The Influence of Digital Technology on Managerial Decision-Making Efficiency of Food and Beverage Manufacturers in Thailand

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Abstract

This study aims to examine digital technology and managerial decision-making efficiency and investigate the influence of digital technology on managerial decision-making efficiency of food and beverage manufacturers in Thailand. Data were collected through questionnaires from 239 respondents. The statistical methods employed included mean, standard deviation, and multiple regression analysis. The results revealed that digital technology and managerial decision-making efficiency were at a high level. Digital technology explained 58.9 percent of the variance in managerial decision-making efficiency of food and beverage manufacturers in Thailand.

The findings indicate that the adoption of digital technology in food and beverage manufacturing organizations plays a crucial role in enhancing managerial decision-making efficiency. The systematic collection and analysis of data from multiple sources enable managers to clearly identify trends, problems, opportunities, and business risks, leading to faster, more accurate, and timely operational and strategic decisions in response to changes in the business environment. At the same time, the use of intelligent digital technologies, automation, and information systems with complete, accurate, and timely data helps reduce errors and improve the effectiveness of performance control and monitoring. Furthermore, transforming work processes and organizational culture toward digital transformation enhances managerial agility and sustainably strengthens organizational competitiveness.

Keywords: Digital Technology, Managerial Decision-Making Efficiency, Food and Beverage Manufacturers

1. Introduction

The food and beverage industry is a key sector that plays a crucial role in driving national economic growth, income generation, and employment. In the context of economic transformation and rapid digital technological change, organizations are required to enhance their management systems and decision-making processes to be faster, more accurate, and responsive to the dynamic business environment. This aligns with the 13th National Economic and Social Development Plan, which emphasizes strengthening national competitiveness through the adoption of digital technologies, data-driven management, and sustainable improvement of industrial operational efficiency (Office of the National Economic and Social Development Council, 2022).

At the same time, the Fifth SME Promotion Plan highlights the importance of encouraging entrepreneurs to adapt to digital transformation by adopting information systems and analytical data to support managerial decision-making, as well as developing managerial capabilities to ensure organizational effectiveness and long-term competitiveness (Office of Small and Medium Enterprises Promotion, 2023).

Digital technology has become increasingly influential in organizational operations and management, particularly in the food and beverage industry, which faces intense competition, market volatility, rapidly changing consumer behavior, and constraints related to cost, quality, and production standards. The adoption of digital technologies—such as management information systems, big data analytics, automation, and intelligent digital technologies—for systematically collecting, analyzing, and processing data from multiple sources enables managers to access accurate, complete, and timely information (Ming et al., 2021). Consequently, managerial decision-making at both operational and strategic levels becomes faster, more accurate, and more effective, while errors are reduced and organizational control and performance monitoring are enhanced, ultimately strengthening sustainable competitiveness (Hamdat et al., 2024).

Previous studies indicate that digital technology and information systems play a significant role in enabling managers to systematically monitor, control, and evaluate organizational performance, thereby improving the quality of both operational and strategic decisions (Mazur & Chukhray, 2023). Moreover, the use of analytical data and intelligent technologies enhances managers' ability to identify business trends, opportunities, and risks, which is critical for improving organizational competitiveness (Sutarman et al., 2025). In the food and beverage industry in particular, digital technology supports more advanced production control systems and managerial decision-making in response to increasingly complex business environments (Lavorato & Piedepalumbo, 2023).

Although international research has extensively examined the role of digital technology, information systems, and data analytics in managerial decision-making (Ragazou et al., 2023), most studies focus on large organizations or industries in developed countries. Many adopt case study approaches or concentrate on specific technologies, such as artificial intelligence or isolated information systems (Song et al., 2025). As a result, there remains a lack of comprehensive empirical research examining the multidimensional impact of digital technology on managerial decision-making efficiency, particularly within the context of Thailand's food and beverage industry, which differs in organizational structure, firm size, and levels of technological adoption.

Therefore, the study entitled *The Influence of Digital Technology on Managerial Decision-Making Efficiency of Food and Beverage Manufacturers in Thailand* is essential for generating empirical knowledge that reflects the domestic industrial context. This research aims to systematically explain the role of digital technology in supporting decision-making, control, and organizational management. The findings will contribute academically by extending knowledge in digital management and practically by providing guidance for entrepreneurs and executives in adopting digital technologies to enhance decision-making efficiency, strengthen competitiveness, and achieve sustainable long-term organizational growth.

2. Research Objectives

1. To examine digital technology and managerial decision-making efficiency of food and beverage manufacturers in Thailand.

2. To investigate the influence of digital technology on managerial decision-making efficiency of food and beverage manufacturers in Thailand.

3. Methodology

3.1 Population and Sample

The population of this study consisted of business owners, executives, marketing managers, and business development managers of licensed food and beverage manufacturing plants operating in Thailand as of the end of 2025, totaling 593 factories (Department of Industrial Works, 2025). The sample size was determined using Yamane's (1973) formula for a known population with a 95% confidence level. Accordingly, the calculated sample size was 239 factories.

$$n = \frac{N}{1 + Ne^2}$$

The researcher employed simple random sampling to select business owners, executives, marketing managers, and business development managers from food and beverage manufacturing plants. This approach was adopted to ensure that all sampling units in the population had an equal chance of being selected. Simple random sampling helps minimize selection bias and allows the research findings to be reliably generalized to the population.

3.2 Research Instrument

The instrument used for data collection in this study was a questionnaire, which consisted of three parts:

Part 1 consisted of questions regarding the general information of the respondents. The questions were close-ended and required respondents to select the most appropriate answers.

Part 2 focused on digital technology, including:

1. Management information systems,
2. Intelligent digital technologies and automation,
3. Big data analytics, and
4. Organizational digital transformation.

Responses in this section were measured using a five-point Likert scale.

Part 3 addressed managerial decision-making efficiency, including:

1. Speed and timeliness of decision-making,
2. Accuracy and quality of decision-making,
3. Support for strategic decision-making, and
4. Effectiveness in performance control and monitoring.

Responses in this section were also measured using a five-point Likert scale.

After the questionnaire was developed, its quality was tested in two stages:

1. Content validity was examined using the Index of Item-Objective Congruence (IOC), evaluated by three experts. In this study, IOC values ranged from 0.67 to 1.00, with an overall IOC of 0.965 (Rovinelli & Hambleton, 1976).

2. Reliability was assessed by administering the validated questionnaire to a pilot group of 30 respondents with characteristics similar to those of the sample. Cronbach's alpha coefficients indicated high reliability, with values of 0.974 for digital technology and 0.963 for managerial decision-making efficiency (Cronbach, 1951).

4. Result

The research findings addressing Objective 1, which aimed to examine digital technology and managerial decision-makin

Table 1 Mean and Standard Deviation of Digital Technology

Digital Technology	$\overline{X}$	S.D.	Interpretation	Skewness	Kurtosis
1) Management information systems	4.25	.550	High	-.932	.388
2) Intelligent digital technologies and automation	4.30	.504	High	-1.003	.682
3) Big data analytics	4.31	.481	High	-1.354	1.289
4) Organizational digital transformation	4.27	.509	High	-.754	-.194
Overall	**4.28**	**.438**	High		

As shown in Table 1, the overall level of digital technology adoption is high ($\bar{X}$ = 4.28, S.D. = 0.438). When considered by dimension, big data analytics exhibits the highest mean score ($\bar{X}$ = 4.31, S.D. = 0.481), followed by intelligent digital technologies and automation ($\bar{X}$ = 4.30, S.D. = 0.504), organizational digital transformation ($\bar{X}$ = 4.27, S.D. = 0.509), and management information systems ($\bar{X}$ = 4.25, S.D. = 0.550). The skewness and kurtosis values for all variables fall within the acceptable range of −2 to +2, indicating an approximately normal distribution of the data.

Table 2 Mean and Standard Deviation of Managerial Decision-Making Efficiency

Managerial Decision-Making Efficiency	$\overline{X}$	S.D.	Interpereation	Skewness	Kurtosis
1) Speed and timeliness of decision-making	4.20	.523	High	-1.127	1.243
2) Accuracy and quality of decision-making	4.16	.621	High	-1.036	.606
3) Support for strategic decision-making	4.23	.574	High	-.994	.694

4) Effectiveness in performance control and monitoring	4.28	.461	High	-.855	.869
Overall	**4.22**	**.492**	มาก		

As shown in Table 2, the overall level of managerial decision-making efficiency is high ($\bar{X}$ = 4.22, S.D. = 0.492). When considered by dimension, effectiveness in performance control and monitoring records the highest mean score ($\bar{X}$ = 4.28, S.D. = 0.461), followed by support for strategic decision-making ($\bar{X}$ = 4.23, S.D. = 0.574), speed and timeliness of decision-making ($\bar{X}$ = 4.20, S.D. = 0.523), and accuracy and quality of decision-making, which shows the lowest mean score ($\bar{X}$ = 4.16, S.D. = 0.621). The skewness and kurtosis values for all variables fall within the acceptable range of −2 to +2, indicating that the data are approximately normally distributed (Groeneveld & Meeden, 1984).

Table 3 Regression Coefficients of Digital Technology Affecting Managerial Decision-Making Efficiency

Independent Variable	b	SE_b	ß	t	p-value	Tolerance	VIF
(Constant)	.539	.187		2.879	.004		
Big data analytics	.261	.049	.292	5.318**	.000	.488	2.049
Intelligent digital technologies and automation	.247	.057	.253	4.313**	.000	.429	2.331
Organizational digital transformation	.205	.062	.201	3.331**	.001	.406	2.461
Management information systems	.148	.055	.153	2.704**	.007	.461	2.170

$R = 0.595$, $R^2 = 0.589$, SEest = 0.31518, F = 7.313, Sig. of F = 0.007, Durbin Watson = 1.675

*Significant at the 0.05 level, **Significant at the 0.01 level*

As shown in Table 3, the tolerance values range from 0.406 to 0.488, which are higher than the recommended threshold of 0.10, while the VIF values range from 2.049 to 2.461, which are below the critical value of 10. These results indicate that none of the independent variables suffer from multicollinearity, meaning that the predictors are not excessively correlated with one another and are appropriate for regression analysis. In addition, the Durbin–Watson statistic is 1.675, indicating that the regression model does not exhibit autocorrelation of residuals and that the predictive results of the model are reliable.

The standardized regression analysis reveals four independent variables that significantly influence managerial decision-making efficiency among food and beverage manufacturers in Thailand. In descending order of influence, these variables are: big data analytics, intelligent digital technologies and automation, organizational digital transformation, and management information systems. The adjusted coefficient of determination (Adjusted R^2) is 0.589, indicating that digital technology explains 58.9% of the variance in managerial decision-

making efficiency, while the remaining 41.1% is attributable to other factors not included in the model.

The standardized regression equation can be expressed as follows:

y = 0.539 + 0.292 (Big Data Analytics) + 0.253 (Intelligent Digital Technologies and Automation) + 0.201 (Organizational Digital Transformation) + 0.153 (Management Information Systems)

The standardized coefficients can be interpreted as follows. The standardized beta coefficient for big data analytics ($\beta = 0.292$) indicates that, holding other factors constant, a one-unit increase in big data analytics is associated with a 0.292-unit increase in managerial decision-making efficiency, or an increase of 29.2%. The standardized beta coefficient for intelligent digital technologies and automation ($\beta = 0.253$) suggests that a one-unit increase in this dimension leads to a 0.253-unit increase in managerial decision-making efficiency, equivalent to a 25.3% improvement.

Similarly, organizational digital transformation has a standardized beta coefficient of 0.201, indicating that a one-unit increase in organizational digital transformation increases managerial decision-making efficiency by 0.201 units, or 20.1%. Finally, management information systems show a standardized beta coefficient of 0.153, meaning that a one-unit increase in management information systems contributes to a 0.153-unit increase in managerial decision-making efficiency, or 15.3%.

5. Conclusion

This study contributes new knowledge by demonstrating that digital technology is not merely a supportive tool for managerial decision-making in the food and beverage industry but functions as a strategic mechanism that systematically integrates data, work processes, and managerial capabilities. The integration of data from multiple sources through information systems, data analytics, and automation technologies shifts managerial decision-making from reliance on personal experience toward evidence-based decision-making that is accurate, timely, and responsive to dynamic business environments. Managerial decision-making efficiency is maximized when organizations possess readiness in terms of structure, processes, and organizational culture that support digital technology adoption and continuous learning. As a result, planning, control, and strategic decision-making become more agile, errors are reduced, operational effectiveness is enhanced, and organizational competitiveness and sustainability are strengthened in the long term.

Recommendations

Recommendations Based on the Findings

1. Organizations should invest in and develop information systems capable of comprehensively, accurately, and timely collecting, integrating, and analyzing data from multiple sources to support both operational and strategic managerial decision-making with greater precision and effectiveness.

2. Food and beverage manufacturers should expand the adoption of intelligent digital technologies, such as automation systems, real-time monitoring, and advanced data analytics, to reduce errors, accelerate decision-making, and enhance the effectiveness of performance control and monitoring.

3. Organizations should prioritize the development of digital knowledge, skills, and attitudes among managers and employees through continuous training and lifelong learning, enabling effective use of data and digital technologies in decision-making in response to changing business environments.

4. Organizations should foster a work culture that embraces innovation, data-driven decision-making, and flexible adaptation to change, while aligning organizational structures and work processes with digital transformation to enhance managerial agility and sustain competitive advantage.

Recommendations for Future Research

Future studies should examine additional variables such as organizational culture, digital readiness, digital leadership, and managers' digital competencies to provide a more comprehensive understanding of the underlying relationships. Furthermore, mixed-method or qualitative research approaches should be employed to gain deeper insights and more clearly capture the dynamics of managerial decision-making in the digital era.

Acknowledgments

The authors would like to thank Suan Sunandha Rajabhat University, Bangkok, Thailand (http://www.ssru.ac.th/) to provide funding support to attend the dissemination of research on this and thank family, friends, colleagues in Suan Sunandha Rajabhat University and College of Innovation and Management for cooperation and provide the dataset in research, all of you.

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