43.28 percent of all registered businesses, had the largest proportion. It is also the city's top commercial revenue generator, with numbers showing an increase in the last three (3) years. Real Estate, Renting, and Other Company Activities, or those engaged in leasing of real properties, consultant and legal offices, janitorial/ messengerial/ labor services, real estate broker and developer, is the city's second largest business type. It registered 17,461 enterprises (about 27% of the total). Lastly, other Community, Social & Personal Services (e.g., beauty salons, dress stores, computer shops, etc.) came in third with 4,318 firms, followed by Hotels & Restaurants Activities with 3,947 businesses (quezoncity.gov.ph).

Meanwhile, the growth of the digital economy and eCommerce platforms will help Quezon City on its economic recovery after the pandemic. During the pandemic, the brick-and-mortar industry of the country and in Quezon City took a huge hit and as a result of it, the eCommerce sector saw huge growth and now it is one of the key factors in which everyone is focusing on the economic recovery of the country.

In 2020, according to the data released by the Philippine Department of Trade and Industry, the contribution of the eCommerce sector in the country of the GDP was 3.4% or US$12 billion. Currently, the government of the Philippines is trying to increase the contribution of the eCommerce sector towards the GDP by 5.5% in 2022. In addition to that, the Philippine Department of Trade and Industry is also trying to ensure that the e-Commerce business which was 500,000 in 2020 reached one million by the end of 2022.

Currently, the boom of the eCommerce sector in the Philippines particularly in Quezon City is such that it is in the second position in eCommerce adoption after Indonesia. The current economy of the country is consumer-driven, and the domestic market of the country has a huge potential to see the growth of online shopping.

On the other hand, supply chain management is the management of a product's or service's entire production flow, from raw materials to final delivery to the consumer (Azadegan et al. 2020). Furthermore, coordination, management, and strategy drive the flow of data, information, resources, and materials to deliver the best product and service to all stakeholders in the process of converting raw goods to a salable product and delivering it to the ultimate customer (Forde, 2020; Goldschmidt, et al. 2020; Jin, & Ellram, 2020; Ketchen, et al.

2018; Lu, et al. 2019; Mena, et al. 2019; Reimann, et al. 2017; Xia, et al. 2017).

The current Covid19 pandemic has brought the economy to the brink of a major financial recession, with two larger financial trends expected in the near future. During recessions, there is usually a significant shift toward consolidating high-interest debts. This could be a major problem for buyers who still owe money to their suppliers. However, Financial Technology (FinTech) is a breakthrough that allows for easier debt consolidation, which can benefit business owners in the post-pandemic era (Breidbach, et al. 2019).

FinTech is used in supply chains to help manufacturers and logistics companies, as well as their partners, better manage financial operations, allowing buyers to complete payments faster and suppliers to receive funds faster (Breidbach, et al. 2019).

Most FinTech platforms are accessed via a cloud management system, which allows businesses to manage their payment accounts by simply downloading an application or visiting an online site (Iman, 2018). Previously, it could take up to three months for a supplier to receive payment on an order, but FinTech eliminates this timeframe immediately. Suppliers now have more control over payment deadlines, allowing them to extend deadlines or finance heavy equipment themselves.

FinTech firms also collaborate with banks to determine the most advantageous payment option for each company (Chen et al. 2019). This, combined with their much lower rates, has thrown a wrench in the financial operations of supply chains. Startups, whose credit profiles are less solid and less successful when working with banks, will benefit the most from leveraging FinTech solutions company (Chen et al. 2019). Suppliers and manufacturers with longer lead times can also benefit. Although FinTech provides many benefits to businesses, it also faces issues and challenges such as security and data privacy concerns, big data and AI integration, blockchain integration, compliance with government regulations, a lack of mobile and tech expertise, growth issues and effective marketing to acquire customers, and user retention and user experience concerns (Breidbach, et al. 2019; Bukharin, 2019; Song, 2015; Zavolokina, et al. 2016). These benefits, issues, and other concerns about FinTech's application to businesses, particularly e-Commerce, motivate the researcher to conduct a study that investigates the impact of FinTech products and services on the efficiency of supply chain management in e-Commerce businesses, specifically in Quezon City, Philippines.

Because Financial Technology (FinTech) is a newer technology, it has its own set of advantages and disadvantages. This study primarily aims to investigate the impact of FinTech products and services on supply chain management efficiency, specifically in the area of online payment processing of e-commerce Businesses in Quezon City, Philippines, as perceived by employees and business managers.

Specifically, this study aims to answer the following research questions:
1. What is the profile of the respondents in terms of:
   1.1 Age;
   1.2 Gender;
   1.3 Position/Nature of work; and
   1.4 Years of Experience?

2. How do the respondents assess the FinTech products and services, in terms of:
   2.1 Blockchain;
   2.2 Data Management;
   2.3 Mobile and Tech Expertise;
   2.4 Security and Data Privacy; and
   2.5 User Retention and Experience?
3. Is there a significant difference in the respondents' assessment towards their perceived usefulness of the FinTech products and services (in terms of the aforementioned variables), when grouped according to their profile?
4. How do the respondents perceive the efficiency of supply chain management among the selected e-Commerce businesses in Quezon City, in terms of:
   4.1 Delivery;
   4.2 Forecasting Accuracy;
   4.3 Inventory Investment and Efficiency;
   4.4 Lead Time; and
   4.5 Overdue Backlog?
5. Is there a significant difference in the respondents' assessment towards their perceived efficiency of supply chain management of the selected Quezon City-based e-Commerce businesses (in terms of the aforementioned variables), when grouped according to their profile?
6. Does a significant relationship exist between the assessment of FinTech products and services to the efficiency of supply chain management of e-Commerce business?
7. Is there a significant difference in the relationship between FinTech products and services to the efficiency of supply chain management of e-Commerce business, when grouped according to their profile?

In the light of the research questions mentioned in this study, the hypotheses below will be tested at 0.05 level of significance.

Hypothesis # 1 (H1): There is no significant difference in the assessment made by the respondents towards FinTech products and services (in terms of blockchain integration, data management, mobile and tech expertise, security and data privacy, and user retention and experience), when grouped according to their profile.

Hypothesis #2 (H2): There is no significant difference on the assessment made by the respondents towards their perceived efficiency of supply chain management of the selected Quezon City City–based e-Commerce businesses (in terms of inventory investment and efficiency, delivery, forecasting accuracy, lead time, and overdue backlog), when grouped according to their profile.

Hypothesis #3 (H3): No significant relationship exists between the perceived usefulness of FinTech products and services to the perceived efficiency of supply chain management of the selected e-Commerce businesses in Quezon City.

Hypothesis #4 (H4): No significant difference in the relationship between FinTech products and services to the

efficiency of supply chain management of e-Commerce business, when grouped according to their profile.

II. METHODOLOGY

2.1 Research Design

The study employed descriptive research design. Descriptive research design is a type of research design that is mainly concerned with describing the nature or condition and the degree in the detail of the present situation. This method was used to describe the nature of a situation, as it existed at the time of the study and explored the cause of a particular phenomenon (Fraenkel, Wallen, & Hyun 2013).

The aim of descriptive research was to obtain an accurate profile of the people, events or situations. With this research type, it was essential that the researcher already had a clear view or picture of the phenomena being investigated before the data collection procedure was carried out. The researcher used this kind of research to obtain firsthand data from the respondents to formulate rational and sound conclusions and recommendations of the study. The descriptive approach was quick and practical in terms of the financial aspect especially during the time of pandemic.

In addition, descriptive method was advantageous due to its flexibility, which can use either qualitative or quantitative data or both, giving the researcher greater options in selecting the instrument for data-gathering.

2.2 Conceptual Framework

The study adopts the Self-Perception Theory (SPT) to explore the respondents' perception towards the impact of FinTech products and services to the efficiency of supply chain management of e-Commerce business. The Self Perception Theory (SPT) is an account of attitude formation developed by psychologist Daryl Bemin 1972. The theory asserts that people develop their attitudes (when there is no previous attitude due to a lack of experience, etc., and the emotional response is ambiguous) by observing their own behavior and concluding what attitudes must have caused it. The theory is counterintuitive in nature, as the conventional wisdom is that attitudes determine behaviors. Furthermore, the theory suggests that people induce attitudes without accessing internal cognition and mood states (Robak et al. 2005). The person interprets their own overt behaviors rationally in the same way they attempt to explain others' behaviors.
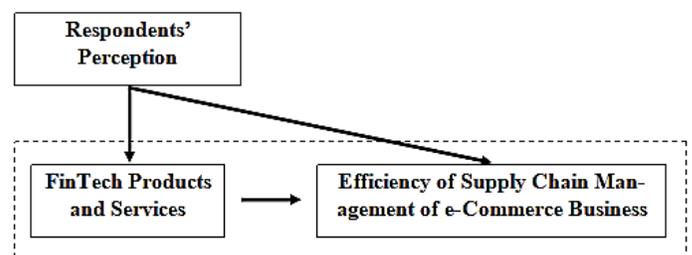

Figure 1. Self-Perception Theory (SPT) on FinTech Products and Services and Efficiency of Supply Chain Management of e-Commerce Business

The conceptual framework of this study adopts the Independent-Dependent Variable framework as shown in figure 2.
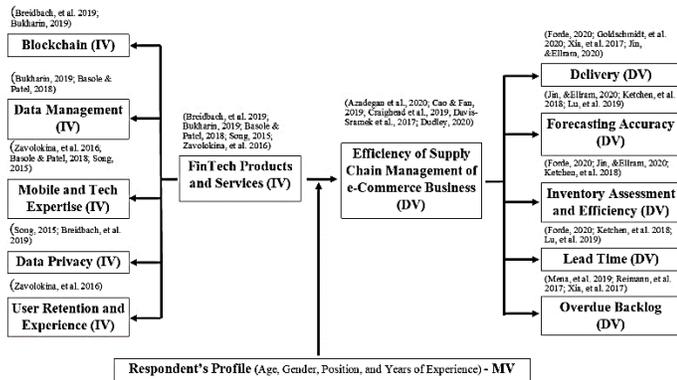

Figure 2. Independent-Dependent Variable Framework

Figure 2 shows that the independent variable of this study is the FinTech products and services used by e-Commerce businesses in Quezon City which will be assessed and described by the respondents in terms of blockchain, data management, mobile and tech expertise, security and data privacy, and user retention and experience. The study aims to establish the direct influence of these variables to the efficiency of the supply chain management of e-Commerce businesses in Quezon City.

Furthermore, figure 2 shows that the efficiency of supply chain management serves as the dependent variable of this study. It is assumed that the efficiency of supply chain management of e-Commerce businesses in Quezon City is directly influenced by the FinTech products and services. To clearly established the influence of FinTech products and services factors such as delivery, forecasting accuracy, inventory investment and efficiency, lead time, and overdue backlog will be described.

Figure 2 established the concept of how FinTech Products and Services being the independent variable of this study influence and affect the dependent variable which is the efficiency of the Supply Chain Management of e-Commerce Business.

2.3 Operational Framework

In light of the Self Perception Theory and the dependent and independent variables of this study, the operational framework is given below (fig. 3) to clearly summarize the key concepts on how the researcher establish the relationship between FinTech product and services and efficiency of supply chain management in e-Commerce business.
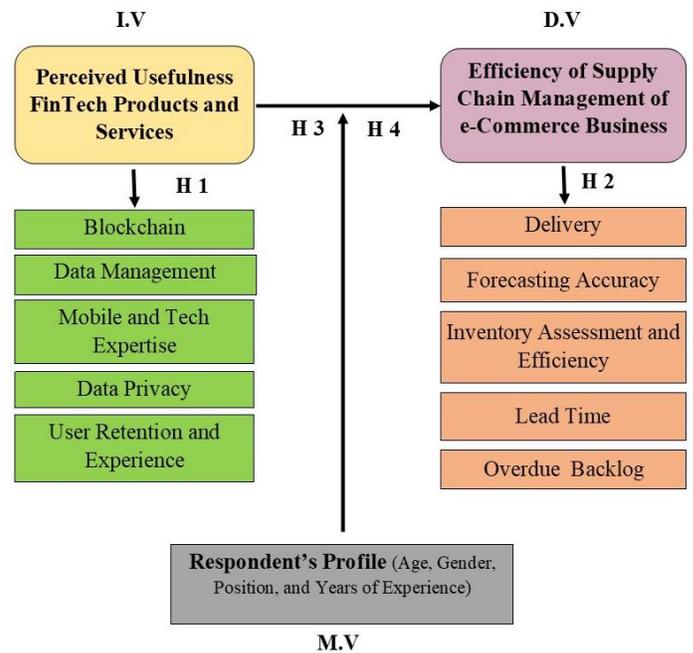

Figure 3. Operational Framework of the Study

Figure 3 shows that in order for the researcher to determine the impact of FinTech products and services on the efficiency of supply chain management of an e-Commerce business in Quezon City, the researcher must first assess respondents' perspectives on FinTech products and services in terms of factors such as blockchain, data management, mobile and tech expertise, security and data privacy, and user retention and experience. The figure depicts an arrow pointing to supply chain management after evaluating FinTech products and services to clearly establish the impact of FinTech products and services to supply chain management, and it will be evaluated in terms of delivery, forecasting accuracy, inventory assessment and efficiency, lead time, and overdue backlog.

2.4 Population and Sampling

The primary goal of this study is to determine the influence of FinTech products and services on the efficiency of supply chain management in e-Commerce businesses based on the perceptions and perspectives of employees and managers of a selected e-Commerce business in Quezon City, Philippines. As a result, the general population of this study refers to all employees and managers of Quezon City-based e-Commerce businesses.

It is feasible to obtain representative samples because the population is large enough for the researcher to survey. The researcher used a two-stage random sampling technique to determine the sample respondents for this study. In a Two-stage Random Sampling Technique, the researcher randomly selects samples or groups and then randomly selects individuals from these groups.

In this case, e-Commerce businesses in Quezon City were clustered into four groups, according to the type of e-Commerce business: (1) business-to-business (B2B); (2) business-to-consumer (B2C); (3) consumer-to-consumer (C2C); and (4) Combination of B2B, B2C, or C2C.

Then, the researcher randomly selected one e-Commerce company from each of the four groups identified. And then from the four selected companies, the researcher randomly selected ten (10) managers and thirty (30) employees to participate in the survey.

Because there is currently limited movement and activity due to the Covid19 pandemic, as well as restrictions imposed by the Inter-Agency Task Force for the Management of Emerging Infectious Diseases in the Philippines (IATF), the survey questionnaire was distributed via email in Google Forms.

2.5 Research Instrument

The intention of this study is to describe the current situation without any attempt to influence it, and obtain a necessary data that can be used to draw a sound and acceptable conclusion of this study. Thus, the researcher used a researcher-made survey questionnaire.

Researcher-made Survey Questionnaire. The survey questionnaire that will be used in this study is a survey questionnaire developed by the research and validated by experts in the field of business management to satisfy the sub-problems number 1, 2, and 4 presented in this study. The questionnaire is divided into three parts and is composed of a series of questions that gathered the perception of employees and managers of selected e-Commerce businesses in Quezon City towards the impact of FinTech products and services on the efficiency of the supply chain management of e-Commerce business in Quezon City.

Part I of the survey questionnaire is composed of the respondent's profile that includes their age, gender, position/nature of work, and years of experience. *Part II* of the survey questionnaire focuses on how the respondents assess FinTech products and services in terms of blockchain, data management, mobile and tech expertise, security and data privacy, and user retention and experience. And lastly, *Part III* of the survey questionnaire explores the perception of the respondents towards the impact of FinTech products and services to the efficiency of supply chain management of e-Commerce business in terms of delivery, forecasting accuracy, inventory investment and efficiency, lead time, and overdue backlog.

Structured statements or questions in a Likert format are used in the researcher-made survey questionnaire. This type of survey questionnaire has five options for each statement or question, and the options are represented by the degree of agreement that each respondent had on the given question. Each variable consists of five (5) items or statements concerning the impact or influence of FinTech products and services on the supply chain management of Quezon City's e-Commerce business.

To ensure the validity of the researcher-created survey questionnaire, the researcher enlisted the assistance of his adviser and business management experts to evaluate the content of the questionnaire in terms of format, language used, and whether or not the questions measured the desired objectives. The thesis adviser's and experts' suggestions and comments were properly documented and reflected on the second version of the survey questionnaire.

In terms of reliability, a total of fifteen (15) randomly selected employees and managers of e-Commerce business in Quezon City, who are not part of this study were asked to answer the second version of the survey questionnaire. And using the SPSS version 22, a Cronbach's alpha test will be performed to determine the reliability of the researcher-made survey questionnaire.

In order to collect the necessary data for this study, the researcher first sought permission from the selected e-Commerce businesses in Quezon City to conduct the survey. Following the approval, the researcher emailed the Informed Consent Letter and Informed Consent Form created with Google Forms to the prospected participants. And then, the link to the survey form was immediately sent to the respondents after they responded to the Informed Consent Forms given to them.

The research instrument was administered during the second week of May 2022, and the responses were collected via Google Forms, and then summarized, evaluated, and interpreted by the researcher using statistical formulations thorugh SPSS version 22.

III. RESULTS AND DISCUSSION

3.1 Description of the respondents in terms of their age, gender, position, and years in service.

Table 1 shows the demographic profile of the respondents who participated in this study.

Table 1. Profile of the Respondents

	Frequency	%
Age		
18 – 22	6	15.0
23 – 27	6	15.0
28 – 32	12	30.0
33 – 37	7	17.5
38 and above	9	22.5
Gender		
Female	22	55.0
Male	18	45.0
Position		
Regular employee	30	75.0
Manager	10	25.0
Years of experience		
<1 year	2	5.0
1 to 5	11	27.5
6 to 10	8	20.0
11 to 15	11	27.5
16 and above	8	20.0

In terms of Age, majority of the respondents falls within the age bracket of 28 to 32 years old with a total of twelve (12) respondents or equivalent to 30% followed by respondents fall within the age bracket of 38 years old and above with a total of nine (9) respondents or 22.5% of the total sample. Meanwhile, a total of seven (7) respondents falls under the age bracket of 33 to 37 years old, while the remaining respondents fall within the age bracket of 23 to 27 years old and 18 to 22 years old with six (6) respondents on each bracket respectively.

In terms of Gender, majority of the respondents or equivalent to 55.0% or twenty-two (22) respondents are female, while the remaining 45.0% or eighteen (18) are male respondents.

In terms of Position, Table 1 shows that majority of the respondents are regular employee with a total of thirty (3) or 75% and the remaining ten (10) are classified as Managers.

In terms of Years of Experience, most of the respondents said that they are in the industry for almost 11 to 15 years now, with a total of eleven (11) or 27.5% of the total respondents. Similar number of respondents said that they are in the industry for almost 1 to 5 years at present.

On the other hand, eight (8) of the respondents said that they were in the industry for almost 6 to 8 years now or equivalent to 27.5%, similar number was found to those respondents who were in the industry for almost 16 years and above. Lastly, there are two (2) respondents said that they are less than 1 year in the industry.

Majority of the respondents falls within the age bracket of 28 to 32 years old, they are female, consists of regular employees and managers, and most of them are in the industry for 1 to 5 years and 11 to 15 years upon the conduct of this study. This implies that majority of employees who are working in an e-Commerce business are definitely competent when it comes to

their profile and they are all belongs to the active, stable, skilled, and productive group of people.

3.2 Assessment of the FinTech products and services in terms of blockchain, data management, mobile and tech expertise, security and data privacy, and user retention and experience.

Table 2 shows the assessment made by the respondents towards the FinTech products and services in terms of Blockchain.

Table 2. Assessment of FinTech Products and Services in terms of Blockchain

Blockchain	Mean	SD	Interpretation	SA %	A %	N %	D %	SD %
1. FinTech significantly decreases the total number of the orders that customers have sent that have not yet been shipped out.	3.83	0.78	Agree	22.5	37.5	40.0	0.0	0.0
2. FinTech helps the business to drive all the back orders to zero.	3.90	0.78	Agree	25.0	40.0	35.0	0.0	0.0
3. FinTech reduces the company's back orders due to late shipping.	4.10	0.84	Agree	40.0	30.0	30.0	0.0	0.0
4. FinTech helps to lessen the work overload, tasks or duties within the company.	4.03	0.83	Agree	35.0	32.5	32.5	0.0	0.0
5. FinTech optimizes the supply chain by providing what the customer's want, when they want it, and spending as little money as possible getting things done.	4.18	0.81	Agree	42.5	32.5	25.0	0.0	0.0
Overall Mean	**4.01**		**Agree**					

As we glean from the table, majority of the respondents agreed that FinTech products and services provides a specific type of database, where it stores data in blocks that are then chained together with computed mean value of 4.01.

In addition, respondents agreed that FinTech products and services optimizes the supply chain by providing what the customer's want, when they want it, and spending as little money as possible getting things done, reduces the company's back orders due to late shipping, and helps to lessen the work overload, tasks or duties within the company.

The above result is supported by the claim of Breidbach et al. (2019) that blockchain plays an important role in financial innovations like FinTech products and services, and is the backbone technology driving the FinTech revolution.

Table 3. Assessment of FinTech Products and Services in terms of Data Management

Data Management	Mean	SD	Interpretation	SA %	A %	N %	D %	SD %
1. FinTech helps to coordinate and organize data across the enterprise.	3.98	0.83	Agree	32.5	32.5	35.0	0.0	0.0
2. FinTech helps to access accurate information in the organization.	3.83	0.84	Agree	27.5	27.5	45.0	0.0	0.0
3. FinTech helps in managing the critical portion of the data.	3.93	0.80	Agree	27.5	37.5	35.0	0.0	0.0
4. FinTech helps in providing data integration as a single source.	4.05	0.88	Agree	40.0	25.0	35.0	0.0	0.0
5. FinTech harmonize the data to ensure its quality.	3.88	0.76	Agree	22.5	42.5	35.0	0.0	0.0
Overall Mean	**3.93**		**Agree**					

The assessment of FinTech products and services in terms of data management made by the respondents is presented in Table 3. Table 3 shows that majority of the respondents agreed

that FinTech products and services able to process, ingest, store, organize, and maintaining data that are created and collected by the company with computed mean value of 3.93. In addition, FinTech products and services ensure that the data of the business is accurate, available and accessible. Respondents also agreed that FinTech helps in providing data integration as a single source.

According to a study conducted by Bukharin (2019), modern businesses are dealing with more data than ever before. The results are in congruent with the study of Bukharin (2019) where he claimed that a plethora of disparate systems that produce and gather data independently, especially in the e-Commerce industry. Furthermore, the results support the claim of Basole and Patel in 2018 that an efficient data management system or platform is required for e-Commerce businesses because it serves as more than just a data storage facility; the idea is to gather data and correctly classify it through proper data attribution.

Table 4. Assessment of FinTech Products and Services in terms of Mobile and Tech Expertise

Mobile and Tech Expertise	Mean	SD	Interpretation	SA %	A %	N %	D %	SD %
1. FinTech manages the mobile worker efficiently.	3.83	0.75	Agree	20.0	42.5	37.5	0.0	0.0
2. FinTech captures warranty and service costs.	3.78	0.77	Agree	20.0	37.5	42.5	0.0	0.0
3. FinTech improves the delivery times through the use of mobile and computer devices.	4.10	0.74	Agree	32.5	45.0	22.5	0.0	0.0
4. FinTech, through the use of mobile and computer devices it proactively manages inventory.	3.80	0.76	Agree	20.0	40.0	40.0	0.0	0.0
5. FinTech delivers a better customer service.	3.78	0.77	Agree	20.0	37.5	42.5	0.0	0.0
Overall Mean	**3.86**		**Agree**					

Table 4 shows the assessment made by the respondents towards FinTech products and services in terms of mobile and tech expertise. Respondents agreed that Fintech products and services helps the business in terms of mobile and tech expertise with computed mean value of 3.86. The results indicates that FinTech products and services help business owners stay in touch with their customers. In addition, Table 4 indicates that majority of the respondents agreed that FinTech products and services improves the delivery times through the use of mobile and computer devices.

Furthermore, the above results are in accordance with the results of the study conducted by Zavolokina et al. in 2016, where the speed of information access can be a key determinant of a company's success, and the supply chain is the most critical area that requires speed.

Table 5. Assessment of FinTech Products and Services in terms of Security and Data Privacy

Security and Data Privacy	Mean	SD	Interpretation	SA %	A %	N %	D %	SD %
1. FinTech can help reduce exposure (limiting who has access to data and how many places it is stored).	3.80	0.76	Agree	20.0	40.0	40.0	0.0	0.0
2. FinTech provides transparency when it comes to what type of data it is collected.	3.93	0.83	Agree	30.0	32.5	37.5	0.0	0.0
3. FinTech provides information on how and for how long will the data be collected.	4.18	0.78	Agree	40.0	37.5	22.5	0.0	0.0
4. FinTech provides transparency when it comes to disclosing whether the data will be sold or shared with other, and for what purposes.	4.13	0.76	Agree	35.0	42.5	22.5	0.0	0.0
5. FinTech provides information on who will collect the data and how it will be used or shared.	4.03	0.95	Agree	45.0	12.5	42.5	0.0	0.0
Overall Mean	**4.01**		**Agree**					

The assessment of the respondents towards FinTech products and services in terms of security and data privacy is shown in Table 5. As we glean from the table, respondents agreed that FinTech products and services complied with all aspects of information safety, from the physical security of hardware and other data storage units to administrative and access protection commands and cybersecurity of software applications, as well as organizational procedures and policies with computed over-all mean value of 4.01.

Furthermore, respondents agreed that FinTech products and services provides information on how and for how long will the data be collected, as well as transparency when it comes to disclosing whether the data will be sold or shared with other, and for what purposes. Also, FinTech products and services provides information on who will collect the data and how it will be used or shared.

More so, the results show similar idea with the claim of Song (2015), where in when FinTech is used wisely, it can provide significant benefits to business such as making financial management faster, easier, and more convenient.

Table 6. Assessment of FinTech Products and Services in terms of User Retention and Experience

User Retention and Experience	Mean	SD	Interpretation	SA %	A %	N %	D %	SD %
1. FinTech develops a system that can gather and assess structured and unstructured data, algorithms to classify behavioral patterns and customer propensity, and analysis capabilities that can then feed that information into dashboards.	3.93	0.83	Agree	30.0	32.5	37.5	0.0	0.0
2. FinTech sets up a centralized customer data platform (CDP) to integrate paid and owned data from across channels.	4.10	0.84	Agree	40.0	30.0	30.0	0.0	0.0
3. FinTech offers unified purchase experiences across devices.	4.05	0.81	Agree	35.0	35.0	30.0	0.0	0.0
4. FinTech provides user-driven purchasing experience that can offer continuous value for existing as well as new customers.	3.93	0.73	Agree	22.5	47.5	30.0	0.0	0.0
5. FinTech unveils insights on customer behavior and demand.	4.00	0.82	Agree	32.5	35.0	32.5	0.0	0.0
Overall Mean	4.00		Agree					

Table 7. Difference between the Assessment of FinTech Products and Services when grouped according to Profile

	Mean	SD	p value	Conclusion
Age				
18 − 22	4.00	0.11		
23 − 27	3.98	0.10		
28 − 32	3.92	0.12	0.5381	Not significant
33 − 37	4.02	0.17		
38 and above	3.92	0.15		
Gender				
Female	3.96	0.13	1.0000	Not significant
Male	3.96	0.13		
Position				
Regular employee	3.97	0.13	0.6259	Not significant
Manager	3.94	0.15		
Years of experience				
<1 year	4.08	0.00		
1 to 5	3.97	0.12		
6 to 10	3.99	0.10	0.408	Not significant
11 to 15	3.91	0.18		
16 and above	3.96	0.12		

In terms of User Retention and Experience, respondents agreed that FinTech products and services helps the company to reduce the number of customer defections with computed mean value of 4.00 as shown in Table 6. The results indicates that FinTech products and services improve the customer retention programs of the business and it helps the company to retain as many customers as possible.

Furthermore, Table 6 depicts that majority of the respondents agreed that FinTech products and services sets up a centralized customer data platform (CDP) to integrate paid and owned data from across channels, and it offers unified purchase experiences across devices. More so, respondents agreed that FinTech products and services unveils insights on customer behavior and demand.

In addition, the results support the claim of Zavolokina et al. (2016) that FinTech companies devote a significant amount of time and capital to acquiring new customers, and the sector's inventories are typically limited to the same types of products and services, and because most financial products are intangible, bringing the true value of products to customers before they purchase and finding ways to buy more can be difficult. As a result, there will be a need to promote products and services that are creative, responsive, and relevant in order to attract customers who are not actively looking for new offerings.

In recap, the aforementioned discussion was able to identify that FinTech products and services greatly helps e-Commerce business in terms of blockchain, data management, mobile and tech expertise, security and data privacy, and user retention and experience.

3.3 Significant difference exists in the assessment made by the respondents towards FinTech products and services when group according to their profile.

The results of Mann Whitney U Test and Kruskal Wallis H Test that shows the differences between the assessment made by the respondents towards FinTech products and services as grouped according to their demographic profile is presented in Table 7.

Table 7 shows that the resulting p value of 0.5381 denotes that the mean assessment of the respondents on FinTech is not significantly different when grouped according to age. The lowest mean is from 38 and above years old of 3.92 while highest is 4.02 among 33 to 37 years old. Likewise, mean of male and female on their assessment is exactly the same at 3.96 (p=1.00), while mean response assessment of regular employee of 3.97 also turns out to be not significantly different from 3.94 among manager. Similarly, p value of 0.408 implies that the mean assessment on Fintech when grouped according to years of experience is also not significantly different. The highest response is 4.08 among less than 1 year while lowest is 3.91 among 11 to 15 years of experience.

3.4 Perceive efficiency of supply chain management of selected Quezon City-based e-Commerce businesses in terms of delivery, forecasting accuracy, inventory investment and efficiency, lead time, and overdue backlog.

In terms of Delivery, the perceived impact of FinTech products and services to the efficiency of Supply Chain Management (SCM) of e-Commerce Business is shown in Table 8.

Table 8. Perceived Impact of FinTech Products and Services to Efficiency of Supply Chain Management of e-Commerce Business in terms of Delivery

Delivery	Mean	SD	Interpretation	E %	H %	M %	L %	I %
1. Improve delivery service resulting to develop customer loyalty.	3.63	0.49	High	0.0	62.5	37.5	0.0	0.0
2. Accurate and quick delivery service resulting to positive reviews on the company's website and likely to be recommended to family and friends.	3.55	0.50	High	0.0	55.0	45.0	0.0	0.0
3. Strong and structured delivery process in place.	3.43	0.50	High	0.0	42.5	57.5	0.0	0.0
4. Prompt delivery service and minimize unnecessary delays.	3.45	0.50	High	0.0	45.0	55.0	0.0	0.0
5. Ensuring the parcel is not damaged nor broken during transit and delivered on time.	3.55	0.50	High	0.0	55.0	45.0	0.0	0.0
Overall Mean	**3.52**		**Agree**					

As we glean from the table, majority of the respondents agreed that FinTech products and services greatly affects the efficiency of Supply Chain Management (SCM) of e-Commerce Businesses in Quezon City in terms of delivery with computed over-all mean value of 3.52.

The above result depicts that respondent agreed that FinTech products and services has a strong influence to the efficiency of Supply Chain Management (SCM) of e-Commerce Business by improving the delivery services of the company that results to develop customer loyalty. In addition, respondents agreed that FinTech products and services influence the accuracy and quickness of the delivery service of the company resulting to positive reviews on the company's website and likely to be recommended to family and friends. And it also ensures that parcels are not damaged nor broken during transit and delivered on time.

Furthermore, results support the idea that most businesses are realizing the potential benefits of going digital, so in order to remain competitive, organizations must provide flawless service (Forde, 2020). Lastly, results agree with the idea of Forde (2020) that good delivery management serves as the foundation for success for e-Commerce businesses, and those with an efficient solution in place are more likely to thrive.

Table 9. Perceived Impact of FinTech Products and Services to Efficiency of Supply Chain Management of e-Commerce Business in terms of Forecasting Accuracy.

Forecasting Accuracy	Mean	SD	Interpretation	E %	H %	M %	L %	I %
1. Accurately capture systematic variation in demand.	3.43	0.50	High	0.0	42.5	57.5	0.0	0.0
2. Accurately capture the impact of events known beforehand.	3.50	0.51	High	0.0	50.0	50.0	0.0	0.0
3. Accuracy behave in a predictable way.	3.40	0.50	Moderate	0.0	40.0	60.0	0.0	0.0
4. Applies automatic optimization of forecast models that identifies systematic patterns without manual intervention.	3.45	0.50	High	0.0	45.0	55.0	0.0	0.0
5. Perform risk analysis of the consequences of over- and under forecasting and to make business decisions accordingly.	3.50	0.51	High	0.0	50.0	50.0	0.0	0.0
Overall Mean	**3.46**		**Agree**					

Table 9 shows the perceived impact of FinTech products and services to the efficiency of Supply Chain Management (SCM) of e-Commerce Business in terms of Forecasting Accuracy. Table 9 reveals that respondents agreed that FinTech products and services has a great influence to the efficiency of Supply Chain Management (SCM) of e-Commerce Businesses in Quezon City in terms of forecasting and accuracy with computed over-all mean value of 3.46.

Furthermore, respondents agreed that FinTech products and services greatly influence the efficiency of Supply Chain Management (SCM) of e-Commerce Business by accurately capture the impact of events known beforehand, and perform risk analysis of the consequences of over- and under forecasting and to make business decisions accordingly.

The above results show congruence with the claim of Ketchen et al. (2018) and Lu et al. (2019) that business owners should understand the role of demand forecasting in achieving business results, what factors influence forecast accuracy, how to assess forecast quality, how the main forecast accuracy metrics work, and how to monitor forecast accuracy.

Table 10. Perceived Impact of FinTech Products and Services to Efficiency of Supply Chain Management of e-Commerce Business in terms of Inventory Investment and Efficiency

Inventory Investment and Efficiency	Mean	SD	Interpretation	E %	H %	M %	L %	I %
1. Increased shipment accuracy by eliminating the need for manual entry, significant time savings, and access to meaningful analytics for cost allocation.	3.40	0.50	Moderate	0.0	40.0	60.0	0.0	0.0
2. React to those quick shipments and ensure that the oldest inventory is being shipped first.	3.55	0.50	High	0.0	55.0	45.0	0.0	0.0
3. Easy to track spoiled or faulty inventory.	3.58	0.50	High	0.0	57.5	42.5	0.0	0.0
4. Products can be tracked down and be easily traced once they leave the warehouse.	3.43	0.50	High	0.0	42.5	57.5	0.0	0.0
5. When an item is on recall, inventory management teams have all the relevant information they need to find and isolate bad product.	3.60	0.50	High	0.0	60.0	40.0	0.0	0.0
Overall Mean	**3.51**		**Agree**					

In terms of Inventory Investment and Efficiency, majority of the respondents agreed that the FinTech Products and Services has a great impact to the efficiency of the Supply Chain Management of e-Commerce Businesses in Quezon City with computed over-all mean value of 3.51 as shown in Table 10.

The result indicates that majority of the respondents believed that FinTech Products and Services in fluence the efficiency of the business' Supply Chain Management by obtaining all the relevant information needed by the inventory management teams to find and isolate bad product, especially when an item is on recall, providing easy way to track spoiled or faulty inventory, and reacting to those quick shipments and ensuring that the oldest inventory is being shipped first.

Results support the claims of Jin and Ellram (2020) that effectively managing inventory allows businesses to meet consumer demand with an appropriate amount of supply. Ineffective management can lead to excess inventory, which

risks spoilage, damage, or a shift in demand, causing stock to pile up even more. And to the claims of Forde (2020), that when accurate and up-to-date information is unavailable, communicating with customers about product availability and estimated shipping dates becomes impossible. Results also supports the findings of Ketchen et al. (2018) that effective supply chain management begins with technology.

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Table 11. Perceived Impact of FinTech Products and Services to Efficiency of Supply Chain Management of e-Commerce Business in terms of Lead Time

Lead Time	Mean	SD	Interpretation	E %	H %	M %	L %	I %
1. Hold stock, ideally the right stock.	3.70	0.46	High	0.0	70.0	30.0	0.0	0.0
2. Vertical integration (the ability to source, manufacture and assemble internally).	3.50	0.51	High	0.0	50.0	50.0	0.0	0.0
3. Reduce Cycle Times.	3.43	0.50	High	0.0	42.5	57.5	0.0	0.0
4. Reduce product and component variation and obsolete low runners.	3.53	0.51	High	0.0	52.5	47.5	0.0	0.0
5. Accurate forecasting, planning and scheduling.	3.50	0.51	High	0.0	50.0	50.0	0.0	0.0
Overall Mean	**3.53**		**Agree**					

In terms of Lead Time, Table 11 shows the perceived impact of FinTech products and services to the efficiency of Supply Chain Management of e-Commerce Business in Quezon City.

According to the response made by the respondents, they are all agreed that FinTech products and services has a great impact to the efficiency of Supply Chain Management of e-Commerce Business in Quezon City in terms of lead time with computed over-all mean value of 3.53 as shown in Table 11.

The result shows that FinTech products and services influence the amount of time that passes from the start of a process until its conclusion. Also, respondents agreed that FinTech products and services greatly influence how the business hold their stock, improves vertical integration (the ability to source, manufacture and assemble internally), and accuracy in forecasting, planning and scheduling.

Furthermore, the result supports the claim of Ketchen, et al. (2018) that to reduce lead time, business should: (1) hold stock, ideally the right stock; (2) practice vertical integration; (3) reduce cycle times; (4) have a good equipment and employee availability; (5) reduce supplier lead times, suppliers/vendors hold stock; (6) develop different types of inventory such as Vendor Owned Inventory (VOI), Vendor Managed Inventory (VMI), and Consignment Inventory; (7) change the shipping methods; (8) have accurate forecasting, planning and scheduling; (9) consider good supplier performance and quality, and (10) reduce product and component variation and obsolete low runners.

Table 12. Perceived Impact of FinTech Products and Services to Efficiency of Supply Chain Management of e-Commerce Business in terms of Overdue Backlog

Overdue Backlog	Mean	SD	Interpretation	E %	H %	M %	L %	I %
1. Customer Demand Management.	3.58	0.50	High	0.0	57.5	42.5	0.0	0.0
2. Internal Throughput Management.	3.55	0.50	High	0.0	55.0	45.0	0.0	0.0
3. Supplier Lead Time Management.	3.58	0.50	High	0.0	57.5	42.5	0.0	0.0
4. Analysis of historic actual shipments, the competitive landscape, seasonality and any marketing or sales promotions that will impact demand.	3.38	0.49	Moderate	0.0	37.5	62.5	0.0	0.0
5. Managing lead time.	3.55	0.50	High	0.0	55.0	45.0	0.0	0.0
Overall Mean	**3.53**		**Agree**					

Table 12 shows the perceived impact of FinTech products and services to the efficiency of Supply Chain Management (SCM) of e-Commerce Businesses in Quezon City in terms of Overdue Backlog. As we glean from the table, most of the respondents agreed that FinTech products and services greatly influence the efficiency of Supply Chain Management (SCM) of e-Commerce Businesses in Quezon City in terms of overdue backlog. This means that FinTech products and services prevents backlog or buildup of work that needs to be completed for to ensure business success.

Furthermore, Table 12 shows that respondents agreed that FinTech products and services greatly influence the efficiency of Supply Chain Management (SCM) of e-Commerce Businesses by meeting customer demands properly, managing supplier lead time efficiently, managing internal throughput properly, and above all managing lead time effectively. In addition, results agreed that driving the company's back orders to zero is an excellent way to maximize revenue (Reimann et al., 2017; Xia et al., 2017).

3.5 Significant difference exists on the perceive impact of FinTech products and services to the efficiency of supply chain management of e-Commerce business when group according to their profile.

The results of Mann Whitney U Test and Kruskal Wallis H Test that shows the differences between the perceived impact of FinTech products and services to the efficiency of the Supply Chain Management (SCM) of e-Commerce Businesses in Quezon City when grouped according to their demographic profile is presented in Table 13.

Table 13. Difference between Perceived Impact of FinTech Products and Services to Efficiency of Supply Chain Management of e-Commerce Business when group according to Profile

	Mean	SD	p value	Conclusion
Age				
18 - 22	3.52	0.08		
23 - 27	3.49	0.07		
28 - 32	3.51	0.11	0.4328	Not significant
33 - 37	3.55	0.05		
38 and above	3.47	0.14		
Gender				
Female	3.52	0.1		
Male	3.5	0.1	0.2850	Not significant
Position				
Regular employee	3.51	0.08		
Manager	3.49	0.14	0.4310	Not significant
Years of experience				
<1 year	3.58	0.03		
1 to 5	3.49	0.08		
6 to 10	3.52	0.10	0.4426	Not significant
11 to 15	3.53	0.09		
16 and above	3.47	0.14		

Table 13 shows that the resulting p value of 0.4328 denotes that the mean perceived impact of fintech products and services is not significantly different when grouped according to age. The lowest mean is from 38 and above years old of 3.47 while highest is 3.55 among 33 to 37 years old. Likewise, mean of male and female on their perceived impact is just the same at 3.52 for female and 3.50 for male (p=.2850), while mean response on perceived impact of regular employee of 3.51 also turns out to be not significantly different from 3.49 among manager. Similarly, p value of 0.4426 implies that the mean perceived impact on Fintech when grouped according to years of experience is also not significantly different. The highest response is 3.58 among less than 1 year while lowest is 3.4 among 16 years and above.

3.6 Significant relationship exists between the use of FinTech products and services to the efficiency of supply chain management of e-Commerce business

The results of Spearman's Rank-Order Correlation that shows the relationship between the use and efficiency of FinTech products and services to the efficiency of Supply Chain Management (SCM) of e-Commerce Businesses in Quezon City is presented in Table 14.

Table 14. Relationship between the Use of FinTech Products and Services to Efficiency of Supply Chain Management of e-Commerce Business

Spearman r	p value	Conclusion
0.245	0.1281	Not significant

Table 14 shows that the resulting p value of 0.1281 which exceeds level of significance denotes that the resulting spearman r of 0.245 is not significant. Hence, it can be concluded that the relationship between their assessment on Fintech products and services is not significantly related to their perceived impact to the efficiency of supply chain management of e-commerce. There is no significant relationship exists between the use of FinTech products and services to the efficiency of supply chain management of e-Commerce business.

As mentioned in previous studies, FinTech incorporates technology into financial services companies' offerings in order to improve their use and delivery to consumers. Similarly, it improves the management of the flow of goods and services, which includes all processes that transform raw materials into finished products. It entails actively streamlining a company's supply-side activities in order to maximize customer value and gain a competitive advantage in the marketplace or known as the Supply Chain Management (SCM).

However, the results show no significant relationship exists between the two, might be affected by factors such as the views and assessment of the respondents to each variable independently. Primarily, the respondents assess the FinTech products and services independently with the efficiency of the supply chain management of their respective companies. This could be one of the primary factors that is why the results show a no significant relationship. However, looking closely at factors like age, gender, position, and length of service in the company, a significant difference found as discussed in the succeeding section.

3.7 Significant difference in the relationship between FinTech products and services to the efficiency of supply chain management of e-Commerce business, when grouped according to their profile

Table 15 shows the results of the Mann Whitney U Test and Kruskal Wallis H Test to determine the differences between the relationship of FinTech products and services to the efficiency of supply chain management of e-Commerce business, when grouped according to profile.

Table 15. Difference between the Relationship of FinTech Products and Services to Efficiency of Supply Chain Management of e-Commerce Business when group according to Profile

	Mean	SD	p value	Conclusion
Age				
18 - 22	3.76	0.24		
23 - 27	3.74	0.26		
28 - 32	3.72	0.21	0.000	Significant
33 - 37	3.79	0.24		
38 and above	4.20	0.23		
Gender				
Female	3.74	0.22		
Male	3.73	0.23	0.000	Significant
Position				
Regular employee	3.74	0.23		
Manager	3.72	0.23	0.000	Significant
Years of experience				
<1 year	3.83	0.25		
1 to 5	3.73	0.24		
6 to 10	3.76	0.24	0.000	Significant
11 to 15	3.72	0.19		
16 and above	3.85	0.25		

Table 15 shows that the resulting p values that determine the differences between the relationship of FinTech products and services to the efficiency of supply chain management of e-Commerce business, when grouped according to their profile, and clearly denotes that there is a significant difference between the mean response of the respondents when group according to age, gender, position, and length of service in the company.

The above results established the connection between FinTech products and services to supply chain management of e-Commerce as also being claimed by the surveyed literature and studies. Results shows that, when grouped according to profile, we can clearly see that FinTech products and services has an impact to supply chain management. The results support and strengthen the claims of previous literature and studies towards the direct impact of FinTech products and services to financial services offered by the company, and to the management of the flow of goods and services, which includes all processes that transform raw materials into finished products.

Furthermore, based on the results of the survey and findings of this study, managers and employees of selected e-Commerce Businesses in Quezon City agreed that FinTech products and services significantly improve their businesses in terms of blockchain, data management, mobile and tech expertise, security and data privacy, and user retention and experiences. Respondents also agreed that FinTech products and services have a significant impact on the efficiency of Supply Chain Management (SCM) of e-Commerce Businesses in Quezon City, as measured by delivery efficiency, forecasting accuracy, inventory assessment and efficiency, lead time, and overdue backlog. Furthermore, the findings revealed that demographic profile has no effect on the assessment and perception of the impact of FinTech products and services on Quezon City e-Commerce businesses.

Results indicate that the FinTech space offers a challenging yet exciting future for e-Commerce businesses not only in Quezon City but throughout the country.

To improve the performances of businesses, especially in the e-Commerce industry, companies may adopt the following:

1. Investigate new possibilities.
2. Make all business processes more customer-friendly.
3. Make access more convenient. Fintech companies' business models are less rigid than traditional banks.
4. Provide a positive user experience to keep users coming back.
5. Increase emphasis on mobile.
6. Maximize the use of social media platforms.
7. Create useful content.
8. Select paid advertising campaigns.
9. Invest in influencer and referral programs.
10. Demonstrate empathy.

IV. CONCLUSION

Based on the findings of this study, the following conclusions were drawn:

Majority of the respondents falls within the age bracket of 28 to 32 years old, they are female, consists of regular employees and managers, and most of them are in the industry for 1 to 5 years and 11 to 15 years upon the conduct of this study.

FinTech products and services greatly helps e-Commerce business in terms of blockchain, data management, mobile and tech expertise, security and data privacy, and user retention and experience.

There is no significant difference in the assessment made by the respondents towards FinTech products and services in terms of blockchain, data management, mobile and tech expertise, security and data privacy, and user retention and experience when group according to their profile.

FinTech products and services has a great impact on the efficiency of supply chain management of e-Commerce business in Quezon City in terms of delivery, forecasting accuracy, inventory investment and efficiency, lead time, and overdue backlog.

There is no significant difference on the perceive impact of FinTech products and services to the efficiency of supply chain management of e-Commerce business in terms of inventory investment and efficiency, delivery, forecasting accuracy, lead time, and overdue backlog when group according to their profile.

There is no significant relationship exists between the use of FinTech products and services to the efficiency of supply chain management of e-Commerce business.

And there is a significant difference in the relationship between FinTech products and services to the efficiency of supply chain management of e-Commerce business, when grouped according to their profile.

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