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How Web System Quality and Forecasting Accuracy Shape Decision Quality Title

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Abstract –

Digital transformation is widely proposed as a solution, the precise internal mechanisms through which technical system deployment translates into tangible bottom-line performance remain underexplored in SME literature. This study aims to investigate the sequential causal mechanisms linking a web-based ordering system integrated with a predictive forecasting engine acting as a Decision Support System to a firm's operational efficiency. The population comprised the entire internal sales force (N = 80 respondents) of CV. Mekar Jaya Sentosa used census sampling. Hypotheses and structural pathways were evaluated using variance-based SEM-PLS. Structural inner model evaluation revealed that both Web System Quality ($\beta = 0,334$, $p < 0,001$) and Ordering Information Quality ($\beta = 0,445$, $p < 0,001$) are significant prerequisites for Forecasting Accuracy, jointly explaining 54,8% of its variance (R Square = 0,548). In turn, Forecasting Accuracy heavily drives managerial Decision-Making Quality ($\beta = 0,648$, $p < 0,001$, R Square = 0,420), which acts as the ultimate predictor of Company Operational Performance ($\beta = 0,712$, $p < 0,001$, R Square = 0,507). This study validates that information technology does not automatically maximize organizational performance, it must first optimize the intermediate cognitive and analytical decision-making frameworks of the firm.

Keywords – Web-Based Ordering System; Forecasting Accuracy; Decision Support System; Operational Performance; Supply Chain Sustainability

I. INTRODUCTION

In an era of high market volatility, speed and accuracy in supply chain management serve as primary determinants of competitive advantage for manufacturing and distribution enterprises (Shah et al., 2025). CV Mekar Jaya Sentosa, an entity operating in the commodity distribution sector, currently faces critical challenges regarding real-time order synchronization and inventory control. Practical phenomena observed on-site reveal a distinct marketing gap and operational bottlenecks rooted in conventional, semi-digital administrative workflows (Neely, 2007) (Nwosu et al., 2025).

Because the ordering process is not integrated across a unified network, information asymmetry continuously disrupts the marketing, warehousing, and production divisions (Vem et al., 2024). Consequently, the company frequently suffers from two alternating operational extremes: severe stockouts during demand surges, or excessive overstocking that freezes working capital (Rincón-Guio et al., 2025). Resolving these inefficiencies requires a digitalized, web-based ordering information system infused with quantitative forecasting capabilities to effectively transform raw transactional data into predictive, data-driven managerial insights (Savimäki et al., 2025).

The following formulation of the research questions is based on the field phenomena were to what extent does CV Mekar Jaya Sentosa's integration of a web-based ordering information system reduce data transmission errors? How well does the embedded forecasting model anticipate future patterns in demand? What simultaneous effects do forecasting accuracy, information quality, and system quality have on decision-making quality and overall operational performance?

This study solves this problem by developing a prototype of a web-based ordering information system that integrates a quantitative forecasting algorithm, namely Exponential Smoothing or ARIMA (Ferreira et al., 2023). Furthermore, the analysis of the effectiveness and impact of system implementation is tested empirically using a quantitative causal method through the SEM-PLS tool (Qi & Wongkumchai, 2025). The SEM-PLS approach was chosen because it is able to test complex relationships between latent variables including System Quality, Forecasting Accuracy, User Acceptance of dependent variables including Decision Quality and Operational Efficiency even with a relatively limited sample size, specifically in the CV Mekar Jaya Sentosa ecosystem.

The practical urgency of this research is that delaying the digitalization of the ordering and forecasting system at CV Mekar Jaya Sentosa will exacerbate financial losses due to logistical inefficiencies, decreased service levels to consumers, and loss of market momentum due to being outpaced by data-driven competitors. This research bridges the gap between the disciplines of information systems, management science in forecasting methods, and strategic management in decision support systems (Han et al., 2025) (Ashrafi, 2023). Testing using SEM-PLS provides an empirical contribution to the literature on the Technology Acceptance Model (TAM) (Hossain et al., 2024) or IS Success Model (Delone & Mclean, 2003) in the Small and Medium Enterprise (SME) sector.

Many previous studies have focused solely on one aspect: building a descriptive ordering information system alone, or testing a purely mathematical forecasting algorithm without integrating a web interface (Aamer et al., 2020). The originality of this research lies in the convergence of system architectures. Author not only build a web-based transaction platform, but also inject a predictive forecasting engine into it as the main basis of a Decision Support System (DSS) (Miah et al., 2014), which is then evaluated structurally using SEM-PLS. This study distinguishes itself from conventional research by statistically proving, rather than merely

qualitative claims whether forecasting accuracy in web systems is indeed positively correlated with the accuracy of managerial decisions at the operational level of SMEs (Aamer et al., 2020).

The purpose of the research is to assess how well the web-based ordering platform can be integrated to streamline transactional data streams and reduce operational bottlenecks in the marketing, warehouse, and manufacturing departments. After that, the study evaluates and assesses the accuracy of the forecasting algorithms included into the online platform to make sure they can predict future market demand patterns with low mistake rates. This study attempts to statistically validate the direct impacts of Web System Quality (X1) and Ordering Information Quality (X2) on Forecasting Accuracy (Y1) in the field of inferential analysis via SEM-PLS. Additionally, the research assesses how much improved forecasting accuracy (Y1) improves management decision-making quality (Y2) with reference to procurement and inventory controls. Additionally, the research assesses how much improved forecasting accuracy (Y1) improves management decision-making quality (Y2) with reference to procurement and inventory controls. In order to ensure CV Mekar Jaya Sentosa's long-term operational sustainability in the face of market volatility, this study ultimately seeks to empirically demonstrate the downstream influence of data-driven Decision-Making Quality (Y2) on improving the enterprise's overall Operational Performance (Y3).

To position this research within a comprehensive research timeline, a development roadmap underpinning and projecting the sustainability of this research is relevant to MSME performance, technological innovation, and forecasting systems. This research framework is built in stages based on several pillars of previous strategic research, namely the MSME Performance and Basic Capabilities Pillar: Conceptual research (Rahmadiane & Mahmudah, 2023), in her study about The Analysis of Marketing, Strategy Planning, Enterprise Orientation, Technology, and Capital on Indonesian MSMEs Performance, laid the foundation, confirming that technology and strategic planning are crucial stimulants that directly influence the performance improvement of MSMEs in Indonesia.

The two pillars of Sustainable Innovation, which serve as the foundation, were further strengthened (Rahmadiane, 2023), who examined the innovation and creativity efforts of MSMEs. This research concluded that to survive in a competitive market, MSMEs must not stagnate; they are required to implement process innovation and operational creativity. The implementation of digitalization in the ordering system in the current study is a concrete manifestation of the process innovation and creativity adopted by CV Mekar Jaya Sentosa. Fourth, this concrete digitalization step aligns with research, which designed and implemented a forecasting-based ordering system. This research technically demonstrated that combining ordering and forecasting modules can simplify supply chain bureaucracy and minimize logistics delays. Fourth, as a practical utility of forecasting, was emphasized by (Nguyen, 2023) through his study on the application of forecasting to determine sales targets. This research demonstrated that predictive forecasting data is highly effective in assisting top management as a decision support instrument (Decision Support System) (Igwe et al., 2024) in setting rational and measurable business targets (Atilgan et al., 2024).

II. METHOD

The conceptual model of the relationship can be seen in the image below:

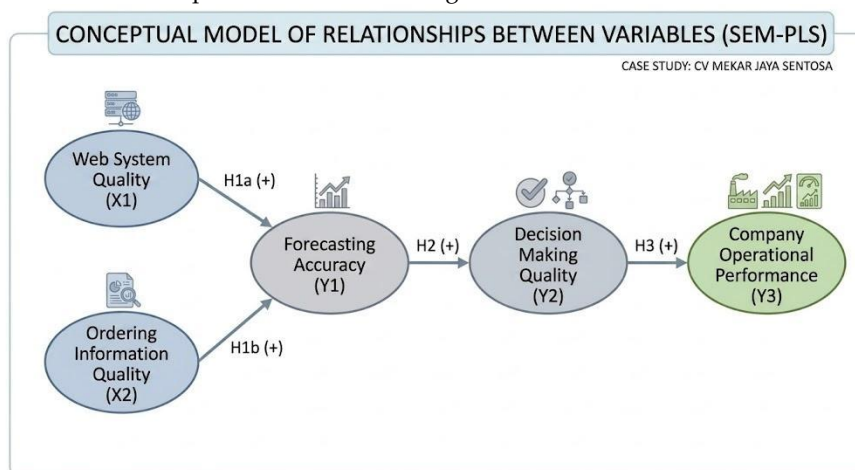


Figure 1. Conceptual Model

This study was conducted within the operational ecosystem of CV. Mekar Jaya Sentosa, a distribution enterprise facing logistical challenges due to volatile market demands. The unit of analysis for this research is the individual. Specifically, it focuses on the active members of the company's field and administrative sales operations. These individuals act as the primary touchpoints for order aggregation and are the direct users of the newly developed forecasting-integrated web platform.

The target population comprises the entire internal sales division of CV. Mekar Jaya Sentosa. To ensure absolute data representation and eliminate sampling bias, this study utilizes saturation sampling (census sampling) (Rahmadiane & Utami, 2022). Saturation sampling is applied when the total population is small, highly specialized, and finite. Consequently, all 80 sales force personnel were selected as active respondents. From a statistical standpoint, a sample size of $N = 80$ is highly robust for variance-based Structural Equation Modeling (PLS-SEM) (Firmansyah & Wahdiniwati, 2023) (Hair et al., 2017) (Hair et al., 2020). According to the 10-times rule and Cohen's power charts, the minimum sample required to detect an R square value of approximately 0,25 (with a 5% significance level and 80% statistical power for a model containing a maximum of 2 structural predictors pointing at a latent construct, X1 and X2 to Y1) is roughly 52 observations. Therefore, our sample of 80 respondents provides excellent statistical power and parameter stability.

A systematic, closed-ended digital questionnaire sent via Google Forms was used to collect data. The collection pipeline was designed over a 4-week window following the initial pilot testing of the web-based ordering system. Prior to data collection, all 80 sales force members attended a hands-on training workshop detailing the user interface of the web ordering platform and the interpretation of its embedded automated forecasting output dashboard. Internal business communication channels were used to distribute link invites. Participation was completely voluntary, anonymous, and supported by a digital informed consent form in order to optimize response rates and guarantee ethical compliance. A 100% response rate ($N = 80$) was attained because saturation sampling was imposed inside a regulated corporate directory. During the initial data screening stage, no straight-lining patterns or missing values were found. All latent constructs within the structural inner model were operationalized as reflective measurements. Indicators were adapted from validated information systems and operational management literature, then tailored specifically to the workflow of CV. Mekar Jaya Sentosa. Responses were captured using a 5-point Likert Scale (Hair et al., 2010).

III. RESULTS AND DISCUSSION

R Square Value

The R Square value measures the amount of variance in an endogenous variable that is explained by its structural predictors:

Forecasting Accuracy (Y1) has an R Square value of 0,548, meaning that 54,8% of the variance in demand projection accuracy at CV. Mekar Jaya Sentosa is jointly explained by Web System Quality and Ordering Information Quality.

Decision-Making Quality (Y2) has an R Square value of 0,420, meaning that 42% of the variance in managerial choice precision is dictated directly by Forecasting Accuracy.

Company Operational Performance (Y3) has an R Square value of 0,507, proving that 50,7% of the total variance in the enterprise's operational efficiency is driven directly by analytical Decision-Making Quality.

Hypothesis verification was determined using a standard 5% significance level. A path is deemed statistically significant if its t-statistic exceeds 1,96 and its p-value is below 0.05.

Table 2. Structural Inner Model Hypothesis Testing Results

Hypothesis	Structural Causal Path	Path Coefficient (β)	Mean Standard Deviation	t-Statistic	p-value	Empirical Status
H1a	Web System Quality (X1) to Forecasting Accuracy (Y1)	0,334	0,092	3,630	< 0,001	Supported
H1b	Ordering Info Quality (X2) to Forecasting Accuracy (Y1)	0,445	0,087	5,115	< 0,001	Supported
H2	Forecasting Accuracy (Y1) to Decision-Making Quality (Y2)	0,648	0,061	10,623	< 0,001	Supported
H3	Decision-Making Quality (Y2) to Operational Performance (Y3)	0,712	0,049	14,531	< 0,001	Supported

The statistical significance of H1a ($\beta = 0,334$, $p < 0,001$) and H1b ($\beta = 0,445$, $p < 0,001$) confirms that the mathematical precision of the predictive framework depends heavily on the system's infrastructure. If the web system does not crash (System Quality) and order metrics remain uncorrupted and update in real-time (Information Quality), the forecasting model can operate with clean data streams (Delone & Mclean, 2003) (Faizal et al., 2018). This directly minimizes unexpected inventory variance.

The relationship between Forecasting Accuracy and Decision-Making Quality is exceptionally strong of H2 ($\beta = 0,648$, $t = 10,623$). This proves that when the sales force operates with low-error mathematical projections, management moves away from intuitive guesswork or reactive adjustments (To & Phan, 2025) (To & Phan, 2025). Instead, they can comfortably pivot toward proactive procurement and precise stock allocations.

Lastly, there is strong evidence for H3 ($\beta = 0,712$, $t = 14,531$), indicating that data-driven decision structures directly enhance company operational performance. CV makes judgments based on precise demand predictions. Mekar Jaya Sentosa successfully maintains a steady inventory turnover rate. In the end, this ensures long-term operational sustainability, lowers logistical waste, avoids expensive stockouts, and minimizes warehouse holding costs (Neely, 2007).

The structural model proves that Web System Quality ($\beta = 0,334$, $p < 0,001$) and Ordering Information Quality ($\beta = 0,445$, $p < 0,001$) are significant prerequisites for Forecasting Accuracy. This statistical reality heavily supports the technical architecture framework (To & Phan, 2025), who engineered a forecasting-based ordering prototype and established that converging transactional mechanics with analytical modules accelerates data flows. Our empirical results advance this finding by proving the mathematical dependency of the forecasting engine on data infrastructure: if the platform secures high real-time information integrity, the algorithm is insulated against data corruption, thereby minimizing forecasting errors. Furthermore, this successful system deployment reflects the strategic mindset highlighted by (Rahmadiane, 2023) regarding the innovation and creativity efforts of MSME actors. Adopting a dual-purpose web portal among transactional and predictive were a direct manifestation of the process innovation and technological creativity required for local enterprises to remain adaptive amid market volatility.

The exceptionally strong path from Forecasting Accuracy to Decision-Making Quality ($\beta = 0,648$, $t = 10,623$) validates the core arguments of Decision Support System (DSS) frameworks. This relationship is strongly supported by (To & Phan, 2025) (Ferreira et al., 2023), whose study on the application of forecasting for sales target determination proved that predictive data serves as a highly reliable instrument for management to establish rational, data-driven goals. Our structural model builds on these findings by showing that forecasting models actively reduce the bounded rationality of operational managers when they produce low error rates within an accessible web interface (Aamer et al., 2020). The low-error demand forecasts offer a steady, objective baseline rather than depending on gut feeling, past guesses, or unpredictable responses to market surges. This makes it possible for the procurement and sales departments to compute inventory goals with a high degree of accuracy and confidence.

Ultimately, the final pathway demonstrates that Decision-Making Quality heavily dictates Company Operational Performance ($\beta = 0,712$, $t = 14,531$). This hulu-to-hilir (end-to-end) transformation bridges a vital empirical gap and confirms the macroeconomic baseline established by (Rahmadiane & Mahmudah, 2023) in her study "The Analysis of Marketing, Strategy Planning, Enterprise Orientation, Technology, and Capital on Indonesian MSMEs Performance." Rahmadiane's early work proved that technology adoption and strategic planning are the most significant positive drivers of overall MSME performance. Technology (Web System and Information Quality) combined with Strategy (Forecasting Accuracy) does not automatically generate profit; instead, it optimizes the cognitive and analytical framework of the firm (Decision-Making Quality). When choices regarding raw material procurement, warehouse loading, and client distribution schedules are optimized, the business eliminates structural waste, prevents costly stockouts, accelerates customer response times, and ultimately locks in long-term operational sustainability (Neely, 2007).

IV. CONCLUSIONS

This research successfully evaluates and confirms the structural pathways through which a digital transformation initiative impacts a localized distribution enterprise. By shifting away from viewing a web platform as a simple digital ledger, this study proves that a web-based ordering system integrated with a predictive engine operates as a highly effective Decision Support System (DSS). The precision of automated demand forecasting is not an isolated mathematical occurrence. It greatly depends on the platform's stability (Web System Quality) and the input data's real-time integrity (Ordering Information Quality). When combined, these infrastructure indicators account for 54,8% of the variation in predicting error reduction. Time-series predictions with high accuracy provide managers with a strong cognitive anchor. The system mitigates constrained rationality, effectively minimizes guessing, and accounts for 42% of the increase in management decision-making quality by offering objective, low-error demand models. Information technology and predictive modeling do not automatically generate bottom-line efficiency. Rather, they achieve impact by optimizing intermediate executive choices. When procurement, warehousing, and logistics decisions are driven by high-quality data, the enterprise optimizes inventory turnover, eliminates holding costs of dead stock, minimizes costly stockouts, and explains 50,7% of the variance in overall Company Operational Performance.

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