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The Mediating Effect of Customer Loyalty on the Relationships among Supply Chain Performance, Inventory Management and Quality Management

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Abstract: Supply chain management is the systematic, strategic coordination of business tasks engaged in a supply chain to enhance a company's and a supplier chain's overall long-term performance. It is also a set of approaches used effectively to integrate suppliers, manufacturers, distributors, or customers to improve the long-term performance of the companies involved and the supply chain itself as a whole. A lack of financial resources is the main obstacle to supply chain management development. This study intends to investigate the mediating effect of customer loyalty on the relationships among supply chain performance, inventory management, and quality management. An electronic manufacturing facility in Penang, Malaysia, served as the site of this investigation. Consequently, 700 individuals were working at this industrial company. This industrial company's employees were given the questionnaire, which was created. An analysis of the relationship and effects of quality management, inventory management, supply chain management, and customer loyalty on the performance of the product market was performed via nonprobability sampling on a population of 700 employees to generate a sample of 65 respondents based on the PLS-SEM. Several statistical methods were employed in this study, and SMART PLS3 was utilised to analyse the data. The effectiveness of a product in the market was found to be significantly influenced by variables such as customer loyalty, inventory management, supply chain management, and product market performance. The results showed that seven hypotheses had significant connections for all variables. Business owners and other relevant stakeholders are suggested to improve the supply chain, inventory management, and quality management systems in their organisation's business operations to promote customer loyalty and product market performance for long-term viability. The effort continued during the RMK-9 period by implementing comprehensive policy because more intense competition had to be faced by the industry, including SMEs, due to the existence of globalisation and trade liberalisation.

Keywords: inventory management; quality management; supply chain management; product; market; performance; electronic manufacturing.

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1. Introduction. This study analyses three characteristics that improve customer loyalty: quality management, operational management, and inventory management. Malaysia is a nation that has made significant investments in the manufacturing industry, which produces a wide range of goods (Emmanuel & Priscilla, 2022). The production of various goods in Malaysia has significantly increased the country's GDP. Malaysia stands out as a prominent player in the sphere of manufacturing diverse commodities, a significant portion of which is both exported internationally and utilised domestically (Kee et al., 2022). This nation is deeply entrenched in the production of an extensive array of goods, encompassing items such as electrical equipment, medical apparatuses, mineral fuels, and machinery, including computers. In the initial month of the year 2022, Malaysia's manufacturing sales reached a notable value of RM139 billion, reflecting a robust growth rate of 13.1% in comparison to the preceding year. This increase in sales during January 2022 can be attributed to amplified figures in sectors such as food, beverages and tobacco products (20.6%), petroleum, chemical, rubber and plastic products (15.7%), and electrical and electronics products (10.6%) (Department of Statistics of Malaysia, 2022). These product categories collectively play a pivotal role in augmenting the nation's gross domestic product (GDP), thereby directly fostering economic expansion. Consequently, the impetus for this enquiry emerged from the aspiration to delve into the nexus between customer loyalty and its ramifications for operational management and product market performance within the ambit of Malaysia's manufacturing sector. Notably, the efficacy of quality management holds utmost significance in shaping product market performance and operational management within this particular industry. A salient determinant of customer loyalty resides in the domain of quality management, as the calibre of a given product or service exerts substantial influence on product market performance. Another pivotal factor governing customer allegiance to a specific commodity or service pertains to inventory management – a repository of goods and materials possessed by an enterprise (Kee et al., 2022). Thus, the discipline of optimising the management of goods and materials within an organisational framework assumes a critical role in bolstering product market performance. Furthermore, supply chain management, as evidenced by Perez-Moron et al. (2022), emerges as an additional indispensable factor impacting product market performance. The practise of supply chain management encompasses the intricate movement of goods and services across diverse commercial entities and geographical locales. Consequently, it becomes evident that supply chain management constitutes a pivotal consideration in the arena of product market performance.

The quality dimension has emerged as a predominant concern in relation to the facet of market performance. When the quality of a given product is substandard, the resultant effect on the performance within the product market is markedly unfavourable (Othman et al., 2022). Consequently, the efficacy of quality management practises within the ambit of the manufacturing industry has a direct impact on the subsequent market performance of its products (Lee et al., 2022). A decline in product quality invariably corresponds to a reduction in customer allegiance (Othman et al., 2022). The production of inferior quality goods by manufacturing enterprises precipitates a concomitant decrease in customer loyalty, thereby engendering a decrease in overall product market performance (Janahi & Al Mubarak, 2017). The extent of proficiency in quality management and the consequent level of customer loyalty are contingent upon the calibre of products or services provided by a given company (Androniceanu, 2017; Lee et al., 2022). The inadequate quality of products can be attributed to deficiencies in the manufacturing processes (Lee et al., 2022). Thus, it is evident that suboptimal production processes, particularly within the manufacturing sector, constitute the principal antecedent of substandard products (Mutambo et al., 2022), thereby undermining the tenets of quality management. The waning degree of customer allegiance, in turn, has deleterious ramifications for product market performance (Rego et al., 2022). Furthermore, the influence of quality management extends to the domain of product market performance (Prajogo et al., 2022). Addressing the existing disparity between operational management and product market performance within the Malaysian manufacturing sector, in conjunction with customer loyalty, is imperative. To this end, an array of statistical methodologies will be employed to investigate the impact of customer loyalty on operational management and product market performance within the context of the Malaysian manufacturing sector. Amplified figures in sectors such as food, beverages and tobacco products (20.6%), petroleum, chemical, rubber and plastic products (15.7%), and electrical and electronics products (10.6%) (Department of Statistics of Malaysia, 2022). These product categories collectively play a pivotal role in augmenting the nation's gross domestic product (GDP), thereby directly fostering economic expansion. Consequently, the impetus for this enquiry emerged from the aspiration to delve into the nexus between customer loyalty and its ramifications for operational management and product market performance within the ambit of Malaysia's manufacturing sector. Notably, the efficacy of quality management holds utmost significance in shaping product market performance and operational

management within this particular industry. A salient determinant of customer loyalty resides in the domain of quality management, as the calibre of a given product or service exerts substantial influence on product market performance. Another pivotal factor governing customer allegiance to a specific commodity or service pertains to inventory management—a repository of goods and materials possessed by an enterprise (Kee et al., 2022). Thus, the discipline of optimising the management of goods and materials within an organisational framework assumes a critical role in bolstering product market performance. Furthermore, supply chain management, as evidenced by Perez-Moron et al. (2022), emerges as an additional indispensable factor impacting product market performance. The practise of supply chain management encompasses the intricate movement of goods and services across diverse commercial entities and geographical locales. Consequently, it becomes evident that supply chain management constitutes a pivotal consideration in the arena of product market performance.

2. Literature review. Inventory management is a discipline encompassing the effective oversight and control of goods and materials within the framework of an organisation or business entity (Apriyanti & Bernanda, 2023). The meticulous management and preservation of goods and materials within a given business are of paramount importance; mismanagement can engender losses, consequently exerting detrimental repercussions on operational management and product market performance within the Malaysian manufacturing sector (Islam et al., 2020). Optimal inventory management necessitates systematic record-keeping, facilitating the monitoring of resource availability. Consequently, the nexus between inventory management and customer satisfaction assumes considerable significance, exerting a noteworthy influence on operational management and product market performance within the Malaysian manufacturing sector (Tan & Kim, 2021). Thus, the prudent adoption of sound inventory management practises has emerged as a requisite to bolster product market performance. Examples of inventories pertinent to the Malaysian manufacturing industry include diverse components, such as the raw materials essential for production, including mineral fuel (Mohammed et al., 2022). Notably, mineral fuel represents a pivotal raw material integral to oil production within Malaysia. Consequently, effective management of mineral fuel plays a pivotal role in underpinning the market performance of oil. Another salient inventory within the Malaysian manufacturing landscape is warehousing. The strategic role of warehousing within Malaysia's industrial fabric cannot be overstated, as it provides the infrastructure necessary for the efficient storage of the multifarious goods emanating from manufacturing enterprises.

Supply chain management entails the systematic orchestration of the provisioning of products from their origination point to diverse destinations. The operational underpinnings of industries, particularly in terms of product movements and distribution, necessitate judicious management to ensure the fulfilment of market demands concerning both delivery timeliness and quantity adequacy (Mohamed et al., 2022). Effectual supply chain management within the manufacturing sector has the potential to engender the expeditious production of products aligned with customer preferences. A considerable number of manufacturing enterprises in Malaysia have effectively implemented robust supply chain management strategies, subsequently catalysing heightened product performance (Richey et al., 2020). Consequently, the sphere of supply chain management has a discernible influence on product market performance within Malaysia's manufacturing domain. The merits stemming from proficient supply chain management in the manufacturing industry are multifaceted (Gokalp et al., 2022). One of the foremost advantages is the cultivation of a salutary cash flow. The consistent, uninterrupted flow of goods and services from manufacturing hubs to targeted markets sustains optimal cash flow dynamics. Furthermore, adept supply chain management augments supplier performance across the manufacturing sector and associated industries by ensuring enhanced visibility and streamlined communication (Mandt et al., 2022). The practise of adept supply chain management concurrently fosters operational efficiency through the establishment of a unified database encompassing supply chain activities and suppliers. This integration optimises vendor management and automates iterative procedures, thereby enhancing overall process efficiency. Customer loyalty is a pivotal determinant that profoundly impacts the holistic performance of organisations (Islam et al., 2020). The centrality of customer loyalty is understood by its role as a key gauge of the propensity of customers to repeatedly engage with a specific brand of product or service offered by a particular enterprise (Lee et al., 2022). The magnitude of customer loyalty finds its roots in diverse variables, encompassing the perceived value of the product or service, the level of contentment derived from the offering, and the overall experiential encounter of customers. This range of determinants is intrinsically intertwined, as they collectively inform customers' perspectives (Mandt et al., 2022). Positive encounters with a company's products or services can foster customer loyalty, manifesting through sustained patronage. The cultivation of a conducive atmosphere of dignity, congeniality, and hospitality towards

customers by various organisational stakeholders is indispensable. Such positive customer experiences not only induce recurrent interactions but also engender heightened degrees of customer loyalty (Cuesta-Valino et al., 2023). Concurrently, the calibre of a product substantially contributes to shaping the level of customer loyalty. When customers find gratification in their interactions with an organization's stakeholders, an enduring affinity towards the firm is cultivated, bolstering loyalty.

This study endeavours concerning the interplay of quality management, inventory management, supply chain management, and product market performance within the Malaysian manufacturing sector finds its theoretical underpinning in the construct of customer loyalty theory. This theoretical framework, illustrated in Figure 1, encapsulates the intricate associations between the aforementioned variables. Customer loyalty theory posits that pivotal factors significantly influence product or service markets (Mandt et al., 2022). The present study adopts a conceptual framework comprising three independent variables, one mediating variable, and one dependant variable. The focal point of enquiry, the dependant variable, pertains to aspects of product market performance in the Malaysian manufacturing sector (Othman et al., 2020). The independent variables encompass quality management, inventory management, and supply chain management (Perez-Moron et al., 2022). Furthermore, the theory of consistency reinforces the linkage between customer loyalty, supply chain management, and product market performance. The alignment in product supply, as per the theory of consistency, engenders heightened levels of customer loyalty, thereby culminating in favourable product market performance (Othman et al., 2020). This premise further corroborates the assertion that customer loyalty mediates the nexus connecting supply chain management and product market performance (O'Hern, et al., 2022). Hence, the graphical representation of the conceptual framework delineating the impact of quality management, inventory management, and supply chain management on product market performance is encapsulated in Figure 1.

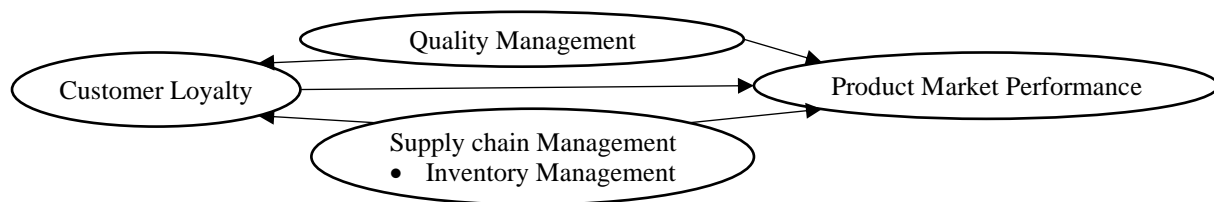


Figure 1. Mediating effect of customer loyalty on the relationship between element operations management and product market performance

Sources: developed by the authors.

Figure 1 explains the overarching objective of the customer loyalty theory, which seeks to discern the factors underpinning customer allegiance to the products and services provided by organisations (Islam et al., 2022). This theory has widespread applicability as a framework for analysing the determinants of customer loyalty and their consequential impact on an organisation's product market performance. Fundamental to this theory is the premise that customer loyalty is intrinsically linked to the calibre of product quality. Consequently, products of superior quality attract and retain a larger customer base, thereby fostering enhanced customer loyalty. This premise establishes a salient nexus between product quality management and the attainment of customer satisfaction. Indeed, any compromise in product quality may lead to customer dissatisfaction and a subsequent decline in product market performance (Mandt et al., 2022). Undoubtedly, customer loyalty theory robustly supports the assertion that quality management, supply chain management, and inventory management constitute pivotal components intricately tied to customer loyalty. A congruent theoretical perspective emerges from consistency theory, which posits that individuals are inherently inclined towards consistency in their values, beliefs, and attitudes, while aversion to uncertainty leads to discomfort (O'Hern et al., 2022). This tenet of consistency holds notable relevance for product market performance, particularly within the realm of supply chain management, where the regularity of product provision assumes paramount importance (Zhou et al., 2020). A consistent supply of products is essential for meeting daily consumer demands, thereby adhering to the principle of consistency. Moreover, the theory accentuates the pivotal role of maintaining consistent product quality by organisations to foster favourable product market performance. Inconsistencies in product quality could lead to consumer scepticism, thereby impeding product market performance (Othman et al., 2020). The principle of consistency also extends to inventory management, where the steadfast maintenance of raw materials and related assets is essential for sustaining the required production rates, thereby contributing to optimal product market performance (O'Hern et al., 2022). The novelty of this study is that supply chain management is a discipline that encompasses inventory

management, where out-of-stock products can essentially constitute a framework under which management strategies are explored (Altekar, 2023).

3. Methodology and research methods. In this study, a nonprobability sampling methodology was employed to gather data from a readily accessible group of participants within the target population (Sekaran & Bougie, 2016). Specifically, the research design encompasses an explanatory research approach, which is employed to investigate the impact of customer loyalty on the facets of operational management and product market performance within the Malaysian manufacturing sector (Tan & Kim, 2021). This research draws upon quantitative data to serve as empirical support, utilising quantitative research to elucidate, predict, construct, and validate theories. Within the noncontrived study environment, data collection is facilitated through an internet-based questionnaire distributed to respondents at their workplaces (Sekaran & Bougie, 2016). As detailed by Sekaran & Bougie (2016), an explanatory research design is particularly attuned to probing the variables that elucidate the mediating effects of relationships and uncovering the causal relationships governing the phenomenon under investigation. Given the constraints posed by the relatively small population size, convenience sampling is deemed appropriate due to the infeasibility of employing probability sampling. By employing nonprobability convenience sampling, participants were selected based on their willingness to cooperate and their willingness to participate in the survey. The electronic manufacturing company under scrutiny employs approximately 700 individuals, thus constituting the target population for this research in Penang, Malaysia. Given the contextual constraints, a total of 100 questionnaires will be disseminated to employees of the electronic manufacturing firm (Table 1).

Table 1. Measurement items

Author/Year	Constructs	Items	No of Items	Likert Scale
Saunders, Lewis and Thornhill, (2019)	Demographic Profile	Gender	4	-
		Age		
		Race		
Van Bogaert et al. (2017)	Quality Management	What is your position within the firm?	4	5-Likert Scale
		QM1: I believe that proper quality management facilitates high product market performance.		
		QM2: The quality of a given product matters a lot in regard to market performance.		
		QM3: When the products of a given organization is of poor quality, then the product-market performance will go down.		
		QM4: The management of a given organization should have close monitoring of the product process to ensure high quality products.		
Lee et al., (2022)	Supply Chain Management	SCM1: When there is good supply chain management, customers will always rely on the services and products of a given company.	4	5-Likert Scale
		SCM2: Reliability is guaranteed among the customers by proper supply chain management.		
		SCM3: Sufficient supply of products from one point to another promotes product market performance.		
		SCM4: Proper supply chain management significantly Influences the market of given product.		
		IM1: Proper recording of assets within the organization stabilizes the product market performance.		
Gakwaya and Irechukwu, (2022)	Inventory Management	IM2: Most of the organizations in Malaysia have got good inventory management system.	4	5-Likert Scale
		IM3: Proper inventory management facilitates survival and continuation of organization.		
		IM4: Quality production process is promoted by proper inventory management process.		
		CL1: When the customers are loyal to certain product or service, the magnitude of sales will automatically go high.		
Shinde et al., (2018)	Customer Loyalty	CL2: The aspect of customers' loyalty on a given product has got some influence on product market performance.	4	5-Likert Scale
		CL3: Customers' loyalty mediates the connection between supply chain management and product market performance.		
		CL4: The aspect of Customers 'loyalty mediates the relationship between product market performance and inventory management.		
		PMP1: There is high degree of product market performance in Malaysian manufacturing sector.		
Shinde et al., (2018)	Product market performance	PMP2: Product market performance play an essential role in regard to survival and continuation of manufacturing industry.	4	5-Likert Scale
		PMP3: The manufacturing industries in Malaysia are having significant number of sales yearly.		
		PMP4: Proper management skills promote product market performance in Malaysian industries.		

Sources: developed by the authors.

This decision is grounded in Cohen's (1992) guidance on sample size determination in partial least squares structural equation modelling (PLS SEM) models, advocating for minimum sample sizes based on specific effect size (R²) thresholds and significance levels. In this context, Cohen's (1992) recommendations are referenced, suggesting the requisite minimum sample sizes to detect R² values of 0.10, 0.25, 0.50, and 0.75 at significance levels of 1%, 5%, and 10%, respectively. This methodological approach is adopted to ensure an adequate sample size for robust statistical analysis within the confines of this research.

4. Results. The responsiveness of the questionnaire assumes a critical role, serving as a metric to gauge the quantity of viable responses procured from the eligible target sample. A higher response rate is indicative of enhanced validity, as it mitigates potential nonresponse bias (Weaver et al., 2019). As depicted in Table 2, out of the 100 questionnaires distributed, all 65 were duly completed and deemed usable, yielding a commendable response rate of 92.86%.

Table 2. Profile Descriptive

Demographic	Category	Frequency	Percent
Gender	Female	29	44.6
	Male	36	55.4
Age	18 to 24 years	8	12.3
	25 to 31 years	32	49.2
	32 to 38 years	19	29.2
	39 years and above	6	9.2
	Manager	9	13.8
Position	Supervisor	12	18.5
	Staff	38	58.5
	Others	6	9.2
Total		65	100.0

Sources: developed by the authors.

Table 2 further elucidates the distribution of the 65 employees who were randomly selected from electronic manufacturing firms in Penang, Malaysia. Within this subset, the gender composition was observed, with 29 respondents (44.6%) being female and 36 (55.4%) being male employees. Table 2 further provides insights into the age distribution of the sampled employees, revealing that 32 individuals (49.2%) were within the age bracket of 25 to 31 years. In addition, 19 employees (29.2%) were aged between 32 and 38 years, 8 (12.3%) were aged 18 to 24 years, and 6 (9.2%) were aged 39 years or older. Notably, the majority of employees within the manufacturing firm are between the ages of 25 and 31 years. The analysis extends to employment positions, with 38 individuals (58.5%) categorised as staff, 12 (18.5%) as supervisors, 9 (13.8%) as managers, and 6 (9.2%) occupying other roles within the firm. Evidently, a significant proportion of employees assume staff positions within the organisation. Furthermore, Table 2 explains the ethnic composition, revealing that 38 employees (58.5%) identified as Malay, 22 (33.8%) as Indian, 3 (4.6%) as Chinese, and 2 (3.1%) as belonging to other races. These data underscore that the predominant ethnicity among the selected manufacturing firm workforce is Malay, followed by Indian representation.

4.1. Results of the reflective measurement model. The assessment of reliability was undertaken to ascertain the extent of internal consistency within the variables under investigation. The Cronbach's alpha coefficient was employed (Table 3), adhering to the established criterion that a coefficient exceeding 0.70 indicates an acceptable degree of internal consistency within the constructs.

Coefficients falling below this threshold denote reduced reliability, potentially yielding inconclusive findings. In this study, the constructs displayed satisfactory composite reliability, as evidenced by the coefficient surpassing 0.9. Furthermore, the Cronbach's alpha values, exceeding 0.70, substantiated the construct's commendable internal reliability. This outcome underscores a notable level of internal congruence among the statements. Moreover, the higher outer loading of each statement towards its corresponding construct underscores their collective significance in measuring the construct at hand.

4.2. Discriminant validity. The average variance extracted (AVE) serves as a pivotal tool for evaluating the extent of construct validity in the measurement model. A value surpassing 0.50 is considered indicative of an acceptable level of construct validity, as this is further corroborated by the assessment of factor loading. The ideal factor loading coefficient exceeds 0.60. In the present study, all the AVE values surpassed the 0.50 threshold, with corresponding factor loadings exceeding 0.60.

Table 3. Results of the reflective measurement model

Construct	Measurement Items	Outer loading	Cronbach's alpha	rho_A	Composite reliability	AVE
CL	CL1	0.785	0.827	0.829	0.885	0.659
	CL2	0.865				
	CL3	0.789				
	CL4	0.805				
IM	IM1	0.794	0.857	0.864	0.904	0.701
	IM2	0.893				
	IM3	0.862				
	IM4	0.797				
PMP	PMP1	0.858	0.891	0.892	0.925	0.754
	PMP2	0.883				
	PMP3	0.881				
	PMP4	0.852				
QM	QM1	0.856	0.823	0.825	0.883	0.654
	QM2	0.820				
	QM3	0.765				
	QM4	0.791				
SCM	SCM1	0.833	0.797	0.798	0.868	0.623
	SCM2	0.801				
	SCM3	0.770				
	SCM4	0.750				

Sources: developed by the authors.

Notably, Customer Loyalty has an AVE value of 0.659, while Inventory Management and Supply Chain Management have values of 0.701 and 0.623, respectively. This discernible pattern underscores the adherence to the stipulated thresholds, substantiating construct validity. To appraise discriminant validity, the Fornell–Larcker criterion is invoked. This criterion gauges the interstatement correlation within a construct. The outcomes presented in Table 4 demonstrate that, barring Quality Management (0.836), which surpasses the values for both Customer Loyalty (0.812) and Product Market Performance (0.800), the remaining values align appropriately. This deduction underscores the presence of discriminant validity within the construct measurements.

Table 4. Discriminant Validity – Fornell–Larcker Criterion

Statements	CL	IM	PMP	QM	SCM
CL	0.812				
IM	0.783	0.837			
PMP	0.800	0.693	0.868		
QM	0.836	0.788	0.821	0.809	
SCM	0.838	0.690	0.754	0.760	0.789

Sources: developed by the authors.

4.3. Cross Loading Analysis. The evaluation of cross loadings serves as a crucial analytical step aimed at ascertaining whether statements belonging to a particular construct exhibit stronger affiliation with other constructs. This scrutiny is imperative to discern whether statements inadvertently place greater emphasis on an unintended construct rather than accurately reflecting the construct they were designed to measure. In cross-loading analysis, it is advisable to consider that the exclusion of a statement's loading towards the respective latent variable exceeds that towards alternative constructs. This observation substantiates the discernible validity and distinction among constructs, thereby affirming the integrity of the utilized dataset.

Table 5. Cross-loading Results

Statements	CL	IM	PMP	QM	SCM
CL1	0.785	0.591	0.552	0.684	0.623
CL2	0.865	0.588	0.656	0.713	0.663
CL3	0.789	0.760	0.685	0.651	0.651
CL4	0.805	0.597	0.691	0.668	0.722
IM1	0.625	0.794	0.529	0.573	0.527
IM2	0.709	0.893	0.659	0.717	0.637
IM3	0.696	0.862	0.595	0.746	0.610
IM4	0.583	0.797	0.530	0.589	0.526
PMP1	0.716	0.624	0.858	0.702	0.675
PMP2	0.713	0.540	0.883	0.687	0.593

PMP3	0.662	0.650	0.881	0.744	0.720
PMP4	0.683	0.598	0.852	0.720	0.635
QM1	0.715	0.637	0.671	0.856	0.655
QM2	0.664	0.650	0.659	0.820	0.606
QM3	0.690	0.641	0.651	0.765	0.581
QM4	0.630	0.623	0.674	0.791	0.615
SCM1	0.668	0.543	0.656	0.590	0.833
SCM2	0.626	0.565	0.573	0.607	0.801
SCM3	0.628	0.538	0.499	0.563	0.770
SCM4	0.666	0.531	0.644	0.636	0.750

Sources: developed by the authors

4.4. Structural Model Results. The examination of hypotheses pertaining to path coefficients mandated the application of bootstrapping, a resampling technique employed to assess the statistical significance of coefficients. As exhibited in Table 6, the structural model substantiated the validity of all hypotheses.

Table 6. Path Coefficients

	Hypothesis	Path coefficient	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
H1	IM -> CL	0.235	0.251	0.095	2.483	0.013
H2	QM -> CL	0.355	0.349	0.094	3.775	0.000
H3	SCM -> CL	0.389	0.38	0.086	4.531	0.000
H4	CL -> PMP	0.800	0.803	0.044	18.343	0.000
H5	IM -> PMP	0.188	0.201	0.074	2.529	0.011
H6	QM -> PMP	0.284	0.282	0.081	3.482	0.001
H7	SCM -> PMP	0.311	0.305	0.07	4.444	0.000

Sources: developed by the authors.

Specifically, it is affirmed that a significant relationship exists between inventory management and customer loyalty ($\beta = 0.235$, $t = 2.483$, $p < 0.05$), thereby offering robust support for Hypothesis 1 and other hypotheses. Notably, upon scrutinising the coefficient summary, it is confirmed that customer loyalty exerts the most pronounced influence on product market performance $\beta = 0.800$, $t = 18.343$, $p < 0.05$ (Figure 2).

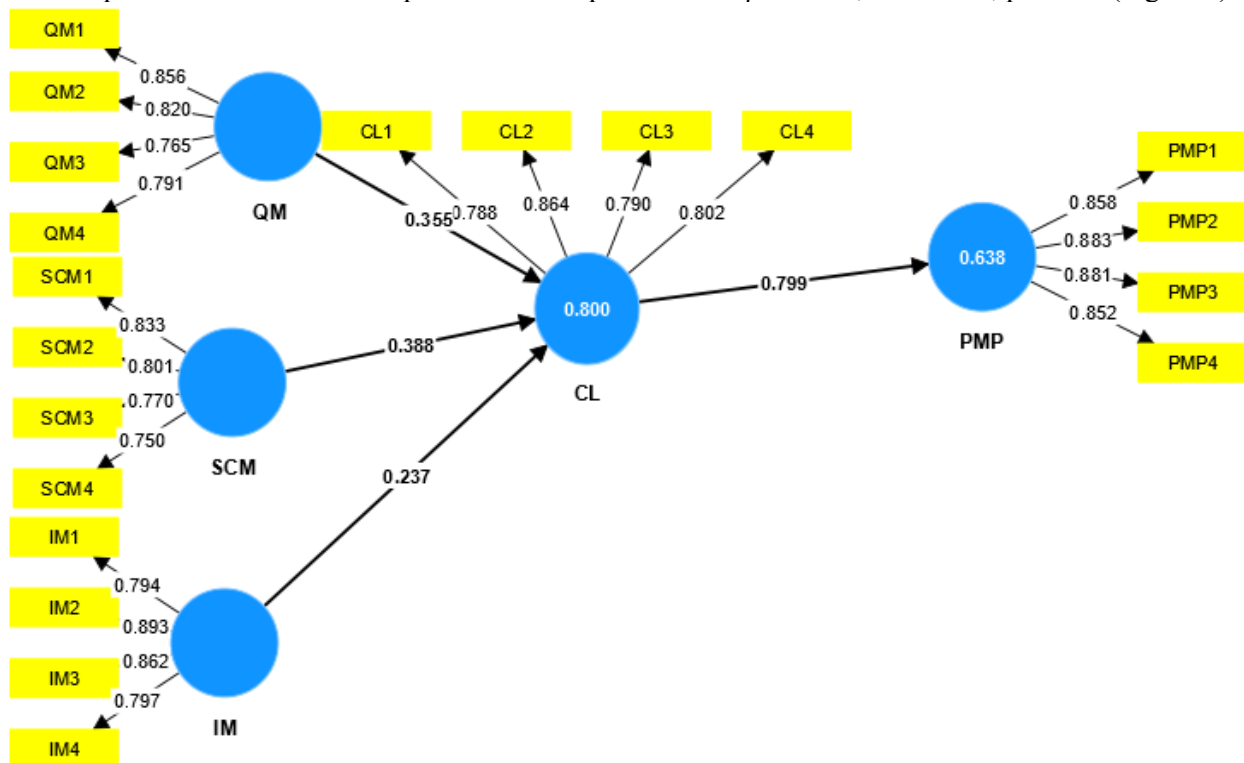


Figure 2. The Structural Model – Path Coefficient

Sources: developed by the authors.

5. Discussion. Table 7 presents an exposition of the outcomes pertaining to the direct relationships among constructs. Additionally, the researcher has articulated the formulated hypotheses within this table, delineating whether these hypotheses are substantiated by the derived findings.

H1: Quality management positively relates to product-market performance.

A substantial and statistically significant influence of quality management on product-market performance was observed. Specifically, the evidence garnered was compelling enough to conclude that quality management has a positive correlation with product market performance ($\beta = 0.284$, $p < 0.05$), thereby necessitating the rejection of the null hypothesis.

Table 7. Discussion of the results and hypotheses

Path	Hypothesis	t value	Sig	Decision
IM -> CL	Inventory management positively relates to product-market performance	2.483	0.013	Accepted
QM -> CL	Quality management positively relates to product-market performance	18.343	0.000	Accepted
SCM -> CL	Supply chain management positively relates to product-market performance	3.775	0.000	Accepted
CL -> PMP	Customer loyalty positively relates to product-market performance	4.531	0.000	Accepted
IM -> CL -> PMP	Inventory management mediates the relationship between customer loyalty and product-market performance.	3.482	0.001	Accepted
QM -> CL -> PMP	Quality management mediates the relationship between customer loyalty and product-market performance.	2.529	0.011	Accepted
SCM -> CL-> PMP	Supply chain management mediates the relationship between customer loyalty and product-market performance.	4.444	0.000	Accepted

Sources: developed by the authors.

Consequently, as explained by the results of the structural model, when other factors remain constant, an increase in quality management corresponds to an increase of 0.284 points in the product-market performance score. These findings resonate with those of Gokalp et al. (2022), who emphasise the pivotal role of product or service quality within the market context. A high-quality product is more likely to increase customer satisfaction, thereby exerting a positive influence on product-market performance (Othman et al., 2020). Conversely, a subpar product is less likely to attract customers, thereby contributing to a negative impact on product-market performance. Notably, the summation of factor loadings underscores that QM1 exhibits the most substantial weight in relation to product-market performance.

H2: SCM is positively related to product-market performance.

Table 7 shows evidence of a positive relationship between supply chain management and product-market performance ($\beta = 0.311$, $p < 0.05$). The outcome affirmed that, in the context of holding other variables constant, an increase of one unit in the supply chain management score corresponds to an increase of 0.311 points in the product-market performance metric. The alignment of a higher agreement score regarding the adequacy of product supply between various points is directly correlated with an increased likelihood of bolstering product-market performance. Supply chain management plays a pivotal role in facilitating the seamless movement of products or services from one juncture to another, ensuring both timeliness and the desired quantity (Mohamed et al., 2022). This salient contribution resonates with the findings of this study and is congruent with prior research (Richey et al., 2020). It is therefore imperative for manufacturing entities to establish an effective supply chain management framework, as it engenders timely deliveries, ultimately fostering heightened product-market performance.

H3: Inventory management positively relates to product-market performance.

The outcomes of this empirical result indicate that there is a positive relationship between inventory management and product-market performance ($\beta = 0.188$, $p < 0.05$). The theoretical model discerns that, under the premise of keeping all other factors constant, an incremental augmentation of one unit in the inventory management metric corresponds to an anticipated elevation of 0.188 points in the product-market performance indicator. This underscores the pivotal role of enhancing inventory management practises in catalysing

heightened product-market performance. Inventory management encompasses the meticulous administration of all goods and materials within an organisational framework. By effectively overseeing these elements, losses can be mitigated, thereby bolstering operational management (Islam et al., 2020). This observation aligns with the findings presented by Islam et al. (2020) and Tan & Kim (2021), among other scholars. The meticulous maintenance of inventory, facilitated through record-keeping and monitoring of available products, goods, or resources, has a pronounced influence on operational management and product-market performance. Consequently, businesses are encouraged to embrace the strategic implementation of robust inventory management practises to optimise their performance outcomes.

H4: Customer loyalty is positively related to product-market performance

The results of the structural model reveal a discernible and statistically significant correlation between customer loyalty and product-market performance ($\beta = 0.800$, $p < 0.05$). Within the framework of this nodal, it becomes evident that this factor exerts the most pronounced influence on product-market performance. The calculated path coefficient indicates that an escalation in customer loyalty is anticipated to lead to a corresponding increase of 0.80 in product-market performance. Consonant outcomes regarding the directional affiliation between these variables have been substantiated in prior research by various scholars (Islam et al. 2020; Lee et al. 2022). Lee et al. (2022) elucidated that customer loyalty plays a pivotal role in determining the likelihood of a customer's recurrent product purchases, thereby subsequently impacting product-market performance.

H5: Customer loyalty mediates the relationship between quality management and product-market performance.

Table 7 and Figure 2 present compelling evidence of a substantial association between quality management and product market performance, particularly in cases where customer loyalty functions as a mediating factor. The findings underscore that the influence of quality management remains statistically significant even after accounting for the influence of customer loyalty. These outcomes align with the findings of Golkap et al. (2022), whose research similarly demonstrates that a positive experiential dimension pertaining to the quality of products or services has a substantial influence on product market performance.

H6: Customer loyalty mediates the relationship between the dimensions of inventory management and product-market performance.

Incorporating customer loyalty as a mediating variable, the empirical outcome displayed in Table 7 reveals a noteworthy and affirmative correlation between the inventory management dimension and product market performance ($\beta = 0.188$, $p < 0.05$). These findings hold paramount significance because, while customer loyalty undeniably bears significance for fostering optional product market performance, the facet of inventory management also exerts a substantiate meaningful indirect influence. This insight suggests that the adept management of an organization's inventory, resulting in the enhancement of service quality, contributes to heightened customer loyalty, thereby engendering a robust product-market performance milieu (Perez-Moron et al. 2022).

H7: Customer loyalty mediates the relationship between supply chain management and product-market performance.

In the context of mediating customer loyalty, as illustrated in Table 7, the empirical findings substantiate that supply chain management has a marked and favourable influence on the efficacy of product market performance ($\beta = 0.311$, $p < 0.05$). Consequently, a logical inference is that enhancements in supply chain management are poised to engender commensurate improvements in product market performance outcomes. This outcome aligns with the observation made by Mandt et al. (2022), who likewise discerned a substantial impact of supply chain management on performance outcomes. However, it is noteworthy that the present investigation delineates these effects within the framework of mediation via customer loyalty.

6. Conclusions. The limitation of this study is that it is limited to studying the factors that affect product market performance in the Malaysian electronics manufacturing industry. Information collected from one's surroundings can lead to biased information. The diversification of manufacturing activities across various product categories in Malaysia has yielded a substantial increase in gross domestic product (GDP). Enhanced market conditions for a specific product hinge upon the attainment of high levels of customer satisfaction. The intrinsic quality of a given commodity or service holds profound significance in its marketing endeavours. Optimal product quality engenders customer contentment, thereby eliciting a favourable impact on overall performance within the product market sphere. Conversely, inferior product quality results in customer dissatisfaction, thereby exerting adverse repercussions on product market performance. Notably, the implications derived from this research extend to both manufacturing and service-oriented entities. The

proposed recommendations lean towards the assurance of quality products as well as the seamless provisioning of both production inputs and finished goods. The investigation revealed that quality management, inventory management, and supply chain management exert not only direct but also indirect positive linear effects on product market performance. In light of these findings, organisations are advised to formulate strategic initiatives to enhance these operational facets with a view to fortifying their market performance. This chapter underscores the scholarly and practical contributions of this research endeavour. Additionally, entities operating within the industrial sphere could benefit from a comprehensive understanding of their supply chains, thereby forestalling disruptions in inventory management. Remedial actions may entail the expedited disposition of sluggish-moving and obsolete stock, complemented by the adoption of efficient inventory management software solutions. By doing so, firms stand to augment not only their product performance but also their enduring customer loyalty. This study delineates practical ramifications and offers recommendations aimed at bolstering the dimensions of quality management, inventory management, and supply chain management. These enhancements, in turn, foster an escalation in product market performance. As a result, the creation and implementation of policy depend on the intricate interconnections between governmental and nongovernmental actors, who all act according to their distinct perspectives, preferred solutions, and objectives. Regulatory regimes significantly impact the planning and implementation of supply chains. The positions and activities of supply and distribution networks are influenced by tax laws, labour legislation, and environmental rules. The fact that this region is ideally positioned to discuss efficient policymaking is a somewhat less evident reason why supply chain management experts should conduct policy research. The reason is that good supply chain management is based on the same fundamental ideas as good policymaking, including formulation, implementation, and assessment; different levels of analysis; and different objectives, such as operational effectiveness, from those of economists due to the uniqueness of their position in addressing policy questions.

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Вплив лояльності споживачів на зв'язки між ефективністю ланцюга поставок, управлінням запасами та якістю

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Управління ланцюгом поставок являє собою систематичну та стратегічну координацію бізнес-процесів у ланцюзі поставок з метою підвищення ефективності діяльності як компанії, так і ланцюга поставок в цілому у довгостроковій перспективі. Це також включає набір підходів, які ефективно застосовуються для інтеграції постачальників, виробників, дистриб'юторів та споживачів. Основною перешкодою для розвитку управління ланцюгом поставок є обмежені фінансові ресурси. Дане дослідження має на меті з'ясувати вплив лояльності споживачів на зв'язки між ефективністю функціонування ланцюга поставок, системи управління запасами та якістю. Дослідження проводилося на IT підприємстві в Пенангу, Малайзія. До участі було залучено 700 працівників цієї компанії. Аналіз взаємозв'язків та впливів системи управління якістю, запасами, ланцюгом поставок та лояльності споживачів на ефективність просування продукції на ринку був проведений з

використанням інструментарію PLS-SEM. У дослідженні застосовано декілька статистичних методів, а для аналізу даних використано програмне забезпечення SMART PLS3. Було встановлено значущий вплив досліджуваних змінних, таких як лояльність споживачів, система управління запасами, ланцюгом поставок та ефективністю просування продукції на ринку. Результати показали, що всі сім досліджуваних гіпотез мають статистично значущі зв'язки між усіма обраними змінними. Результати дослідження дозволили сформулювати емпірично підтверджені рекомендації власникам бізнесу та іншим зацікавленим сторонам щодо підвищення ефективності системи управління ланцюгом поставок, запасами та якістю в бізнес-процесах своїх організацій для сприяння лояльності споживачів. Авторами наголошено, що інструменти та політики, які були розроблені в рамках РМК-9, зіткнулися з більш інтенсивною конкуренцією через глобалізацію та лібералізацію торгівлі, що тим самим обумовлює подальші дослідження з даної проблематики.

Ключові слова: управління запасами; управління якістю; управління ланцюгом поставок; результативність; продукція; ринок; електронне виробництво.