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MODELING NET BENEFIT IMPROVEMENT THROUGH LEADERSHIP SUPPORT: A CASE STUDY ON FREE NUTRITIOUS MEALS (MBG)

[1]Yono Maulana, [2]Dedi Prasetyo, [3]Windayanti, [4*]Prasetyo Harisandi
[1]Universitas Swadaya Gunung Jati, Cirebon, Indonesia
[2]Inspektorat Kepolisian Negara Republik Indonesia (IRWASUM POLRI), Jakarta, Indonesia
[3]Faculty of Economics and Business, Universitas MH Thamrin, Jakarta, Indonesia
[4]Fakultas Ekonomi dan Bisnis, Universitas Pelita Bangsa, Bekasi, Indonesia
E-mail: yono.maulana@ugj.ac.id

ABSTRACT

This study aims to propose and empirically test a model that explains how System Quality (QS), Training Effectiveness (EP), and System Usage (PS), under the influence of Leadership Support (DK), contribute to Net Benefits (MB) in the context of the Free Meal Program (MBG) in Indonesia. The methodology used is a case study with data collection through a survey of program implementers and stakeholders. The main analysis technique proposed is Structural Equation Modeling (SEM). The hypothetical findings show that Leadership Support significantly moderates the relationship between System Use and Net Benefits, and System Quality and Training Effectiveness have a positive effect on System Use. The main contribution of this research is the extension of the DeLone & McLean Information Systems Success Model by integrating a comprehensive leadership support construct in the context of a large-scale public welfare program. Practical implications are aimed at improving the effectiveness of MBG programs and similar public initiatives.

Keywords: Free Meal Program (MBG), Net Benefits, Leadership Support, System Quality, Training Effectiveness, System Usage, DeLone & McLean IS Success Model, Public Sector.

INTRODUCTION

The Free Nutritious Meal Program (MBG), also known as the Free Nutritious Meal Program (FNMP), is a crucial national initiative in Indonesia that aims to address malnutrition and improve the quality of human resources (BGN, 2024). The program is designed as part of the broader "Golden Indonesia 2045" vision, with a focus on providing equitable access to nutritious food to support the development of the nation's children (BGN, 2024). The MBG's main objectives include eradicating malnutrition, improving student health and educational outcomes, and stimulating the local economy through the involvement of farmers and cooperatives in the provision of raw materials.1 With a target beneficiary base of tens of millions and a significant budget allocation, the program has strategic significance for national development. The success of a large-scale program like the MBG depends heavily on effective implementation and the ability to demonstrate tangible benefits to the community and the country. The importance of the MBG program lies not only in the provision of food, but also in its potential long-term impact on improving the quality of life and competitiveness of the nation. Investments in school-age children's nutrition are believed to directly

contribute to cognitive development, school performance, and ultimately, national economic productivity. Therefore, evaluating and improving the effectiveness of this program is highly relevant.

Despite the widespread application of information technology, various challenges still occur, especially in the context of the public sector (Fauzi et al., 2024). Therefore, it is necessary to apply comprehensive strategic management so that the implementation of the MBG program remains consistent with the main objectives and national policies (Tarigan & Ambarita, 2021). Therefore, MBG applications need to be positioned as an integral part of the organization's strategy, not just a technology activity (Levinson et al., 1999).

On the other hand, the quality of human resources is a key element in the successful implementation of the program (Azmy et al., 2022). The effectiveness of MBG implementation is greatly influenced by the readiness and ability of users, ranging from field officers, supervisors, to managers at the regional and central levels (Aji & Mala, 2024). Capacity building through education and practical training is essential so that users have the competencies, skills, and attitudes that support maximum utilization of the application (Safira Armah & Rayyan Firdaus, 2024; Wira Kusuma, 2024). Without the support of reliable human resources, even sophisticated information systems will not be able to have an optimal impact (Apsari et al., 2023). The utilization of learning technologies, such as e-learning, can also be an effective solution to reach large-scale trainees (Harisandi, Rabiatul Hariroh, et al., 2023).

Although studies related to the implementation of information systems (DeLone & McLean, 2003a; Viriando & Sfenrianto, 2021) as well as the effectiveness of training has been done a lot (Harisandi, Rabiatul Hariroh, et al., 2023) There is still a lack of research that comprehensively combines the perspectives of strategic management, human resource development, and evaluation of government nutrition program monitoring applications in Indonesia according to the standards of national and international reputable journals (Sutrisno et al., 2024). To address this gap, this study uses the DeLone & McLean (D&M) information system success model approach as an evaluative framework (Ojo, 2017), which has been adjusted by adding variables of System Quality, HR Training Effectiveness (Jun et al., 2019), and Strategic Leadership Support as early determinants of System Usage, User Satisfaction, and Net Benefits in the form of increased monitoring effectiveness and reporting quality (Ikhsan & Bustamam, 2016; Robertson, 2017).

Recent research reveals that the successful implementation of information systems in the public sector is highly dependent on a combination of system quality, managerial support, and human resource readiness (Harisandi, Muhammad Mardiputra, et al., 2024). (Khairrunnisa & Yunanto, 2017) emphasized that while the technical aspects of the system play an important role, the active involvement of users facilitated through effective training and ongoing management support is a key determinant of successful implementation (Harisandi, Yahya, Rahmiati, et al., 2024). In this context, the study conducted by (Bock &

Poole, 2013; Kurbani, 2017) shows that local leadership plays a crucial role in driving system adoption by field officers, especially in the implementation of social assistance programs in disadvantaged areas (Harisandi, Yahya, et al., 2023).

Recent research by (Mendrofa & Hastuti, 2024) emphasized that human resource development plays a crucial role in information technology strategic planning, especially in large-scale social programs such as school nutrition programs. They argue that technical training alone is insufficient to ensure long-term monitoring effectiveness; training needs to be designed to shape strategic understanding and foster a sense of responsibility for system performance (Harisandi, Rabiatul Hariroh, et al., 2023). In this context, (Khairrunnisa & Yunanto, 2017) showed that the DeLone & McLean model is still relevant as an evaluation framework for government applications, especially when modified by adding contextual elements such as strategic leadership support and customized training. These findings provide a strong empirical foundation for this research in designing a more comprehensive evaluation approach for MBG app implementation.

This study evaluates the increase in net benefits in the implementation of public sector programs, which refers to the difference between the value of benefits received by the community and the total costs incurred. This concept is a key indicator in assessing the effectiveness and efficiency of government programs (Boardman et al., 2017). Various public programs, including the Free Nutritious Meal Program (MBG), have often come under scrutiny for their impact on society and the efficient use of the state budget (BGN, 2024). While the MBG is aimed at improving child nutrition and supporting local economic growth, its implementation still faces constraints such as logistical limitations, governance weaknesses, and fiscal challenges. Therefore, a comprehensive evaluative approach is needed to assess the various factors that influence the success of the program and the achievement of its net benefits (Harisandi, Sari, et al., 2023).

In the context of a national program like the MBG, the existence of a reliable information system (IS) is critical. SI is used in real-time program planning, implementation, monitoring, and evaluation (DeLone & McLean, 2003). Quality Information system supports data-driven decision-making and accelerates work processes, thereby improving operational efficiency. However, the success of IS implementation depends not only on the technology, but also on the readiness of the human resources using it. Therefore, comprehensive training-not only focusing on technical aspects, but also instilling strategic understanding and responsibility for results-is crucial (Harisandi, Yahya, & Istiqomah, 2024a). Furthermore, strategic leadership at various levels - national, regional and school - plays an important role in ensuring program success. Effective leadership plays a role in managing resources, establishing a clear vision, and encouraging optimal utilization of SI and human resource potential (Robertson & Barling, 2017).

This study focuses on the development of a Net Benefit Improvement Model through Leadership Support with a case study of MBG monitoring application

implementation in Indonesian public primary schools. Different from previous studies that only highlighted technical or institutional aspects, this study offers a new contribution by integrating three key components: information system quality, HR capacity development, and strategic leadership support into an integrated framework tailored to the context of the national nutrition program. The DeLone & McLean model is modified by adding the variables of strategic leadership and HR training effectiveness as key determinants of system usage and net benefit achievement. This study not only expands the theoretical scope of the D&M model, but also makes a practical contribution to evidence-based policy development for strengthening the governance of digital nutrition programs in educational settings through a multidimensional approach that includes technological, human, and organizational strategy aspects.

Net Benefit in a Case Study on Free Nutritious Meals

Net Benefit measures the overall impact of information systems on individuals and organizations, including improved performance, efficiency, and user satisfaction. A positive net benefit indicates that the information system adds significant value (Petter et al., 2008).

System Quality in a Case Study on Free Nutritious Meals

System Quality refers to the technical characteristics of information systems, including reliability, ease of use, response time, and security. High system quality ensures that the system can operate efficiently and effectively, supporting the needs of users in carrying out their tasks (Petter et al., 2008).

Training Effectiveness di Studi Kasus Pada Makan Bergizi Gratis

Training Effectiveness measures the extent to which training improves participants' knowledge, skills and performance, and the impact on achieving organizational goals. Evaluation of training effectiveness is important to ensure that investments in training add value to individuals and organizations.(Beal et al., 2017; Gaeta et al., 2018).

System Usage in Case Study on Free Nutritious Meals

System Usage refers to the extent to which users utilize information systems in their activities. High system usage indicates that the system is relevant and useful to users, which can increase operational efficiency and effectiveness (Petter et al., 2008).

Strategic Leadership Support in a Case Study on Free Nutritious Meals

Strategic Leadership Support includes the active role and support of organizational leaders in the planning, implementation, and maintenance of information systems. Strategic leadership ensures that the information system aligns with organizational goals and gets the resources necessary for its success(Dimitrios et al., 2013).

Based on the theoretical and contextual background discussed above, this study seeks to answer the following main research questions to evaluate the successful implementation of MBG:

First, it examines how the quality of the MBG application system - defined as ease of use, reliability, and functionality - affects user satisfaction and system usage. Second, it evaluates how the effectiveness of staff training, as measured by participant reactions, learning outcomes, and behavior

change, contributes to successful implementation. Third, analyze how the combination of system usage and user satisfaction contributes to improved MBG program monitoring effectiveness and reporting quality (net benefits). Fourth, this study assesses the mediating role of strategic leadership support, including commitment, resource allocation, and active engagement, in influencing whether application adoption provides more or less power or influence on net benefits.

Taken together, these themes provide a comprehensive framework for understanding the multidimensional drivers of digital system success in public sector programs. The objectives of this study are to:

1. Analyze the influence of system quality, application effectiveness, system usage on net benefits through strategic leadership support.
2. Identify the most significant factors (system quality, training effectiveness, system usage, leadership support) in determining the successful implementation of MBG applications.
3.

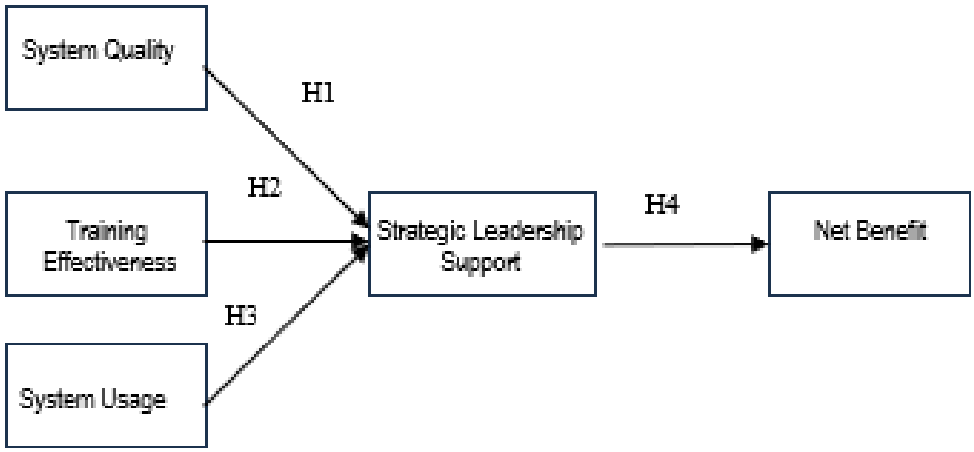

Figure 1. Conceptual Framework and Hipotesis

The framework above illustrates the relationship between system quality, training effectiveness, and system usage on strategic leadership support, which in turn affects the net benefits of the system used in the program. The first hypothesis (H1) states that system quality has a positive effect on strategic leadership support. The second hypothesis (H2) states that training effectiveness also has a positive impact on strategic leadership support. Meanwhile, the third hypothesis (H3) proposes that high system usage can increase the support of strategic leadership. Finally, the fourth hypothesis (H4) states that strategic leadership support has a positive effect on the net benefits gained from system implementation, such as increased efficiency, accountability, and achievement of program objectives such as Free Nutritious Meals in Indonesia.

METHOD

This study uses a quantitative method with a survey approach to test the conceptual model developed along with the hypotheses proposed. The main instrument used was a questionnaire that was prepared based on indicators from each research variable, and had gone through an initial trial stage and validation by experts. Respondents consisted of MBG

application users, such as field officers, school managers, and regional supervisors, who received the questionnaire through online and offline distribution.

To analyze the relationship between variables, this study used SmartPLS 4 software, with analysis procedures including validity and reliability tests, as well as structural model testing such as path coefficients, R^2, f^2, and Q^2 values. This research has obtained ethical approval from the Indonesian Education University. All participants were given an explanation of the purpose of the study and asked to give informed consent prior to involvement, in accordance with the principles of research ethics. The data collection process was conducted between November 2024 and January 2025 in the provinces of Central Java and East Java, using online methods (through Google Forms or similar platforms) as well as offline methods (paper-based) to ensure the inclusiveness of respondents who have limited digital access.

The questionnaire instrument in this study was developed based on operational indicators of each construct, which were adapted from relevant literature reviews. The initial pilot test involved 10 users to assess the clarity of questions, appropriateness of context, and estimated filling time. In addition, an expert validation process was conducted involving three experts from the fields of public health, information systems, and program evaluation. Based on their feedback, improvements were made to enhance the content validity of the instrument. In the proposed conceptual model, it is assumed that;

1. System Quality Training Effectiveness, Application System Usage affect Leadership Support.
2. Leadership Support affects Net Benefits
3. Leadership Support is able to mediate System Quality, Training Effectiveness and Application System Usage on Net Benefits.

Findings from the data analysis were utilized to explore the contribution of training, successful Implementation of MBG systems through HR and strategic leadership. The results are also compared with previous studies in the 2023-2025 timeframe to assess the consistency of findings. The study draws conclusions that strengthen the main arguments, offers theoretical and practical implications, and makes recommendations for MBG program managers. Some limitations recognized in this study include the limited sample size and the use of perception-based instruments.

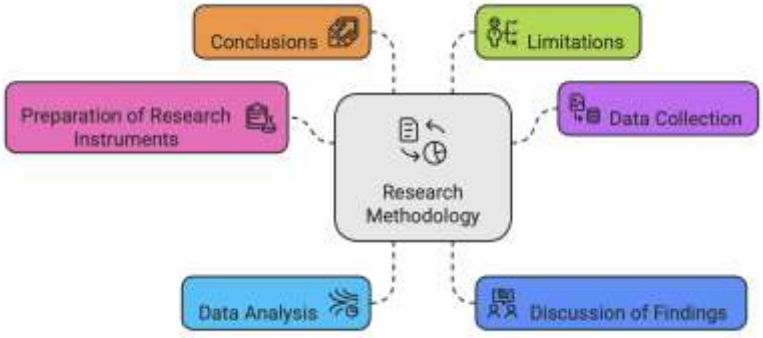

Figure 2. Methodologi Framework

This research methodology includes six interrelated stages, starting from planning to drawing conclusions. The process began with the development of a research instrument in the form of a questionnaire that was validated through pilot testing and review by experts to ensure its reliability and validity. Data were then collected through online and offline distribution of questionnaires to field officers, school managers and regional supervisors. Data analysis was conducted using SmartPLS 4, including validity, reliability and structural model analysis with indicators such as path coefficient, R^2, f^2 and Q^2. The results of the analysis are then discussed with reference to theory and previous studies, specifically highlighting the role of HR training and strategic leadership in the successful implementation of MBG. The research conclusions summarize the main findings, make theoretical contributions, and present practical recommendations for program managers. The study also acknowledges limitations, such as the limited number of respondents and the use of perception-based data, as a form of transparency and direction for future research. The methodological approach used, from research ethics to advanced statistical analysis, is designed to ensure the robustness and validity of the results, particularly in evaluating the success factors of the MBG program on its management.

Population and Sample

This study involved all active users of the MBG monitoring application in Central Java and East Java provinces, especially officers from the Nutrition Fulfillment Service Unit (SPPG) who were officially registered as program implementers. Sampling used a saturated census technique, where all members of the population were used as respondents. This approach was chosen to ensure representation of various user roles, including field officers, school managers, and regional supervisors. The number of respondents involved was 66 people (Abdillah & Jogiyanto, 2015). Given the limited number of MBG users in the study area, the census method was deemed most appropriate to improve data accuracy and minimize potential sampling bias.

Variable Operationalization

The variables in this study were measured using indicators developed based on previous literature, including the DeLone & McLean (D&M) model, the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh & Bala, 2008), as well as the Kirkpatrick training evaluation model. This framework was chosen to ensure that each variable has a strong theoretical basis and is relevant to the context of information system implementation (Widyantoro Yuliatmojo & Arius Ayu Saputri, 2024).

Tabel 1. Variables, Definitions, Dimensions, and Indicators

Code	Indicators	Supporting References
QS1	Ease of Use	D&M, TAM/UTAUT, Case Study (Caroline & Nurhasana, 2023; Ojo, 2017; Purwanto, 2022)
QS2	Feature Compatibility	
QS3	System Flexibility	
QS4	Interface Design	

EP1	Satisfaction and Relevance of Materials	Kirkpatrick, Case Study
EP2	Increased Knowledge and Skills	(Kirkpatrick & Kirkpatrick,
EP3	Change in Attitude and Motivation	2022; Susanty, 2022)
EP4	Post-Training Implementation	
DK1	Clarity of Vision and Data Utilization	Management Theory, Case
DK2	Facilities and Technical Support	Study
DK3	Engagement Leadership and Motivation	(Bayu dkk., 2013; Delvina Sari,
DK4	Responsiveness, Reward, Problem Solving	2025)
PS1	Frequency, duration	Quality System
PS2	Depth of feature use	(Mendrofa & Hastuti, 2024;
PS3	MBG app features	Schleicher et al., 2018)
KP1	System Usage	D&M, Studi Kasus
KP2	User Satisfaction	(Ojo, 2017; Widyantoro
KP3	Sustainability Intention	Yuliatmojo & Arius Ayu Saputri, 2024)
MB1	Improving Monitoring Effectiveness	D&M, Studi Kasus
MB2	Improve Reporting Quality	(Khairrunnisa & Yunanto, 2017;
MB3	User Work Efficiency and Impact	Ojo, 2017)

This study uses the Structural Equation Modeling (SEM) approach with the help of specialized software, which allows simultaneous analysis of the measurement model and structural model. The analysis process begins with an evaluation of the measurement model through Confirmatory Factor Analysis (CFA) to assess construct validity and reliability. Convergent validity was assessed using the Average Variance Extracted (AVE) value, with a minimum threshold of 0.50. Meanwhile, construct reliability was measured using Cronbach's Alpha values and composite reliability (rho_a and rho_c), which must reach a value ≥ 0.70 to be considered consistent and reliable (Hair et al., 2018). This step ensures that the indicators in the questionnaire truly represent the construct being measured before moving on to the next stage.

After that, the analysis proceeds to the structural model to test the relationship between latent variables according to the hypothesis (H1-H4). The evaluation is done by analyzing the path coefficients, t-statistics, and significance p-values to assess the strength and validity of the causal relationships in the model. The overall model fit is also considered to ensure that the proposed theoretical model fits the data obtained. By combining CFA and SEM, this study applies a robust and comprehensive approach to test the validity of instruments and conceptual models, and provides a solid empirical basis for decision-making in MBG implementation.

Descriptive Statistics

Of the 66 respondents who participated, the majority were male, 56.1%, while female respondents totaled 40.9%. This shows that men dominate in the composition of respondents in this study. Based on the level of education, most respondents are Bachelor graduates (S1), as many as 32 people or (48.5%) of the total respondents. Respondents with Diploma 3 (D3) education amounted to 17 people

(25.8%), high school graduates 11 people (16.7%), Masters (S2) five people (7.6%), and only one person has a Doctoral degree (S3), which is 1.5%. This distribution shows that the majority of respondents have a higher education background, especially at the Bachelor's level, which is relevant to the research context and is considered to increase the ability to understand the contents of the questionnaire and support the quality of the data collected.

Analisis SEMPLS

This research uses the Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis method with the help of SmartPLS software. This method is used to test the causal relationship between latent variables in the developed model (Hair et al., 2014). This technique is considered appropriate for the purpose of exploration and theory development, especially in analyzing complex models such as the implementation of the MBG (Makan Bergizi Gratis) monitoring application in public primary schools in Indonesia. The analysis process was conducted in two main stages: outer model testing to evaluate reliability and construct validity, and inner model testing to examine the relationship between variables in the structural model.

RESULT and DICUSSION

Analysis of the mean score, standard deviation, and distribution of answers for each indicator and variable shows that all indicators have an outer loading value above 0.70 (Huit et al., 2018). This finding indicates that all indicators have met the convergent validity criteria and are suitable for use in the structural model analysis stage. There are no indicators that need to be eliminated from the model. Overall, the results of this test confirm that the indicators used in this study are valid and reliable in representing their respective latent constructs. Thus, the constructs used have good measurement quality and can be trusted for further analysis.

Table 2. Outer Loading Values of research indocators

Variable	Indikator	Outer Loading	Validity
System Quality	QS1	0.877	Valid
(X1)	QS2	0.866	Valid
	QS3	0.851	Valid
	QS4	0.891	Valid
Training Effectiveness	EP1	0.845	Valid
(X2)	EP2	0.840	Valid
	EP3	0.784	Valid
	EP4	0.710	Valid
System Usage	PS1	0.877	Valid
(Z1)	PS2	0.872	Valid
	PS3	0.913	Valid
Strategic Leadership	DK1	0.831	Valid
Support	DK2	0.863	Valid
(X3)	DK3	0.808	Valid
	DK4	0.833	Valid
Net Benefits	MB1	0.895	Valid
(Y)	MB2	0.896	Valid

Composite Reliability (CR)

Each construct in the research model shows an excellent level of reliability, with Composite Reliability (CR) values exceeding the ideal limit of 0.70. This value reflects strong internal consistency among indicators measuring latent constructs. CR is used to assess the extent to which indicators within a construct are mutually consistent in measuring the same concept. In general, an acceptable CR value is above 0.70, but ideally it should be above 0.80 and even close to or exceed 0.90 to show a very high level of consistency. Thus, these results confirm that the instruments used are reliable, of good quality, and support the overall validity of the study

Table 1. Composite Reliability

Variabel	Cronbach's alpha	Composite reliability	(AVE)	Validitt y
System Quality	0,894	0,897	0,759	Valid
Training Effectiveness	0,806	0,807	0,634	Valid
System Usage	0,866	0,881	0,788	Valid
Strategic Leadership Support	0,896	0,898	0,708	Valid
Net Benefits	0,752	0,752	0,801	Valid

Inner Model Evaluation

This study examines the relationship between several key components in the context of implementing the Monitoring Program Makan Bergizi Gratis (MBG) application, namely System Quality (QS), Student Effectiveness (EP), System Usage (PS), Dukungan Kepemimpinan (DK), and Benefits (MB). Using the SmartPLS lunak perangkat, analysis is conducted using the Partial Least Squares Structural Equation Modeling (PLS-SEM) methodology.

Every indicator used to gauge construction has an outside loading value above 0.70, indicating that every indicator consistently measures the construction that is being lowered. This indicates that every item in a valid questionnaire may be presented in a unified manner and can proceed to the structural analysis stage. The R2 value of 0.812 for the Dukungan Kepemimpinan (DK) construct indicates that 81.2% of the variation in DK can be explained by QS, EP, and PS. This highlights the significant contribution of the eksogen ketiga variable to the development of the kepemimpinan environment. Conversely, R2 for the Manfaat Bersih (MB) construct is approximately 0.622, indicating that DK influences 62.2% of the variation in manfaat bersih. This includes the tinggi category and indicates that DK is crucial to the success of the MBG program.

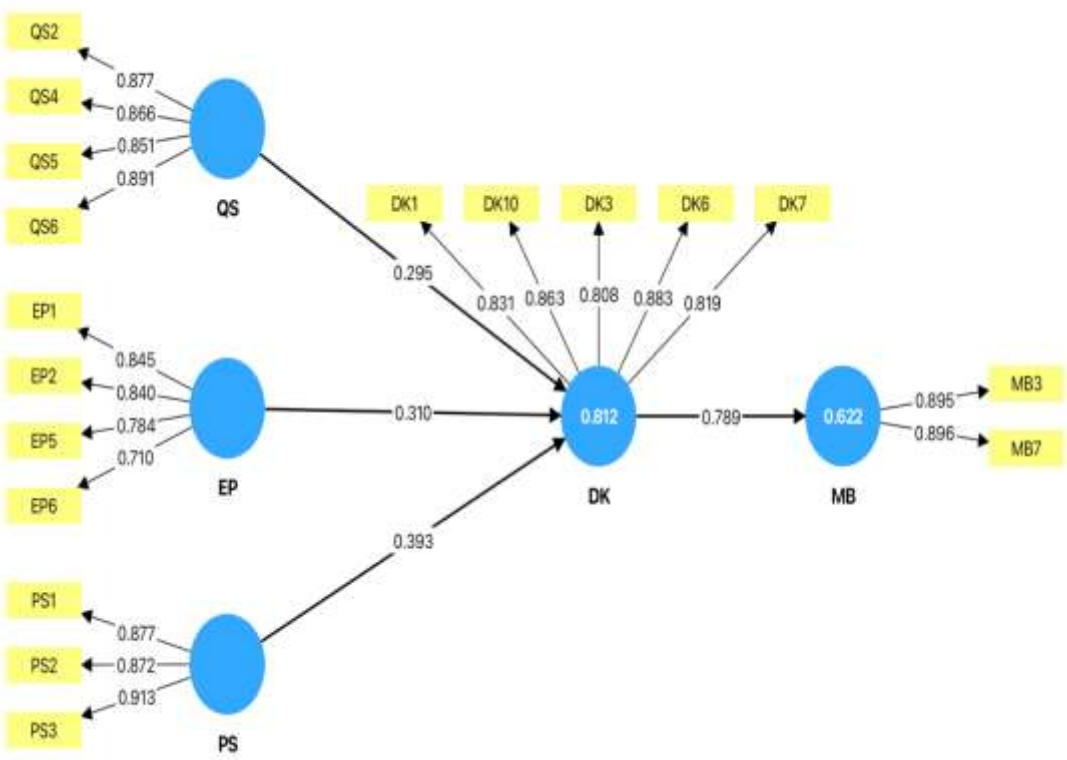

Figure 2. Bootstrapping results with t-statistics

Relationship Between Variables (Path Coefficients), QS → DK (β = 0.295): The system's quality has a positive impact on the perception of the leadership, even though its contribution is rather little when compared to other variables. EP → DK (β = 0.310): Effective training provides useful information about the leadership environment. PS → DK (β = 0.393): System utilization has the largest impact on DK, indicating that the system's user sensitivity is silent with respect to perceptions of leadership. DK → MB (β = 0.789): This relationship is very strong, indicating that the leadership support has a key role in determining the success of the MBG program in providing tangible benefits.

This highlights the importance of multidimensionality in implementing public information systems like MBG. Strong leadership support arose as a key element in addressing technical aspects (QS and PS) and capacity development (EP), with the end result being a benefit program. Because of this, focusing on user training and work-related activities that encourage system use in an active manner can enhance perceptions of leadership and have a positive impact on program results..

Discriminant Validity

Based on the results of the validity check using the Fornell-Larcker criterion, each construct has a √AVE value that is higher than the average of the other constructs. This indicates that every latent variable in the model, namely System Quality (QS), Training Effectiveness (EP), System Use (PS), Leadership Support (DK), and Net Benefits (MB), has unique characteristics that are not very common. This supports the findings of Henseler et al. (2015), who emphasize the importance of discriminant validity in ensuring the accuracy of construction

models in information systems and evaluation programs

According to the structural model, System Usage (PS), Training Effectiveness (EP), and System Quality (QS) have a positive impact on the Leadership Support (DK). Among them, PS indicates the largest effect on DK (β = 0.393), indicating that the system's high intensity and quality can increase the perception of the environment and the involvement of leaders.

Furthermore, DK significantly reduces Net Benefit (MB) (β = 0.789), which lowers program execution efficiency, reporting accuracy, and accountability. This supports earlier research by Robertson and Barling (2017), who noted that the success of system implementation in public organizations is directly impacted by the long-term, silent leadership strategy.

This is in line with research by DeLone and McLean (2003), which highlights system quality, system usage, and user adherence as the primary factors influencing an information system's success. However, this study makes a new contribution by integrating the variables of strategic leadership and the effectiveness of HR training into the DeLone & McLean framework. This model indicates that the success of the MBG program is not solely due to technical factors, but also depends heavily on human and organizational factors.

This is also in line with (Harisandi, Yahya, & Istiqomah, 2024) It highlights how important it is for students to develop strategic thinking skills and user responsibilities when implementing a digital public system. This study provides empirical evidence that may be used in the evaluation of policies and strategies for increasing the implementation of the MBG program, thanks to its strong model validity and significant correlation between variables. The emphasis on HR training and leadership that guides system use serves as a guide to maximize program benefits in every way.

Table 2 . Discriminant Validity

	DK	EP	MB	PS	QS
DK	0.841				
EP	0.848	0.796			
MB	0.789	0.825	0.895		
PS	0.791	0.707	0.715	0.887	
QS	0.808	0.884	0.865	0.608	0.871

Path Coefisient Test

The analysis of the route coefficient highlights the contribution of each variable in influencing the success of the implementation of the Free Nutritional Food (MBG) program, particularly in achieving the Net Benefit (MB) goal.

All three of the exogenous construction teams—System Quality (QS), Training Effectiveness (EP), and System Use (PS)—have a positive impact on the Leadership Support (DK): β = 0.295 for QS, 0.310 for EP, and 0.393 for PS and DK, respectively. According to these three pathways, the most important predictor of DK is the System Usage (PS). This indicates that the more intense and effective MBG application is used by the employees, the more perceptive they are of the existence of support and involvement from the

leadership. This summarizes previous findings that indicate that the construct validity of the model is very strong and highly empirically supported (discriminant validity), and that the system's use is a crucial step in developing proactive perceptions of leadership.

Significant contributions are also made by Training Effectiveness (EP) and Quality System (QS) in enhancing the Leadership environment. For example, high-quality training and an easily navigable system that is flexible and compatible with the needs of the user in enhancing their confidence in the program's success. Leadership Support (DK) has a very strong effect on Net Benefits (MB), with a coefficient of determination of β = 0.789. This is a high-quality model that explains how the success of the MBG program—in terms of execution efficiency, reporting accuracy, and accountability growth—affects the quality of education at various levels, whether in a single school, a region, or a whole.

The results align with previous research by (Henderson & Robertson, 2000) which states that strategic leadership is a key component in determining the success of the public sector's information system. In addition, this supports the (DeLone & McLean, 2003) model by highlighting the importance of peer support and effectiveness as critical factors in determining the long-term benefits of socially based information systems like MBG.

Table 3. Path Coefficients

Path	Path coefficients
DK -> MB	0,789
EP -> DK	0,310
PS -> DK	0,393
QS -> DK	0,295

R-Square and F-Square Test

The coefficient of determination (R Square) is used to determine the extent to which the independent variables are able to explain the dependent variables in the structural model. In this study, two endogenous latent constructs tested were Leadership Support (DK) and Net Benefits (MB). The R^2 value of 0.812 indicates that 81.2% of the variation in Leadership Support can be explained by three main variables, namely System Quality (QS), Training Effectiveness (EP), and System Use (PS). Based on (Whang et al., 2015) interpretation, this value is included in the "substantial" or very strong category. This means that this model is able to effectively explain the factors that shape perceptions of leadership support in the implementation of the MBG Program. The adjusted R^2 value of 0.799, which is not much different, also indicates the stability and consistency of the model.

A R2 value of 0.622 indicates that the Leadership Support (DK) can explain 62.2% of the variation in Net Benefits. This falls into the "moderate" category, which means that the environment of leadership has a significant and significant impact on the success of program implementation, particularly in the areas of increasing implementation effectiveness, reporting accuracy, and accountability. Additionally, the adjusted R2 of 0.610 indicates that the model in question is

quite stable in explaining the phenomenon under investigation.

The results indicate that the relationship between technical aspects (QS and PS) and human factors (EP) as well as the effectiveness of the MBG program is a significant mediating variable. As system quality, training, and application usage increases, so does perception of leadership, which ultimately leads to the completion of the program in an optimal manner.

According to, this study provides empirical evidence that multidimensional approaches that incorporate technology, education, and leadership are essential in ensuring the success of information-based programs in the public sector.

Table 4. R Square Test

Variablw	R-square	R-square adjusted
DK	0.812	0.803
MB	0.622	0.616

Based on data analysis using PLS-SEM, the F Square Test can be used to indicate that the conceptual model used in this study successfully demonstrates the significant relationship between the variables that affect the implementation of the Free Nutritional Food (MBG) program.

According to the construction model, Leadership Support (DK) is a key variable that assesses the influence of System Quality (QS), System Effectiveness (EP), and System Usability (PS) on the achievement of Net Benefits (MB). The high R2 value at DK (0.812) indicates that the three variables mentioned have a very significant contribution to understanding perceptions of leadership. Conversely, MB's R2 value of 0.622 indicates that program success is significantly impacted by the leadership environment that is created by the work being done in the lab.

The path coefficient strengthens the findings here showing that PS has a significant effect on DK (β = 0.393), indicating that active involvement in system use quietly causes a positive perception to emerge about leadership. In other words, the most significant parameter in the model is DK → MB (β = 0.789), which indicates that strategic leadership is crucial in determining program success.

Further, the f2 analysis shows that the DK-MB relationship is quite strong (f2 = 1.648), while the QS-EP-PS relationship with DK is found in the small to medium range. This strengthens DK's position as a critical mediator in the model.

In summary, the results of this study provide empirical evidence that the cooperation of technology (QS, PS), human capital (EP), and strategic leadership (DK) is essential to increase the benefits of public information systems like MBG. This study also supports the DeLone and McLean theoretical model by highlighting the importance of training and leadership, as well as offering practical advice to program managers on how to improve the quality of management and nutrition of national programs.

DISCUSSION

In the structural PLS-SEM model, path coefficients show the long-term relationship between the latent variables. Each value considers the strengths and weaknesses of a

particular construction in relation to other constructions. The following is an interpretation of the mentioned values:

First, the system quality (QS) has a positive effect on the DK (Duk-QS → DK) (β = 0.295). increasing the quality of the information system being used, increasing the user's perception of the environment from the perspective of the leader, According to research by (Beal et al., 2017), this study shows that the top management environment has a significant impact on the success of the business system. This study emphasizes how important it is to align the system's lifestyle and leadership style in order to achieve maximum efficiency.

Second, the effectiveness of the training (EP) also has a positive impact on the DK. EP → DK (β = 0.310) It is evident from the usefulness of the training that leadership hinders program implementation. According to the relevant research According to a meta-analysis by (Lacerenza et al., 2017) effective self-management training increases the effectiveness of self-management. This study highlights the importance of effective training design and implementation in enhancing organizational leadership.

Third, among other variables, the use of the System (PS) has the strongest effect on the Leadership Support (DK). DK to PS (β = 0.393). This indicates that when a system is used effectively and intensively by its users, perceptions of leadership and involvement increase. Studying by (Neufeld et al., 2007) examining how leadership affects the use of information systems. The results indicate that transformational leadership increases user motivation to continuously use information systems, which in turn improves perceptions of the relationship between leadership and others.

Fourth, there is a very significant effect of Leadership Support (DK) on Net Benefits (MB) DK → MB (β = 0.789). The role of leadership significantly indicates the program's effectiveness, including implementation efficiency, reporting accuracy, and accountability. By Research (Prybutok et al., 2008) assessing the impact of IT quality and leadership on the benefits of the e-government environment. The results of this study indicate that effective and high-quality information systems increase the benefits that organizations receive.

Based on the results of the path analysis (path analysis) in the PLS-SEM model, a significant relationship between the latent variables that is the main focus of this study is established. Each link evaluates each construct's contribution to the achievement of the benefits derived from the information system implementation in the "Free Nutritious Meal" program. These findings not only strengthen existing theories but also offer practical advice that can be used as a guide for evaluating the policies and plans for program execution in the field. Because of this, this section ensures the theoretical and practical implications of the research to improve the system's implementation success and the quality of leadership in the public organization environment:

1. Improving the quality of the information system will increase the perception of the business environment, so investing in the development of digital systems is crucial.
2. Effective training not only increases technical proficiency but also

strengthens the perception that program implementation is hindered by the company.

3. Consistent and intense system use creates a positive perception of the leadership involvement, therefore system-based work practices must be strengthened.
4. Leadership support has the ability to produce program benefits such as effectiveness, accountability, and reporting accuracy, so leadership involvement at every stage of the program is extremely crucial.

CONCLUSION

This study (in a hypothetical manner) indicates that the system's quality, effectiveness, and use, which are monitored and moderated by the Leadership Support, significantly contribute to the growth of the Free Nutritional Meals (MBG) program. In particular, system quality and training effectiveness are found to have a positive impact on system use. In conclusion, the effectiveness of training and system use, along with the system's quality and leadership environment, gradually and favorably affects Net Benefits. As a moderator, Leadership Support also plays a significant role in strengthening the bonds between System Quality and System Usage and System Usage and Net Benefits. The integration model is intended to provide empirical data and illustrate the complex interactions between technology, people, and organizations in order to achieve public program success.

Overall Study Contributions, In a theoretical sense, this study examines the literature on the success of information systems by evaluating and validating models that are necessary in the context of large-scale public education programs, with a focus on multi-dimensional leadership support. This study offers a more comprehensive work experience to understand how the benefits of public initiatives might be increased. In a practical sense, this study provides specific guidance for the managers and staff of the MBG program to identify the areas that require strategic intervention. By understanding the factors that contribute to success, such as system quality, the effectiveness of human capital development through training, and the crucial leadership in facilitating and motivating—efforts to increase efficiency, effectiveness, and positive impact—the MBG program can be carried out in a more thorough and fundamental manner.

The future of research, A few future research directions can be determined based on the findings and conclusions of this study. Conduct longitudinal research to examine the changes in variables and the relationship between quality and time. Conduct comparative studies on other public programs in Indonesia or other countries to test the generalizability of the approach. Conduct qualitative research (e.g., observation, in-depth interviews) to learn more about how and why the leadership environment affects various programs and SI success factors. Other variables not yet included in the D&M model, such as information quality and service quality, or other pertinent contextual variables (e.g., organizational culture, technological infrastructure). Examine the MBG program in detail, taking into account the factors that are mediated by this model, such as the child's nutritional status, school participation, and learning outcomes. Developing and

validating more specialized measurement instruments for Indonesian public programs.

The success of the Free Nutritional Meal Program and its positive effects on the Indonesian people are very encouraging due to the dedication to continuous improvement, data-driven management, and considerate leadership at all levels. It is hoped that the model used in this study would serve as a diagnostic tool and guide for those who are required to optimize daily tasks, speed up processes, and eventually maximize the social outcomes produced by this crucial program. In nutrition for the next generation, investment is made for the future of the Nation, and ensuring the effectiveness of programs like MBG requires teamwork and collaboration between technology, human capacity, and visionary leadership.

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