

THE INFLUENCE OF DIGITALIZATION ON CUSTOMER SATISFACTION THROUGH SUPPLY CHAIN INTEGRATION AS AN INTERVENING VARIABLE AT DHL EXPRESS KALIMANTAN 2024

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Abstract: This research aims to analyze the impact of digitalization and supply chain integration in optimizing services and its influence on customer satisfaction of DHL Express Kalimantan. In an era of globalization and rapidly evolving technology, logistics companies like DHL Express Kalimantan need to implement effective digital innovation and supply chain integration strategies to remain competitive and meet customer satisfaction. Effective supply chain integration, both internally and externally with business partners, can reduce cycle times and improve responsiveness to customer demand. Digitization and supply chain integration as a whole contribute positively to customer satisfaction. This research uses quantitative methods with data collection through questionnaires distributed to DHL Express Kalimantan customers. The sample used was 120 respondents who were DHL Express Kalimantan customers and analyzed using Structural Equation Modelling-Partial Least Square (SEM-PLS).

Keywords: *Digitalization, Supply Chain Integration, Customer Satisfaction, DHL Express*

1. Introduction

Businesses use customer satisfaction to attract customers, so companies must provide the best service if they want to survive and maintain customer trust (Zalelawati et al., 2023). In other research (Hardiyanti, 2017) Providing the best service is one way to satisfy customers. Besides, according to (Hardiyanti, 2017) If a company has high-quality services, customers will feel satisfied and compare them. Therefore, businesses must begin to consider customer service more thoroughly through service quality because it is increasingly realized that customer satisfaction is the key to business sustainability and victory compared to competitors.

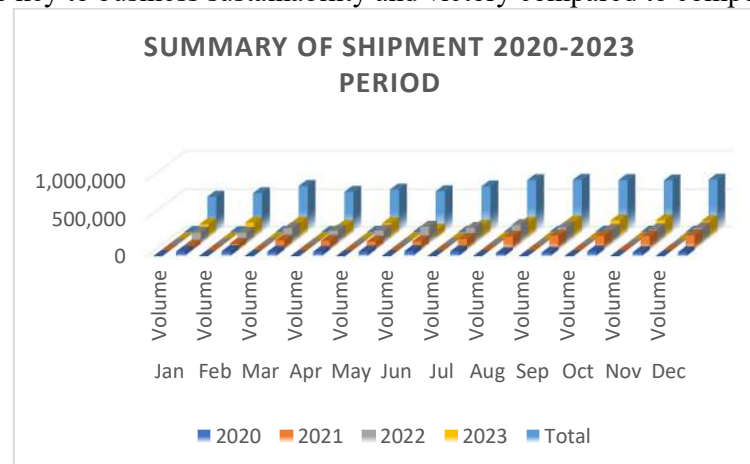


Figure. 1. Summary of Shipment 2020-2023 Period

This graph shows the 2020-2023 shipment results. Overall, there was a significant increase in both volume and weight each year. In 2021, volume increased by 53.38%, and weight increased by 145.38%. The increase in DHL Express shipments was due to COVID-19 at the time. With social distancing and health concerns, many people are turning to digital solutions, such as MyDHL+, an app that offers online booking, real-time tracking of shipments, and comprehensive information on delivery services. Deliveries can be arranged more efficiently and safely as customers do not need to visit a physical location. This proves that digital transformation is essential for DHL Express and businesses. It also keeps the supply chain well-integrated under challenging conditions.

With the advancement of information technology, the Industrial Revolution 4.0 helps the development of industry. New technologies can improve HR efficiency. According (Mantri & Yusuf, 2023) Digitizing services is one of the innovations in the shipping and logistics industry. It is designed to meet the needs of today's customers, who typically want fast, accurate and efficient services. DHL Express, a courier service company, is following the digitization trend and turning its business services digital. Nearly 90% of companies believe that digitalization will provide a competitive advantage in the supply chain in the next five years. However, most companies (73%) are very unclear about what it means to “digitize” the supply chain (SupplyChainDigest, 2016). According Saxena (2016) in (Liu & Chiu, 2021), Companies that are not prepared to take advantage of these digital and technological advancements risk going out of business.

Supply chain digitization is influenced by technological advancements such as cloud computing, artificial intelligence (AI), Internet of Things (IoT), and mobile technology. This can be achieved by providing correct and open data. This enables accurate forecasting of upcoming events and improves supply chain robustness, adaptability and resilience (Bienhaus & Haddud, 2018) (Gunasekaran et al., 2017). Dr. Lina Anatan, a supply chain management expert, said that the main characteristic of business competition today is competition between networks, or networks, where competition no longer occurs between individual companies or organizations but between supply chains (Sherlywati, 2018). Relationships with customers are affected by integration; if there is no integration between the actors in the chain, delays and poor performance in various aspects of the chain can occur (Wong et al., 2011).

With the existing phenomenon, this research aims to show whether digitalization and supply chain integration significantly influence customer satisfaction. In other words, this research shows that digitalization and supply chain integration have a significant influence on customer satisfaction (Heni Susilowati & Siswanto Siswanto, 2021). The results show that, although digitalization of customer satisfaction is affected by supply chain integration, service provision variables and digitalization partially and simultaneously have a positive effect on customer satisfaction. In addition, the results show that there is a strong relationship between customer satisfaction and each of the SCM practices (firm integration with suppliers, firm integration with customers, information sharing practices, internal integration, and logistics design practices) (Enterprises & Region, 2021).

2. Literature review

2.1 Customer Satisfaction

A critical goal for business activities is customer satisfaction. Customer satisfaction contributes to several essential aspects, such as building customer loyalty, improving company reputation, and employee efficiency and productivity. In addition, customer satisfaction is considered one of the best indicators of future profits (Ritter & Pedersen, 2020). Service providers try to attract as many customers as possible in the hope that they will use their services

and be satisfied with the results. To maintain customer satisfaction, service providers must pay attention to several things that will ultimately result in customer satisfaction through service quality, maintaining relationships with customers, and maintaining customer trust (Kediri et al., 2023). To achieve customer satisfaction, companies must understand customer expectations correctly and precisely because companies often cannot control customer expectations, which can cause customers to switch to competitors (Mulatsih et al., 2015). In research on Determinants of Customer Satisfaction, indicators of customer satisfaction were studied by (Sangereng et al., 2021), namely Delivery Time, Delivery Cost, Delivery Reliability, Complaints and Delivery, and Information Quality.

2.2 Digitalization

With advances in the creation, transfer, storage, and analysis of digital data, digitization can structure, shape, and influence the modern world (Ritter & Pedersen, 2020). According to (Aziz, 2012), Information technology includes all aspects of the process, tools, manipulation, and management of information. Brennen & Kreiss (2016) state that digitalization is when digital data becomes more accessible thanks to advances in the creation, delivery, storage, and analysis of digital data. The criteria for measuring the success of digital transformation for businesses are ease of transactions for customers and consumers, faster service speed, greater transparency, and the ability to customize services according to customer needs (Heni Susilowati & Siswanto Siswanto, 2021). According to (Anggraeni et al., 2023) The shift from analog data to digital data to accelerate existing processes, such as building an operational backbone or implementing an ERP system through standardized processes, and business transformation and digitalization have met the company's existing problems. An increase in corporate profits has been observed during the research period after implementing digitalization (ERP system) and business transformation (Ritter & Pedersen, 2020). According to Brennen & Kreiss (2016) in (Zhang et al., 2020), that digitalization can “structure, shape and influence the contemporary world” due to advances in the creation, transfer, storage and analysis of digital data.

2.3 Supply Chain Integration

Chain integration is always related to the term “supply” as it refers to the extent to which an organization can cooperate with supply chain management partners and orchestrate organizational processes, both domestically and internationally, to achieve effective products, information services, payments, and decision-making and goals that generate more excellent value (Eriksson, 2015). Indicators of supply chain integration according to (Singh & Teng, 2016) and Kaliani et al (2016) in (Nabila Achmad Wildan, 2019) namely, delivery, establishing relationships between service providers and customers, building competitive communication, monitoring performance and activities, and coordinating activities Every function in an organization must be integrated internally, as well as externally, through coordination relationships between organizations (producers-consumers) (Mulatsih et al., 2015). Suppliers, customers and internal integration are the three dimensions of supply chain integration. The goal is to save money and provide customers with added value (Shukor et al., 2020). According to (Zhang et al., 2020) In the supplier integration process, the company cooperates and works together with its suppliers to optimize the supply of inputs.

2.4 THE INFLUENCE OF DIGITALIZATION ON CUSTOMER SATISFACTION

In the digital age, digital transformation is a critical component in driving economic and financial growth towards sustainability. This is not only a global trend, but also an imperative to maintain competitiveness, sustainability and benefits for the general public (Togatorop et al.,

2024). Business digitization can provide value to every customer. Digitalization through electronic services has a positive and significant effect on customer satisfaction (Josua et al., 2017). From other research conducted (Mantri & Yusuf, 2023), the results of this research reveal that there is an effect of service digitalization on customer satisfaction at PT Pos Indonesia, Bandung City Headquarters.

Based on previous research, the hypothesis of this research can be formulated as follows:

H1: It is suspected that digitalization has a positive effect on customer satisfaction.

2.5 THE INFLUENCE OF SUPPLY CHAIN INTEGRATION ON CUSTOMER SATISFACTION

Supply chain integration is a strategic move where businesses work together with their supply chain partners to manage intra- and inter-organizational processes with the aim of achieving better customer satisfaction and making communication with customers easier, clearer, and more efficient (Flynn et al., 2010). Companies that can ensure that all parties involved are satisfied, comfortable, and loyal Businesses must be able to integrate all elements of the supply chain into their operations so that their operations can run well (Firmansyah & Priyono, 2022).

Based on previous research, the hypothesis of this research can be formulated as follows:

H2: It is suspected that Supply Chain Integration has a positive effect on Customer Satisfaction.

2.6 THE INFLUENCE OF DIGITALIZATION ON CUSTOMER SATISFACTION WITH SUPPLY CHAIN INTEGRATION AS AN INTERVENING VARIABLE

Companies can improve relationships with their partners by adopting technological innovations, which improve supply chain integration (Ramdani & Hidayati, 2023). This fact is supported by research (Aloulou, 2019), which found that strategic orientation through market orientation and technology orientation is very beneficial for supply chain integration. his statement is also supported by research (Agan, 2011), which found that there is a direct relationship between information technology capabilities and supply chain integration. Furthermore, research findings (Vanpoucke et al., 2017) corroborate this statement. The results showed that information technology has a significant positive effect on supply chain integration performance.

Based on previous research, the hypothesis of this research can be formulated as follows:

H3: It is suspected that Digitalization have a positive effect on Supply Chain Integration

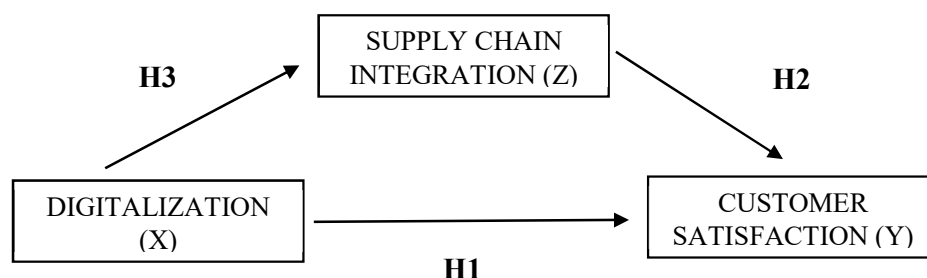


Figure 2. Framework

3. Research method

This research uses quantitative methods and data is collected through online questionnaire distribution using the Google Form platform. The population in this study were DHL Express Kalimantan customers who have interacted with the company's digitization and supply chain systems. The sample used was 120 respondents taken from 3 large companies (Komatsu Marketing Support Indonesia, Hexindo Adiperkasa, Trakindo Utama) that frequently use DHL Express Kalimantan courier services. The collected data were analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS) with the help of SmartPLS software.

Table 1. Key Indicator

Variable	Definition	Indicator
Digitalization (X1)	Digitalization According to Brennen & Kreiss (2016) in research (Zhang et al., 2020) the increased availability of digital data made possible by advances in data creation, transmission, storage, and analysis can “structure, shape, and influence the contemporary world”.	1. Convenience in transaction needs for customers. 2. Faster service can be accessed by customers. 3. Services provided are more transparent. 4. Can be personalized according to consumer needs. (Heni Susilowati & Siswanto Siswanto, 2021)
Supply Chain Integration (X2)	One of the strategic steps that companies can take is supply chain integration, which allows them to cooperate with their supply chain partners and manage intra- and inter-organizational processes simultaneously. The goal of supply chain integration is to ensure that the flow of products and services, information, money, and decisions is carried out in an efficient and effective manner, and to deliver maximum value to customers at low cost and high speed (Flynn et al., 2010).	1. Delivery. 2. Establishing contact between the service provider and the customer. 3. Creating competent communication. 4. Performance and Activity monitoring. 5. Activity coordination. (Singh & Teng, 2016)
Customer Satisfaction	After acquiring and using goods or services, customer satisfaction is	1. Delivery Time.

- (Y) defined as the customer's overall attitude towards them (Supertini et al., 2020).
2. Delivery Cost, Delivery Reliability.
 3. Complaints and Delivery.
 4. Information Quality.
- (Sangkereng et al., 2021)

4. Results and Discussion

4.1 Results

Table 2. Convergent Validity and AVE

Construct	Item	Outer Loading	T-Statistics	AVE	Result
Digitalization	D.1	0,705	10,486	0,524	Valid
	D.2	0,783	17,750		Valid
	D.3	0,774	19,404		Valid
	D.4	0,769	16,781		Valid
Supply Chain Integration	SCI.1	0,657	9,140	0,575	Valid
	SCI.2	0,775	16,06		Valid
	SCI.3	0,811	23,944		Valid
	SCI.4	0,775	16,770		Valid
	SCI.5	0,463	4,035		Valid
Costumer Satisfaction	CS.1	0,828	23,362	0,501	Valid
	CS.2	0,854	30,179		Valid
	CS.3	0,638	8,982		Valid
	CS.4	0,683	11,978		Valid
	CS.5	0,577	7,245		Valid

According to (Abdullah, 2015), To determine the convergent validity of model measurements, you can look at the correlation between the indicator score and the variable score. An indicator is considered valid if its AVE value >0.5 or if the variable dimension's outer load value >0.5 . It can be concluded that the indicators used in this research achieved results convergent validity.

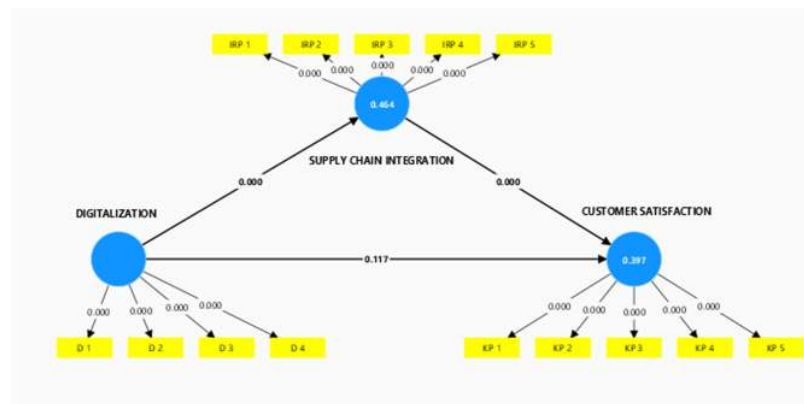


Figure 2. PLS Alagarithm

Tabel 4. Discriminant Validity

	Customer Satisfactio	Digitalization	Supply Chain Integration
CS			
D	0,642		
SCI	0,775	0,880	

Based on Table 4, compared to the loading results of other constructs, all construct indicators show a higher relationship. Thus, it can be concluded that discriminant validity is good. For this reliability test, the Composite Reliability (CR) method and the Alpha-Cronbach method are used. According to Ghazali (2011), research instruments can be trusted if the CR and Alpha-Cronbach values are greater than 0.6. The results of Reliability testing are shown below.

Tabel 5. Reliability Testing

	Composite Reliability	Cronbach's Alpha	Result
Customer Satisfaction	0,812	0,770	Reliable
Digitalization	0,763	0,756	Reliable
Suplly Chain Integration	0,788	0,743	Reliable

Tabel 6. Hypothesis Testing

Path	Path Coef	Sample Mean	Standard Deviation	T Statistics	P Values
D - CS	0,178	0,179	0,113	1,569	0,117
D- SCI	0,681	0,686	0,059	11,543	0,000
SCI - CS	0,496	0,504	0,100	4,944	0,000

Based on table 6, Digitalization has an effect on Supply Chain Integration as shown by the calculation of $11.543 > 1.97$. This shows that Digitalization has a direct effect on Supply Chain Integration as measured by a correlation coefficient of 0.681. Supply Chain Integration has a positive effect on Customer Satisfaction with a tcount of $4.944 > 1.97$ and with a Path Coef of 0.496. However, Digitalization on Customer Satisfaction has a coefficient of 0.178 with t count $1.569 > 1.97$, meaning that Digitalization has an effect but not directly on Customer Satisfaction.

Table 7. Indirect Effect

Variable	Original Sample	Result
D>SCI>CS	0,338	Significant

From table 7, it can be seen that digitalization has an indirect impact on customer satisfaction through supply chain integration with a result of 0.338 or 33,8%.

Table 7. R Square Model

	R-square	R-square adjusted
Customer Satisfaction	0,397	0,387
Supply Chain Integration	0,464	0,459

Based on the data, it is known that the R square value of the digitization variable is 46.4% on supply chain integration, and the R square value of the digitization variable and supply chain integration on customer satisfaction is 39.7%.

4.2 Discussion

4.2.1 There is an effect of Digitalization on Customer Satisfaction

Digitalization has a positive influence but indirect effect on customer satisfaction, but digitalization remains a key factor in customer satisfaction. Digitalization of services, such as the real-time shipment tracking system that allows customers to monitor the position of their goods at all times, is highly valued by customers and increases their sense of security and trust in DHL Express. In addition, customer satisfaction increases due to easy access to services through mobile apps and digital platforms. This is in line with previous research conducted by (Mantri & Yusuf, 2023) on customers at PT Pos Indonesia, Bandung City with a correlation coefficient of 0.665 and a coefficient of determination of 0.442, which shows that service digitization has an influence of 44.2 percent on customer satisfaction at PT Pos Indonesia, Bandung City. Other factors not examined in this research have an influence of 55.8 percent.

4.2.2 There is an effect of Supply Chain Integration on Customer Satisfaction

Supply Chain Integration has a positive effect on Customer Satisfaction with a t-count of $4,994 > 1.97$ and with a correlation coefficient of 0.496. This is because customers enjoy a faster delivery process and rarely experience delays due to better coordination between DHL Express and its partners around the world. This is in line with research conducted by (Enterprises & Region, 2021). According to the findings, there is a strong relationship between customer satisfaction and each of the following SCM practices (company integration with suppliers; company integration with customers; information sharing practices; internal integration with customers).

4.2.3 There is an effect of Digitalization on Supply Chain Integration

Digitalization has a positive effect on Supply Chain Integration with a t-count of 11,543 > 1.97 and with a correlation coefficient of 0.681. Companies can improve relationships with their partners by adopting technological innovations, which improve supply chain integration (Ramdani & Hidayati, 2023). This is in line with previous research which says that technology has a positive influence on customer satisfaction (Ramdani & Hidayati, 2023), (Aloulou, 2019), (Agan, 2011), and (Vanpoucke et al., 2017) The results showed that information technology has a significant positive effect on supply chain integration performance.

5. Conclusion

This research aims to see how digitalization and supply chain integration affect customer satisfaction. The results of the data analysis show that the independent variable, digitalization, has a significant influence on the dependent variable, customer satisfaction. In addition, supply chain integration also influences digitalization on customer satisfaction. According to the analysis results of this research, digitalization has a significant positive effect on customer

satisfaction. Digital technology in various parts of business operations has been shown to improve the quality and efficiency of customer service, resulting in better customer experience and satisfaction. In addition, it was found that customer satisfaction increases significantly with supply chain integration. Using an integrated supply chain management system and better collaboration between various parties in the supply chain allows for faster and more timely delivery of products. It reduces errors and uncertainties, resulting in more satisfied customers. Overall, this research shows that digitization and supply chain integration are critical to improving customer satisfaction. Companies that invest in digital technologies and optimize their supply chains tend to provide better services and meet customer expectations more effectively.

6. Implications

6.1 Theoretical Implications:

This research can support the theory that digitalization and supply chain integration increase customer satisfaction. It can also add new insights into how digitalization affects efficiency and customer satisfaction and enrich the literature on supply chain management by providing empirical evidence supporting or opposing theoretical models that link digitalization and supply chain integration to increased customer satisfaction.

6.2 Practical Implications:

Companies should invest in technologies supporting supply chain integration and digital technology adoption to achieve competitive advantage. These technologies should also assist customers in interacting with supply chain integration, which can improve customer experience and loyalty.

7. Research limitations

7.1 Data Limitations

The main limitation of this research was access to data. The data in this research came from primary sources, and the researcher needed help accessing critical data for more in-depth analysis. Due to the data providers' privacy and confidentiality limitations, researchers had to use the current information, even though it was relevant.

7.2 Sample Limitations

This research cannot represent a population larger than seventy respondents as the sample size was limited to seventy people. The sample is only from one city, which may affect how generalizable the findings are. Findings may differ due to economic and social differences elsewhere.

7.3 Time Limitations

This research was conducted over a relatively short period of two months, which limited the ability to collect more in-depth data—the short time also impacted the amount and quality of data collected. Reduced sample representation may occur as some respondents may not be able to respond within the specified time.

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