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The Effect of E-Commerce Platform on Inventory Turnover: Evidence from Indonesian Retail Companies

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Abstract: Digital transformation has transformed the retail industry, as consumers gradually shift from physical stores to online shopping platform. This condition has intensified competition and encouraged retail companies to adopt online channel. This study examines the effect of e-commerce platform adoption and other factors, such as gross margin, capital intensity, sales growth, firm size, and time trend, on inventory turnover among retail companies in Indonesia. The study objective is to examine whether adopting e-commerce actually has a positive effect on inventory turnover. A quantitative method is applied using secondary financial statement data from 14 retail companies covering the years 2016 to 2024. The study using panel data regression with the random effects model. The results show that e-commerce platform adoption has an insignificant effect, suggesting that e-commerce adoption alone does not directly enhance inventory efficiency in Indonesian retail companies. This study also find that gross margin has a significant negative effect on inventory turnover, while sales growth has a significant positive effect. Capital intensity, firm size, and time trend has no significant influence. Overall, this study provides new insights into how the use of e-commerce platform affects inventory turnover in the Indonesian retail industry.

Keywords: Retail Industry, E-commerce Adoption, Inventory Turnover, Gross Margin, Capital Intensity, Sales Growth, Firm Size, Time Trend

INTRODUCTION

The retail industry is growing and developing in Indonesia, providing many job opportunities, as well as giving a significant contribution to the national economy. According to statistics data, the wholesale and retail trade sector, including the retail subsector contributed 12.91% to the national Gross Domestic Product (GDP) (Badan Pusat Statistik, 2024). Furthermore, the market value of Indonesia's retail industry was around USD 46.34 billion in 2022, and the government predicts that the retail industry will increase in value to USD 71.89 billion by 2031, with a Compound Annual Growth Rate (CAGR) of 5% over the projected growth period (Ministry of Trade of the Republic of Indonesia, 2023). Therefore, the retail industry is an important growing industry in Indonesia. The level of contribution that the retail industry makes to the GDP and the positive market values projected by the government indicate

that this industry is currently supporting the national economy, and the retail industry has the potential for further growth in the future.

The rise of digitalization has prompted a number of industries to change their ways of doing business and to develop new business models, including the shift from physical store to online store. As a result of rapid technology advancement, many innovative technologies have emerged in the retail sector (Mostaghel et al., 2022). The use of this technology has seen significant growth due to the shift in consumer behavior caused by the COVID pandemic. According to Badan Pusat Statistik (2020), online sales during the pandemic increased significantly compared to sales in January 2020, rising by 320% in March 2020 and further increasing to 480% in April 2020. In addition, the changes caused by the COVID pandemic have also provided a different perspective on how consumers shop, with a very high relative preference to online shopping compared to shopping in a traditional retail store.

In this dynamic economy, retailers need to adapt to changing consumer preferences by accelerating their digital transformation efforts. The expansion of internet penetration in Indonesia with more than 70% of the population having internet access has encouraged the growth of e-commerce, which is transforming the retail industry (Ministry of Trade of the Republic of Indonesia, 2023). Based on the data from Bloomberg Intelligence (2024), the online retail sales in Indonesia is growing faster than the offline retail sales. The offline retail sales are projected to reach IDR 2,449 trillion in 2028, while online retail sales are projected to reach IDR 1,660 trillion. Although the proportion of online retail sales is still lower in value, the growth of online retail sales is still expected to continue in the future.

The retail market's growth will lead to more competition in this sector. In addition to adopting e-commerce, firms will need to monitor their performance, especially important operational metrics like inventory turnover. For retailers, inventory turnover is an important performance metric to measure how well a firm is managing its inventory and how often a firm is selling products (Breivik, 2019). Maintaining a sustainable inventory turnover is essential for retailers to remain competitive as the retail industry continues to evolve. Therefore, it is essential to determine whether the adoption of e-commerce platforms will have a positive impact on inventory turnover for retail firms within Indonesia. This study introduces novelty by including e-commerce adoption as a factor in the inventory turnover model for the Indonesian retail industry. Previous studies mostly focused on financial and operational factors, including gross margin, capital intensity, and sales growth. In addition to focusing on e-commerce adoption, this study also examines the influence of digital transformation on inventory turnover. These findings should enhance understanding about how digital transformation affects inventory turnover for emerging markets.

To understand how e-commerce adoption may influence inventory turnover, it is important to review the theories and previous studies. A literature review is needed to provide a clear understanding of the concepts and research that relate to this study. Therefore, this section provides theoretical foundation related to literature on this study.

Inventory Turnover

Inventory turnover is a financial ratio that measures the effectiveness of companies in managing their inventory. It also indicates the frequency of the company to sell and replace its inventory over a specific period. This ratio is calculated by dividing the cost of goods sold to its average inventory. In practice, inventory turnover is frequently used. This ratio is utilized by the companies to correlate their inventory level with their sales and evaluate their inventory performance trend over time, as well as compare their performance against competitors of differing sizes (Hançerlioğulları et al., 2016). A high inventory turnover ratio is a good sign for the company because it can indicate high sales and efficient inventory management, while low ratio shows weak sales performance and inefficiencies in inventory levels.

Inventory is a significant asset in a retail company, and its management can significantly impact on the company's financial and operational performance. On average, inventory contributes for about 36% of a retailer's total assets and 53% of its current assets, thus retailers pay close attention to inventory productivity (Gaur et al., 2005). Retail companies operate in a fast-moving and highly competitive landscape, where maintaining optimal inventory level is crucial. Taking a longitudinal approach to evaluating inventory management performance is critical to understand how retail firms maintain their competitive advantage over time (Shockley and Turner, 2014). According to (Breivik, 2019), inventory turnover is most frequently used to measure inventory management performance in the company. Therefore, inventory turnover is used for evaluating the impact of adopting e-commerce platforms into retail sales and distribution strategies in this study.

Determinants of Inventory Turnover

In determining the effect of e-commerce platform adoption on inventory turnover, this study uses some variables related with firm's characteristics such as, gross margin, capital intensity, sales growth, and firm size, as the previous studies stated. There are some determinants of inventory, such as gross margin, capital intensity and sales surprise (Gaur et al., 2005; Rumyantsev and Netessine, 2007; Kolias, et al., 2011; Sano and Yamada, 2020; Yousaf and Dehning, 2023). In addition, some studies include sales growth as their research variable (Breivik, et al., 2021; Breivik, 2019; Kolias, et al., 2011; Rumyantsev and Netessine, 2007).

Gross margin is defined as the difference between sales and cost of goods sold divided sales. The relationship between gross margin and inventory turnover is direct with an optimal service level, and indirect through pricing, product variety and product life cycle length (Gaur et al., 2005). Meanwhile, capital intensity is defined as the ratio of gross fixed assets to sum of gross fixed asset and inventory. Capital intensity shows the investment level of a company in fixed asset, such as information technology, warehouses, and distribution networks. These types of fixed asset investments will increase the efficiency of inventory management and the expectation is higher capital intensity will increase the inventory turnover (Sano and Yamada, 2020).

Instead of sales surprise, this study uses sales growth as the independent variable, which represents the percentage increase in sales from the previous year. Meanwhile, firm size is proxied by total sales. The size of a company can influence how quickly it sells through its inventory, so that small business owners should give more attention to inventory management by closely monitoring inventory levels (Breivik, 2019).

Finally, time trend is used in this study to manage the impact of external changes on companies. Moreover, time trends are used in inventory turnover research to systematically capture changes in inventory performance over time (Gaur et al., 2005; Kolias, et al., 2011; Breivik, 2019; Breivik, et al., 2021). All of these variables are crucial to obtain more accurate estimation of the relationship between e-commerce platform adoption and inventory turnover.

Adoption of E-commerce Platforms in Retail Industry

Electric commerce, or also known as e-commerce provides a digital marketplace for businesses to sell and distribute their products. According to (Rainer Jr. et al., 2021), the term e-commerce is used to describe the process of purchasing, selling, transferring, or exchanging of products, services, and/or information via computer networks, particularly the internet. In just three decades, e-commerce has transformed the way people shop, from shopping in-store activity into a digital experience where consumers can browse, purchase, and receive goods without leaving their homes (McKinsey & Company, 2025). The e-commerce transformed the retail industry by providing a new sales distribution channel, which can also increase market competition.

The growth of e-commerce has created both opportunities and challenges for retailers. According to Intel Corporation, e-business provides six major benefits, including better management information, improved integration with suppliers and vendors, stronger channel partnerships, reduced transaction costs, deeper understanding of the market, and the ability to reach many more geographic markets (Damanpour, 2001). Companies that implement an online sales channel achieve better overall company performance and higher sales compared to firms that do not use such channels (Cosgun and Dogerlioglu, 2012). At the same time, the rise of e-commerce becomes challenges for traditional retailers, since they have to invest more in digital infrastructure to remain competitive in today's economy. For large companies that already have established e-commerce systems, the transition to an online shopping method has been beneficial. On the other hand, small and medium-sized companies are generally faced with great difficulty in implementing and adopting an e-commerce model and typically receive fewer revenues from e-commerce (McKinsey & Company, 2025).

In this digital era, e-commerce platforms have become more widely used in the retail industry because they allow companies to reach larger markets and adapt to consumer preferences for convenience and fast transactions. Consequently, many retailers have integrated these platforms into their business strategies. According to the Ministry of Trade of the Republic of Indonesia (2023), e-commerce accounted for approximately 11.5% of total retail sales in 2022, with projections indicating a rise to 21.8% by 2027. E-commerce platforms are still growing in Indonesia as the number of people shopping on online platforms increases. Currently, many platforms operate in the market, with Tokopedia and Shopee as the most popular among online visitors. In the second quarter of 2022, Tokopedia recorded the highest online traffic, with 158.35 million clicks, followed by Shopee with 131.3 million clicks (Pusat Data dan Sistem Informasi Kementerian Perdagangan, 2024). Because there are many e-commerce platforms operating in Indonesia, this study focuses only on retailers that use those two major e-commerce platforms for their business.

E-Commerce Adoption Based on the Resource-Based View (RBV) Theory

The Resource-Based View (RBV) provides a theoretical framework for explaining how adopting e-commerce can improve retailer's performance by enhancing inventory efficiency. Several retail companies have started to use e-commerce platforms to sell their products, as a way for them to remain competitive in the middle of the rise of digital transformation. To achieve a lasting competitive edge, a firm's resources must be distinctive, economically valuable, and challenging for rivals to imitate (Barney, 1991). Teece et al. (1997) introduced the notion of dynamic capabilities, which describes a firm's capacity to integrate, build, and adapt its internal and external competencies amid rapidly evolving environments. In addition to aligning existing resources with present market opportunities, firms need to build the ability to recognize new opportunities and respond quickly to them (Jarvenpaa & Leidner, 1998). Therefore, possessing resources alone is insufficient, firms must also have strong dynamic capabilities to utilize these resources optimally.

This study defined e-commerce as a firm resource that can help companies to remain competitive during periods of rapid growth due to digital transformation. The critical factor in the effectiveness of e-commerce is the firm's ability to successfully integrate its online and offline sales channels. According to Xia and Zhan (2010), online and offline sales channels can work together in many ways. For instance, the online sales channel may expand the company's market reach, provide the customer with more detailed information about products, and allow the customer to receive customer support via the internet. In addition to this, customers making purchases through the online channel generate valuable data which can be used by the company to improve its marketing tactics and forecast future sales. Last, there is a complementarity between the two sales channels through distribution networks. Traditional retail stores have already established distribution infrastructures that can support the fulfillment and shipping of

orders made via the online sales channel. Thus, according to the Resource-Based View (RBV), the adoption of e-commerce represents a strategic resource for improving a company's ability to manage its inventory efficiently, assuming the company possesses the necessary resources and capabilities.

Relationship Between E-commerce Platform Adoption and Inventory Turnover

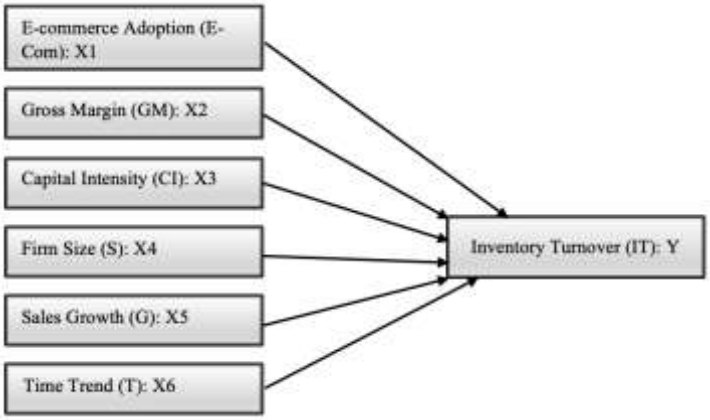
In recent years, many retail companies have adopted e-commerce as their additional sales and distribution strategy. The significant increase of online sales has accelerated retail companies to start selling their products on digital platforms. E-business is no longer an option, it has become an imperative factor for any business success in the future (Damanpour, 2001). With the continuous advancement of technology over time, it has become crucial for the companies to have the capability to adapt in order to remain competitive in the industry. Based on the previous studies by (Xia and Zhang, 2010), the benefit from using online channels offers traditional retailers the ability to use the channel to manage inventory more effectively and facilitate fast turnover of products. Companies that integrate online sales channel have a better overall performance and higher sales compared to other firms with no online sales (Cosgun and Dogerlioglu, 2012). According to (Zhu & Kraemer, 2002), e-commerce adoption is positively associated with inventory management and supply chain efficiency, which lead to improving inventory turnover. Selling through online channel not only expands the market reach but also increases overall sales by making products more accessible to a wider range of consumers. The increase of sales indicates that inventory can be turned over more quickly, so it leads to higher inventory turnover. Hence, this study seeks to analyze the effect of e-commerce platform adoption on inventory turnover among retail companies listed on the Indonesia Stock Exchange.

METHOD

This study employs a quantitative approach to analyze the effect of e-commerce platform adoption and other factors, such as gross margin, capital intensity, sales growth, firm size, and time trend on inventory turnover among retail companies. The population of this study includes all retail companies classified as retailing subsector on the Indonesia Stock Exchange. From a total of 44 listed companies, 14 companies were selected as the sample based on the availability and completeness of data from 2016 to 2024.

This study uses secondary data obtained from the financial statements published by retail companies. Historical financial data are collected annually for a nine-year period from 2016 to 2024. Additionally, information regarding e-commerce adoption platforms was gathered from annual reports, e-commerce platform information, and publicly available news. In addition, this study uses secondary data from previous empirical studies to support the literature review related to the research topic.

The variables used in this study consist of one dependent variable and six independent variables. The dependent variable is Inventory Turnover (IT), measured by dividing the cost of goods sold to its average inventory. The independent variables include E-commerce Adoption (E-com) that measure using a dummy variable (0=not adopt e-commerce, 1=adopt e-commerce), Gross Margin (GM) defined as the difference between sales and cost of goods sold divided sales, Capital Intensity (CI) is defined as the ratio of gross fixed assets to sum of gross fixed asset and inventory, Sales Growth (G) measures by annual sales divided by prior sales, Firm Size (S) is defined as the annual sales, and Time Trend (T) is defined as linear time trend (coded sequentially as 1, 2, 3, … for each year in the sample period). These variables are selected based on prior empirical studies to capture operational and financial factors influencing inventory turnover. The conceptual framework was developed for this study, as shown in Figure 1.



Source: Research Results

Figure 1. Conceptual Framework

The procedure of this study involves collecting data, computing the variables based on defined formulas, and preparing the dataset for panel data regression. After data preparation, a classical assumption test is conducted to check normality, multicollinearity and heteroskedasticity. The next procedure includes running model selection tests, using Chow test, Lagrange Multiplier test, and Hausman test, to determine the appropriate panel data model. Panel data regression analysis is used to test the hypotheses and assess the relationship between independent variables and inventory turnover. The analysis is conducted using statistical software Stata version 17. In addition, the hypothesis testing includes the F-test for overall model significance, the T-test for individual variable significance, and the coefficient of determination to assess model explanatory power.

RESULTS AND DISCUSSION

After conducting the classical assumption tests and regression model selection procedures, the model was confirmed to be valid, and the random effects model was determined as the most appropriate model for this study. The results of this study are presented in this section, including the descriptive statistics, the correlation matrix analysis and the regression analysis. Each result is further interpreted to explain its relevance to the research objectives.

Descriptive Statistics

Table 1 shows the descriptive statistics result of the dependent and independent variables of the dataset.

Table 1. Descriptive Statistics Result

Variables	Obs.	Full Sample				E-com=0	E-com=1
		Mean	Std. dev.	Min.	Max.	Mean	Mean
IT	126	9.313175	17.55716	1.349697	158.9875	8.434933	10.03868
GM	126	0.2738306	0.1731022	0.0469018	0.6818561	0.2561326	0.2884506
CI	126	0.6399138	0.1928223	0.0975643	0.9912972	0.6411066	0.6389285
G	126	1.063487	0.2539684	0.1285395	2.000341	1.028377	1.092491
S (in trillion)	126	14728.9	22687.6	30.6715	118227	19843.08	10504.14

Source: Research data

The descriptive statistics result shows that the mean inventory turnover for the full sample is 9.31 with a relatively high standard deviation of 17.55, while the mean value for without e-commerce and with e-commerce are 8.43 and 10.03, respectively. Firms that adopt e-commerce as their sales channel get a higher average inventory turnover ratio, which may indicate more efficient inventory utilization. The inventory turnover is ranging from 1.34 to 158.99, indicating

high variation across firms. Furthermore, the result showed that the mean gross margin is approximately 0.27 for the full sample, 0.25 and 0.28 for without e-commerce and with e-commerce, respectively. The measure of mean capital intensity is 0.63 for full sample and with e-commerce, while it is slightly higher at 0.64 for without e-commerce. Meanwhile, the mean value of growth in sales is 1.06 for the full sample, 1.02 and 1.09 for without e-commerce and with e-commerce, respectively. Finally, the firm size averages 14,729 trillion for the full sample, while without e-commerce at 19,843 trillion and with e-commerce at 10,504 trillion. In summary, the descriptive statistics show that firms adopting e-commerce tend to have higher inventory turnover, better gross margins, and higher sales growth, although its generally smaller in size compared to companies that do not adopt e-commerce. From the descriptive statistics analysis, it indicates that e-commerce adoption may contribute to enhancing inventory management practices and supporting firm performance.

Correlation Matrix Analysis

Table 2 shows the pairwise correlation matrix result including the correlation coefficient and p-value.

Table 2. Correlation Matrix Result

	Log_IT	Log_GM	Log_CI	Log_G	Log_S
Log_IT	1.0000				
Log_GM	-0.8266***	1.0000			
Log_CI	-0.0085	0.1742*	1.0000		
Log_G	-0.1393	0.2379***	-0.3213***	1.0000	
Log_S	-0.3771***	0.2706***	-0.1461	0.2290***	1.0000

*Notes: *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.10*

Source: Research data

According to the correlation matrix result, it shows that inventory turnover has a significant negative correlation with gross margin, indicating that firms with higher margins tend to generate lower inventory turnover. Firm size is also moderately and negatively correlated with inventory turnover, which implies that larger firms are generally associated with lower levels of inventory turnover. Conversely, the correlations between inventory turnover and both capital intensity and sales growth are weak and statistically insignificant. The correlations between independent variables also highlight several significant but not excessively strong. Gross margin is positively correlated with sales growth and firm size, while capital intensity shows a negative correlation with sales growth. A more in-depth analysis of the interrelationships among the variables will be explained in the regression result and discussion section.

Regression Analysis

This study employs a log-linear regression model that is consistent with the prior studies by Gaur et al. (2005), Rumyantsev and Netessine (2007), Kolias et al., (2011), Rajagopalan (2013), Grubor et al., (2013), Hançerlioğulları et al., (2016), Breivik (2019), Sano and Yamada (2020), Breivik et al., (2021), and Yousaf and Dehning (2023), who adopted a log-linear model. Gaur et al., (2005) compared the prediction errors of log-linear and linear model by simulating a periodic-review inventory system with stationary demand under different levels of gross margin, lead time, and demand variance and the finding indicate that the log-linear model generates lower prediction errors. In the log-linear model, both the regressor (dependent variable) and the regressor (independent variable) are expressed in logarithmic form (Gujarati & Porter, 2009). The following is the panel data regression model used in this study:

$$\log\_IT_{it} = \beta_0 + \beta_1 \log\_GM_{it} + \beta_2 \log\_CI_{it} + \beta_3 \log\_G_{it} + \beta_4 \log\_S_{it} + \beta_5 E\_com_{it} + \beta_6 Time_{it} + \varepsilon_{it}$$

The logarithmic transformation for all dependent variables and independent variables is used to address data skewness and reduce heteroskedasticity (Hançerlioğulları et al., 2016). In this study, all dependent variable and independent variables were transformed into logarithmic forms, except for E_com and Time. The E_com variable was not transformed because it is a dummy variable that takes binary values, making the log transformation inappropriate. Similarly, the Time variable, represents a linear sequence of years, that is also kept in its original form. The following table shows the results of the panel data regression estimation:

Table 3. Regression Result

Log_IT	Coefficient	
Log_GM	-0.8415456	***
Log_CI	0.1168822	
Log_G	0.3856608	***
Log_S	0.0160452	
E_com	-0.0432935	
Time	0.0117654	
Number of observations	126	
Number of groups	14	
Wald Chi^2 (6)	56.59	
Prob > Chi^2	0.0000	
R-squared:		
Within	0.2020	
Between	0.7322	
Overall	0.6792	
Estimation Model	Random Effect	

*Notes: *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.10*

Source: Research data

a) F-Test

The regression result shows that the overall model is significant, as indicated by the Wald Chi-squared value of 56.59 with a p-value of 0.0000. This result indicates that all independent variables have a significant joint effect on the inventory turnover variable. The significance of the Wald Chi-squared test also confirms that the estimated model is well-specified. Hence, the regression estimation model is considered valid and appropriate for further interpretation.

b) Coefficient of Determination (R-squared)

The R-squared value measures the proportion of the total variation in the dependent variable that can be explained by the independent variables in the regression model. Since this study using the random effect model, the overall R-squared value is used to assess the explanatory power of the model, as it captures both within and between variations across entities over time. In Table 3, the regression result shows that the overall R-squared value of 0.6792 indicates that approximately 67.92% of the total variation in inventory turnover can be explained by gross margin, capital intensity, sales growth, firm size, e-commerce affiliation, and time trend. According to the explanation theory of R-squared, this result implies that the regression model used in this study has relatively strong explanatory power, as more than half of the variance in inventory turnover is explained by the independent variables. Therefore, the regression model can be considered reliable in explaining the determinants of inventory turnover among retail firms during the study period.

c) T-Test

The t-test is a testing method to determine whether the influence of each independent variable on the dependent variable is significant or not. The significance level used in t-test is three significance levels, which already explained in the previous chapter. Beside that, to

determine the direction of the test the coefficient value can be used as a reference. The results of regression testing of each independent variable on the dependent variable are as follows:

Hypothesis Testing 1: E-commerce Adoption (E-Com) has a positive effect on Inventory Turnover (IT)

The regression result shows that e-commerce adoption has an insignificant effect on inventory turnover. This indicates that adopting e-commerce platforms does not directly increase inventory turnover. The insignificant result can be due to the fact that offline retail sales still dominate the total retail sales in Indonesia, while e-commerce contributes only a small portion. Because online sales are still relatively small, their impact on overall inventory movement is limited. This means the effect is not strong enough to show a significant result in the regression. This condition is consistent with the regression result, which shows that e-commerce adoption has an insignificant effect on inventory turnover. Therefore, the hypothesis 1 in this study is not supported.

According to Xia and Zhan (2010), since online sales account for only a small portion of total retail sales, the internet channel makes a limited contribution to overall revenue. They explained that the key to success lies not in the amount of online sales, but in how effectively retailers can use and integrate the online channel with their existing operations. Hence, companies that are able to adopt and manage e-commerce platforms effectively can leverage them to improve their offline operations and overall supply chain performance. A firm's success in online initiatives depends not only on its internal digitalization efforts but also on the willingness and readiness of customers, suppliers, and partners to participate in electronic interactions (Zhu & Kraemer, 2002). In summary, the effectiveness of e-commerce adoption depends on how well a company can integrate its online and offline channels, supported by strong internal capabilities and the readiness of customers, suppliers, and partners across its business network.

Hypothesis Testing 2: Gross Margin (GM) has a negative effect on Inventory Turnover (IT)

Table 3 shows that the coefficient value of gross margin is negative at -0.8415456 and significant with the p-value < 0.01. This means that the estimation result of this test is in line with the proposed hypothesis. Therefore, hypothesis 2 is accepted, concluding that gross margin has a negative effect on inventory turnover. The findings demonstrate that companies with a higher gross margin on their products usually experience lower ratio of inventory turnover. These estimate result of the relationship between inventory turnover and gross margin are similar with several previous studies (Yousaf and Dehning, 2023; Sano and Yamada, 2020; Breivik, 2019; Hançerlioğulları et al.,2016; Mittal et al.,2014; Kolias et al., 2011; and Gaur et al.,2005). While most prior studies found that higher gross margins lead to lower inventory turnover, Grubor et al., (2013) finding of a slightly positive correlation between inventory turnover and gross margin in the Serbia retail environment. They argued that this outcome can be related to the unique structure of Serbia's retail industry. In contrast, this study's result is consistent with the most empirical evidence, showing a company has higher gross margin, its inventory turnover tends to be lower.

The negative relationship indicates that a higher gross margin leads to lower inventory turnover, which can occur for several reasons. There are several reasons explained by Gaur et al., (2005). First, higher gross margin tend to maintain higher service levels to prevent stockouts, which increases the average inventory level and reduces inventory turnover. Second, higher gross margins are often related to higher product prices. The rise of product price causes a decrease in the average demand for the product. Hence, it leads to lower inventory turnover. Third, to get a higher gross margin, firms usually increased their product variety. Consequently, the average demand of each product will decrease as the product variety expands. Thus, it can

lead to reduced inventory turnover. Lastly, firms tend to increase prices for products with shorter life cycles to better match changing customer preferences. However, limited historical sales data make demand forecasting more difficult, increasing uncertainty. As a result, firms need to keep more safety stock, which leads to lower inventory turnover. Other elements that impact the negative correlation between gross margins and inventory turnover include the intended market, business and organization structure, type of communications and distribution system, asset and capital structure (Kolias et al., 2011).

In conclusion, the findings demonstrate that a higher gross margin correlated with a lower inventory turnover. This means companies with higher gross margins often hold more stock to ensure they can meet customer demand and keep products available. Although one study by Grubor et al. (2013) found a small positive relation in a particular market, most studies shows a negative link between gross margin and how quickly inventory moves. In the Indonesian retail industry, this result suggests that retailers with higher gross margins, especially those engaged in modernised or higher-end retail markets, will have an overall lower ratio of inventory turnover than their competitors who do not earn as much from their operations.

Hypothesis Testing 3: Capital Intensity (CI) has a positive effect on Inventory Turnover (IT)

The results from estimating capital intensity are not statistically significant. Capital intensity refers to how much money a company invests in fixed assets such as technology, warehouses, and distribution systems. These types of investments can help improve how well a company manages its inventory, therefore it's expected that higher capital intensity would lead to better inventory turnover (Sano and Yamada, 2020). Gaur et al. (2005), also noted that investing in warehouses and information technology can improve how smoothly inventory is managed and increase inventory turnover. New warehouses help reduce safety stock through better stock allocation, while information systems such as Electronic Data Interchange (EDI) and Continuous Replenishment Process (CRP) shorten lead times and enhance inventory control. Since the result is insignificant, the hypothesis 3 could not be supported. However, a prior study by Grubor et al. (2013) also reports an insignificant relationship between capital intensity and inventory turnover. They explained that this result was due to the variation in retail outlets and the market situation in Serbia. Therefore, the difference in significance levels between this study and prior studies may be due to the differences in research settings, model specifications, and observation period. As this study focuses on the Indonesian retail industry under different economic conditions, the strength of the relationship may not be as strong as in earlier studies conducted in other countries.

Hypothesis Testing 4: Firm Size (S) has a positive effect on Inventory Turnover (IT)

As shown in Table 3, firm size does not have a significant impact on inventory turnover. This suggests that the size of a company does not influence how efficiently it manages its inventory. Breivik (2019) mentioned that small retail stores must pay close attention to their inventory to stay competitive. However, the results show that whether a company is large or small does not guarantee better inventory efficiency. Based on the result, hypothesis 4 is not supported.

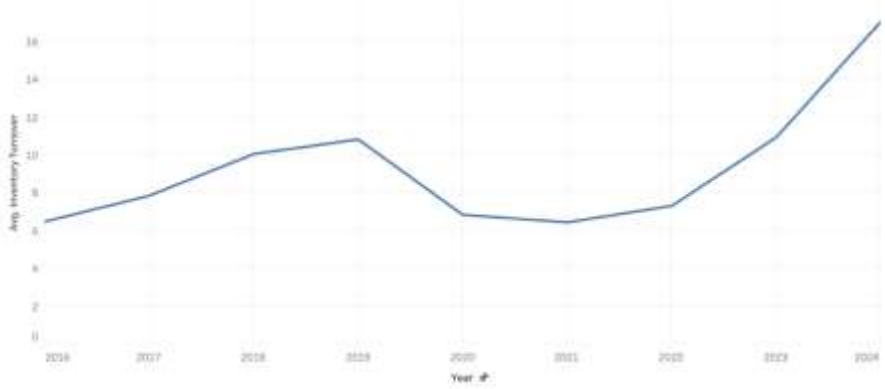
Hypothesis Testing 5: Sales Growth (G) has a positive effect on Inventory Turnover (IT)

Estimates of sales growth show a positive relationship at value of 0.3856608 and significant (p-value < 0.01). This result is in line with the findings from previous studies of Breivik et al., (2021), Breivik, (2019), Mittal et al.,(2014), and Grubor et al., (2013). The result explained that when sales growth increases the inventory turnover will get higher. According to Gaur and Kesavan (2009), the relationship between sales growth and inventory turnover can be both positive and negative, depending on the firm's market situation. They explain that

retailers with strong market opportunities but limited resources may experience sales growing faster than inventory levels, which increases inventory turnover. However, retailers which are constrained by low market opportunity will attempt to increase sales by store more products, open more locations and expand the range of products available to try and grow their business, but these efforts actually lead them to decrease their inventory turnover ratio. Based on the results, this study finds a positive relationship between sales growth and inventory turnover, indicating that the positive effect is dominant. Therefore, hypothesis 5 related with relationship between sales growth and inventory turnover is supported.

Hypothesis Testing 6: Time trend (T) has a positive effect on Inventory Turnover (IT)

The regression result shows that time trend has an insignificant effect on inventory turnover. As shown in Figure 2, the average inventory turnover shows an upward and downward pattern over time. Its value fluctuates across the years without forming a consistent trend. The pattern of the average inventory turnover may explain why the time trend variable is statistically insignificant, as inventory turnover does not follow a stable direction that can be captured by the time variable. This also reflects the dynamic nature of the Indonesian retail industry, where inventory performance changes from year to year depending on market conditions rather than time alone. Therefore, the hypothesis 6 could not be supported.



Source: Research Results

Figure 2. Trend of Average Inventory Turnover from 2016 to 2024

CONCLUSION

Based on the findings of this study, several conclusions can be made about the effect of e-commerce adoption on inventory turnover in Indonesian retail companies. The analysis indicates that e-commerce adoption, gross margin, capital intensity, sales growth, firm size, and time trend collectively have a significant joint influence on inventory turnover, suggesting that these variables together shape inventory efficiency. In the individual analysis, e-commerce adoption has a negative but insignificant effect, indicating that using e-commerce platforms does not directly improve inventory efficiency during the study period. Gross margin has a negative and significant effect, suggesting that higher margins are linked to lower inventory turnover. Capital intensity has an insignificant effect, meaning that investment in fixed assets does not affect how efficiently companies manage their inventory. Sales growth has a positive and significant effect, showing that higher sales growth helps increase inventory movement. Lastly, firm size has an insignificant effect, indicating that the size of the company does not determine the level of its inventory efficiency.

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