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Evaluation of Integrated Business Licensing System in Indonesia Using HOT-fit Model

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Abstract.
Purpose: In an increasingly interconnected global economy, there is a growing recognition among governments of the importance of fostering an environment for businesses to thrive. Indonesia has introduced an integrated business licensing system that centralizes and automates the licensing and permitting processes, simplifying the journey for entrepreneurs, business owners, and government agencies. To multiply the benefits and effectiveness of the system, the government must assess the system to establish a firm basis for its ongoing advancement and enhancement.
Methods: The evaluation of integrated business licensing system was conducted using the HOT-fit framework with the perspective of government agencies. Their involvement is crucial for effective licensing and supervision processes. Data was gathered through questionnaires and analyzed using the PLS-SEM method.
Result: The findings revealed that system quality and service quality significantly influenced user satisfaction, whereas information quality, user satisfaction, organizational structure, and organizational environment positively impacted system usage. The results also showed that system usage and user satisfaction influenced net benefit. These results can be used to improve the system to match the government agencies' expectations.
Novelty: The novelty of this study lies in its research object which is an integrated system. This research provides insights for targeted improvements in technological, organizational, and human aspects of integrated system implementation.

Keywords: E-Government, HOT fit framework, Integrated system, Evaluation, Business licensing
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INTRODUCTION

E-government, or electronic government, is a modern strategy used by many governments to improve the accessibility, efficiency, and transparency of their services [1]. These systems are used extensively in governance, organizations, and companies for conducting administrative tasks [2]. The utilization of e-government can be improved by sharing and exchanging data with one another. This indicates that integration is vital to improve communication between two information system [3]. By consolidating systems and processes, it improves efficiency, reduces redundancies, and lowers operational costs. Based on previous studies, integration of government system faced several issues such as inter-organizational issues, lack of coordination and collaboration [4], [5], [6], [7], [8], lack of trust [9], [10], user resistance [9], [11], lack of knowledge and expertise [9], [12] that need to be addressed.

In today's highly competitive global economy, the utilization of e-government that fosters business growth is more critical than ever. In the Indonesian context, e-government is implemented to enhance government efficiency and expedite the delivery of services to the public[1]. The implementation of the Omnibus Law on Job Creation and Government Regulation No. 5 of 2021 on Risk-Based Business Licensing (PP 5/2021) has brought about a major shift in the regulatory framework and procedures for business licensing in Indonesia. These regulations aim to enhance the investment ecosystem and ease of doing business in the country [13][14]. As a follow-up, in August 2021, the government launched the integrated business licensing system.

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Integrated business licensing system issued business identification number (NIB) as the main identity for business entities to legally conduct business activities in Indonesia [14], [15]. In August 2023, the system issued more than 5 million NIBs, with 98% categorized as micro and small businesses (SMEs), while 2% as medium to large businesses. This system, in collaboration with 23 ministries/agencies and over 500 municipalities, aims to streamline the licensing procedures for all businesses in Indonesia, facilitating both foreign and domestic investments. However, implementation of the system as an integrated and centralized e-government system is laden with challenges and complexities because it involves various stakeholders with their own policies, technologies, and procedures. An evaluation was necessary to help identify whether the system facilitates seamless workflows, enhances interagency data sharing, and addresses operational challenges. By considering the agency perspective, governments can ensure that the system fosters collaboration, improves efficiency, and empowers agencies to deliver high-quality services to citizens.

This study seeks to assess the integrated business licensing system from the viewpoint of government agencies, utilizing the HOT-fit model. The HOT-fit model offers a comprehensive perspective on the system's efficiency, considering elements such as human and organizational factors, which play a crucial role in determining the system's implementation [16]. This cohesive method enables a more precise evaluation of the system's overall advantages and its influence on both system utilization and user contentment [17]. Previous studies [18], [19], evaluate the adoption of a specific system which has less complexity and interdependence than this study. Integrated e-government systems involve multiple agencies working together, requiring a closer evaluation of how well the technology, organizational workflows, and human interactions align to ensure seamless coordination and data sharing.

This research is performed by exploring the research question: "What are the key factors that influence the effectiveness of the implementation of integrated business licensing system from the perspective of government agencies?". This study aims to offer valuable insights to academics, practitioners, and policymakers. The findings will provide a basis for future system enhancements, ensuring it adapts to the changing needs of businesses and fosters a more favorable business environment in Indonesia.

The paper is structured as follows. Section 2 details the research methodology and research model development. Section 3 presents the research findings, discusses their implications, and analyzes the results. Section 4 provides the study's conclusion and highlights its limitations.

METHODS

This research employed the HOT-fit framework to evaluate the integrated business licensing system utilized by the Indonesian government for managing business investments. By utilizing this framework, this study examined the interplay between human, organizational, and technological factors. This approach may provide insights into each aspect and its impact on the system's benefits. A quantitative approach was employed, with data being analyzed using partial least squares structural equation modeling (PLS-SEM). The next section will provide a detailed explanation of the research methodology.

Research stages

This research used a quantitative approach, where data was primarily collected through questionnaires. The study population encompassed all government agencies, both central and local governments, involved in the business licensing process. This study employed a random sampling method to ensure the population had an equal chance of participating, thus ensuring that the evaluation accurately represented the experiences and opinions of all relevant groups, including ministries, non-governmental ministries, and local units. Participants completed a five-point Likert scale questionnaire, with answer options ranging from 1 (strongly disagree) to 5 (strongly agree), to evaluate their responses to the survey questions. Before the questionnaire was distributed, an expert was first consulted to ensure the validity of each instrument and to identify any biases in the words used. The questionnaire was distributed via an instant messaging group chat which consisted of system users of integrated business licensing system. Figure 1 illustrates the stages involved in this research.

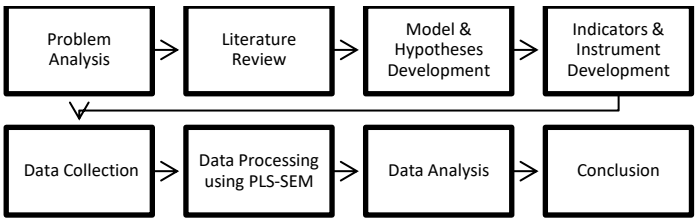

Figure 1. Research stages

The research process started with analyzing the problem and defining the research question. Following this, a literature review was carried out to provide a comprehensive understanding of how to address the research question. Based on the insights gained from the literature review, models and relevant hypotheses were then developed to fit the context of the problem. Indicators and instruments for measurement were also developed based on the proposed model. Data was collected using the quantitative approach and analyzed using the PLS-SEM method. This method involves a two-step process. The initial phase involves evaluating the measurement theory (outer model) to verify the reliability and validity of the measurement models. After confirming the validity of these models, the structural theory (inner model) is tested to determine if the measures are unreliable or invalid. Following this, data processing and analysis were carried out, followed by a conclusion drawing to address the research question based on the results.

Research model and hypotheses development

The HOT-fit framework, developed by Yusof et al. in 2008 [20], offers a comprehensive method for evaluating the effectiveness of information systems (IS). It provides a comprehensive and multifaceted approach to evaluating information systems. It encompasses a wide range of dimensions and measures related to technology, human, and organizational aspects. By combining two well-established information system evaluation models, the IS Success Model and the IT-Organization Fit Model, HOT-fit becomes a robust tool for assessing the effectiveness of different information systems. The framework is organized into eight constructs: system quality, information quality, and service quality under technology aspects; system usage and user satisfaction under human aspects; organizational structure and organizational environment under organizational aspects; and net benefits. The usage of HOT-fit frameworks in the proposed model can be seen in Figure 2.

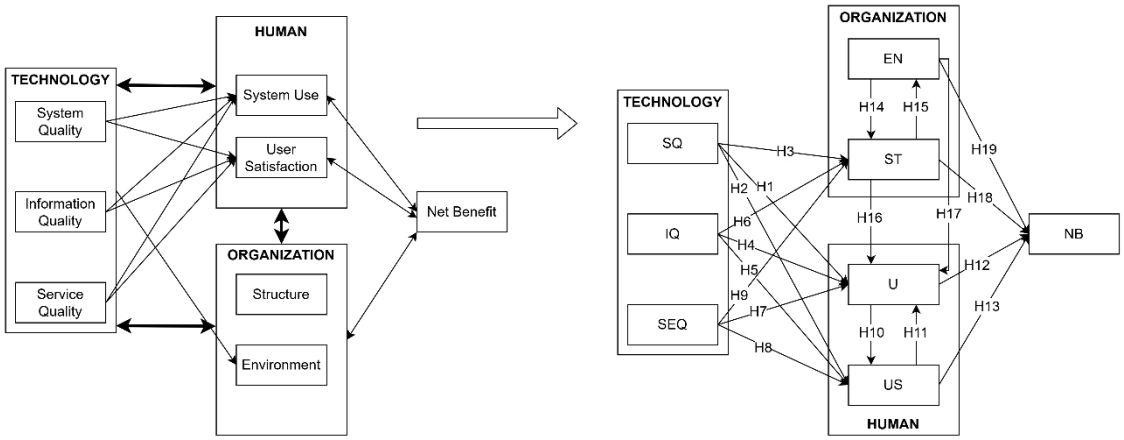

Figure 2. Proposed model

Technology

In the HOT-fit framework, technological aspects pertain to the assessment of an information system's technical components, which include system quality, information quality, and service quality. Evaluating these aspects helps pinpoint areas for improvement, guiding the development, utilization, and overall effectiveness of the information system. The technology aspect assesses how well the information system functions, and performs is related to system quality, information quality, and service quality [21].

System quality refers to the desirable attributes of an information system and is related to system performance or user interface [21]. The quality of the system has the potential to affect both its utilization and user satisfaction. High system quality may result in increased user satisfaction, consequently enhancing the overall benefits derived from the system [16]. In this research, the indicators we used for system quality construct were ease of use, availability, system reliability, and system interactivity [21]. Considering these aspects, the following hypotheses are proposed:

- H1. System quality has a positive impact on the intention to use or actual use
- H2. System quality positively affects user satisfaction
- H3. System quality positively affects structure

Information quality can be defined as the desirable characteristics of the system outputs [21]. Information quality is assessed using criteria such as precision, comprehensiveness, accessibility, timeliness, coherence, pertinence, and data input [22]. The quality of information positively influences user satisfaction, as users experience stability and achieve maximum productivity in systems where information quality is high [22], [23]. The indicators we used for information quality construct were accuracy, usefulness, relevance, and understandability.

- H4. Information quality positively affects the intention to use or actual use
- H5. Information quality has a positive impact on user satisfaction
- H6. Information quality positively affects structure.

Service quality can be defined as the quality of the support provided by the information systems organization and IT support personnel [21]. Enhanced service quality correlates with increased user satisfaction, resulting in heightened productivity and user enjoyment, as users prefer systems characterized by stability, reliability, and user-friendliness [22]. The indicators we used for service quality construct were empathy, responsiveness, and organization interactivity [21].

- H7. Service quality has a positive effect on the intention to use or actual use
- H8. Service quality positively impacts user satisfaction
- H9. Service quality positively affects structure

Human

The HOT-fit framework classifies intention to use or actual use, as well as user satisfaction, under the human aspect. Extensive research has demonstrated a positive impact of intention to use or actual use and user satisfaction on net benefits [24], [25]. These aspects will be analyzed by assessing ease of use, availability, reliability, system interactivity, and accuracy of integrated business licensing systems.

Intention to use can be described as the extent and way users make use of the information system. This encompasses factors such like the amount of use, frequency of use, nature of use, appropriateness of use, extent of use, and purpose of use.

- H10. Intention to use or actual use has a positive effect on user satisfaction
- H12. Intention to use or actual use positively impacts net benefits

User satisfaction shows user's level of satisfaction with the system or support services [21]. Thus, the following hypotheses are proposed for the human aspect.

- H11. User satisfaction positively affects intention to use or actual use
- H13. User satisfaction has a positive impact on net benefits

Organization

In the HOT-fit framework, organization aspect consists of two constructs, namely structure and environment [20]. The organizational environment is crucial for ensuring that the implementation of information systems aligns with the company's goals and objectives [22]. The organizational environment encompasses factors such as funding sources, government influence, politics, competition, communication, and inter-organizational relationships [20].This aspect is used in the following hypotheses:

- H14. Environment positively influences on structure
- H17. Environment positively influences on intention to use
- H19. Environment positively influences net benefits

On the other hand, organizational structure is defined by elements such as organizational nature, culture, hierarchy, politics, autonomy, planning and control systems, communication, strategy, leadership, and support from top management.

- H15. Structure positively influences on environment
- H16. Structure positively influences on intention to use
- H18. Structure positively influences net benefits

Net benefit

Evaluating the success of public sector initiatives is a multifaceted challenge. Unlike private firms that emphasize efficiency, quality, and reliability, public administrators must balance these concerns with accountability, trust-building, and catering to diverse public preference. Net benefit refers to the public value created by e-government services, considering the positive results and value gained from citizens use of information and communication technology (ICT) and the quality aspects of these services [26]. Thus, the indicators we used for net benefit construct were time saving, cost reduction and service effectiveness [21].

All measurement indicators and instruments used for each construct in the present research, shown in Figure 2, are detailed in Table 1. Table 1 shows the final measurement instruments used in this research and lists all the constructs used in this study, along with their corresponding indicators and references for each indicator.

Table 1. Measurement instrument

Constructs	Indicators	Code	Statements	Ref
System Quality (SQ)	Ease of use	SQ1	The integrated business licensing system is easy to use	[21]
	Availability	SQ2	The system service is always available and can be accessed from any geographical location	
	Reliability	SQ3	The system includes necessary features and functions	
	System interactivity	SQ4	The system effectively communicates feedback, alerts, or notifications to users interactively	
Information Quality (IQ)	Accuracy	IQ1	The integrated business licensing system provides accurate and up-to-date information	[21]
	Usefulness	IQ2	The system provides useful information	
	Relevance	IQ3	The system provides me with relevant information	
	Understandability	IQ4	The information within the system is easy to understand and interpret	
Service Quality (SEQ)	Empathy	SEQ1	The organization provides empathy to my problems or my needs	[21], [27]
	Responsiveness	SEQ2	The organization responds quickly to my problems or my needs	
	Organization interactivity	SEQ3	The organization provides multiple channels and utilizes technology effectively to enhance user interactions	
Intention to Use/ Use (U)	Frequency of use	U1	I frequently use the integrated business licensing system for my work	[21], [24]
	Dependency	U2	I am dependent on the system	
	Attitude toward usage	U3	I view the use of the system as a positive step in streamlining licensing processes	
User Satisfaction (US)	Satisfaction	US1	I am satisfied with the integrated business licensing system	[24]
	Meet expectation	US2	The system has met my expectations	
Net Benefit (NB)	Time saving	NB1	The integrated business licensing system saves me time	[21]
	Cost-effectiveness	NB2	The system is cost-effective	
	Service effectiveness	NB3	The system has improved business-licensing services	
Organization Structure (ST)	Training opportunities	ST1	I have received the training needed to use the integrated business licensing system	[28] ,[25], [20] [29]
	Training quality	ST2	Overall, the training I have receive meets my needs	
	Leadership & support	ST3	Our top management provides support and encourages the use of the system	
Organization Environment (EN)	Trust to government	EN1	In my opinion, government agencies are trustworthy	[30], [20], [31], [28]
	Inter-agency trust	EN2	The agencies participating in the the integrated business licensing system have trust in each other	
	Inter-agency teamwork	EN3	The agencies share their knowledge and help each other in using the system	
	Collaboration communication	EN4	Overall, inter-organizational collaboration & communication are effective	

RESULTS AND DISCUSSIONS

In this research, data analysis was analyzed using quantitative methods through the distribution of questionnaires. The guideline of the ten times rule serves as a valuable initial reference for establishing the suitable sample size in a PLS-SEM study [32]. The minimum recommended sample size is ten times the number of structural paths in the proposed model. With the structural path given being eight, a minimum of 80 respondents is required.

Integrated business licensing system is used by various ministries, institutions, and regional governments. This system is used as a one-stop service regarding licensing issues. Users of this system are ministry operators, non-ministerial agency operators, provincial government operators, as well as district and city operators. With more than 500 users from different parts of the government, there were 134 respondents that participated in the study. The data distribution is summarized in Table 2. As shown in Table 2, most respondents were local government users of the integrated business licensing system. Regional governments are indeed the largest users of this system.

Table 2. Respondent profile

Respondent Origin	Total Respondent
Local government unit	109
Ministry	14
Non Ministrial Institution	11
Total Respondents	**134**

Evaluating measurement models involved assessing the correlation between indicators and the constructs of latent variables. Understanding this correlation provides insights into the validity and reliability of a model. To assess the validity and reliability of the construct, we examined indicator reliability, internal consistency reliability, and convergent validity. The test results need to reveal that all indicators meet the validity and reliability criteria.

Indicator reliability

Indicator reliability was performed by ensuring that standardized indicator loadings were ≥0.70. It assesses the extent to which obtained values accurately represent research results and ascertains the credibility of statements that define a variable. Data is considered reliable if the outer loading exceeds 0.7 [33]. The data can be seen in Table 3.

Table 3. Indicator reliability

Indicator	Outer loadings	Validity	Indicator	Outer loadings	Validity	Indicator	Outer loadings	Validity
EN1	0,831	valid	NB2	0,909	valid	ST1	0,915	valid
EN2	0,928	valid	NB3	0,870	valid	ST2	0,928	valid
EN3	0,853	valid	SEQ1	0,898	valid	ST3	0,802	valid
EN4	0,909	valid	SEQ2	0,901	valid	U1	0,825	valid
IQ1	0,863	valid	SEQ3	0,787	valid	U2	0,843	valid
IQ2	0,888	valid	SQ1	0,851	valid	U3	0,843	valid
IQ3	0,894	valid	SQ2	0,714	valid	US1	0,957	valid
IQ4	0,848	valid	SQ3	0,887	valid	US2	0,950	valid
NB1	0,932	valid	SQ4	0,834	valid			

As shown in Table 3, the outer loading value of each existing indicator was found to exceed the limit of 0.7, showing a range of values from 0.714 to 0.957. This indicates that each indicator has passed indicator reliability testing.

Internal consistency reliability

Internal consistency reliability was assessed using Cronbach's alpha. Data is considered reliable if the value exceeds 0.7 [34]. The results of the reliability testing for all constructs are presented in Table 4. In this study, all Cronbach's alpha values exceeded the threshold value of 0.7, exhibiting a range of values from 0.794 to 0.904 (Table 4). This suggests that all construct is considered reliable.

Table 4. Internal consistency reliability, convergent validity, R^2 result

Construct	alpha	CR (rho_a)	CR (rho_c)	AVE	Reliability	R-Square	R^2 Adjusted
EN	0,904	0,909	0,933	0,776	reliable	0.507	0.504
IQ	0,896	0,901	0,928	0,763	reliable	-	-
NB	0,888	0,896	0,930	0,817	reliable	0.669	0.659
SEQ	0,830	0,855	0,898	0,746	reliable	-	-
SQ	0,842	0,863	0,894	0,679	reliable	-	-
ST	0,857	0,856	0,914	0,780	reliable	0.362	0.348
U	0,794	0,830	0,875	0,700	reliable	0.598	0.579
US	0,900	0,903	0,952	0,909	reliable	0.698	0.691

Convergent validity

We also calculated the convergent validity of the construct of the model. Based on the AVE value on Table 4, we decided that all the construct AVE value exceeded the threshold of 0.5 [35], with a range of values from 0.679 to 0.909. Since all indicators exceeded the threshold values, it can be concluded that indicators and constructs are deemed valid.

Coefficient of determination (R^2)

In this study, R-squared (R^2) was used to evaluate how well independent variables explained dependent variables, including system use, user satisfaction, structure, environment, and net benefits. An R^2 value close to 1 signifies that the independent variables effectively account for the variation in the dependent variables.

As shown in Table 4, the value of independent variables (R^2 value) ranged from 0.362 to 0.698. The coefficient of determination was capped at a maximum value of 1, which indicates a perfect fit. Although R-squared does not have a lower bound, a value of 0 signifies a trivial fit [36]. A value close to 1 is considered significant, indicating that the model accounts for a large portion of the variance in the dependent variable. Conversely, a value near 0 suggests weak explanatory power. This indicates that this model has moderate explanatory power.

Hypothesis testing was performed to assess the consistency of relationships between variables in the research model, where consistency was indicated by a significant p-value exceeding 0.05. We carried out calculations on the existing model using the bootstrapping process (Table 5). As shown in Table 5, several hypotheses (H1, H3, H5, H7, H18, H19) were not supported. Other hypotheses were supported and passed the hypotheses testing with values ranging from 0.000 to 0.0048.

Table 5. Hyphotheses result

Hypotheses	Relationship	Path	T statistics	P Values	Result
H1	SQ → U	-0,082	0,653	0,514	not supported
H2	SQ → US	0,415	3,923	0,000	supported
H3	SQ → ST	-0,118	0,966	0,334	not supported
H4	IQ → U	0,414	3,042	0,002	supported
H5	IQ → US	0,065	0,643	0,520	not supported
H6	IQ → ST	0,393	4,128	0,000	supported
H7	SEQ → U	-0,116	1,310	0,190	not supported
H8	SEQ → US	0,267	4,113	0,000	supported
H9	SEQ → ST	-0,178	1,981	0,048	supported
H10	U → US	0,272	3,660	0,000	supported
H11	US → U	0,382	3,480	0,001	supported
H12	U → NB	0,177	2,171	0,030	supported
H13	US → NB	0,612	7,629	0,000	supported
H14	EN → ST	0,649	7,818	0,000	supported
H15	ST → EN	0,712	16,710	0,000	supported
H16	ST → U	0,283	2,801	0,005	supported
H17	EN → U	0,308	2,477	0,013	supported
H18	ST → NB	-0,018	0,208	0,835	not supported
H19	EN → NB	0,118	1,436	0,151	not supported

Following the calculation of p values, the graphical output from PLS-SEM was acquired, as shown in Figure 3.

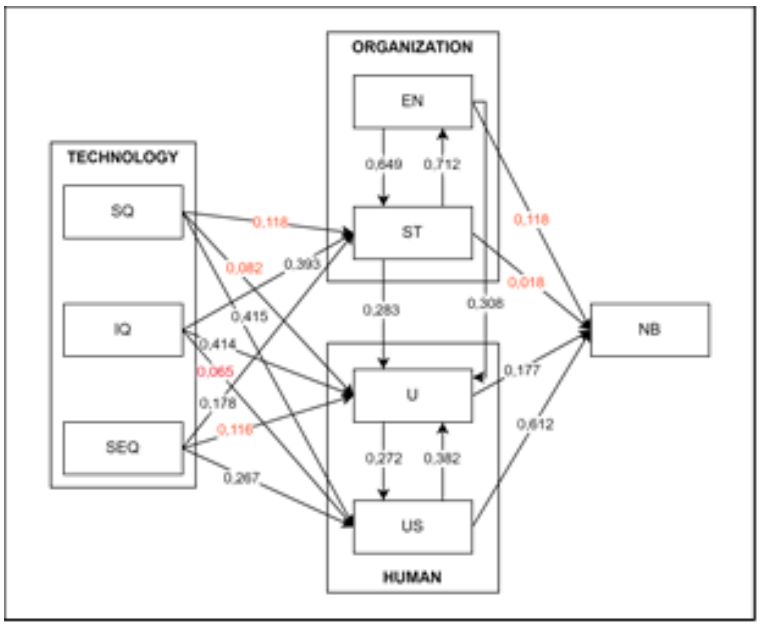

Figure 3. Result of PLS SEM structural model

The PLS-SEM assessment of the results of the questionnaire (Figure 3) showed that user satisfaction was the variable with the greatest impact on net benefit (0.612). This satisfaction was predominantly influenced by the system quality (0.415). User satisfaction was also influenced by system use (0.272), service quality (0.267), and information quality (0.065). The influence of information quality was minor, and thus, based on Table 5, this hypothesis is not supported.

In this quantitative study, the implementation of integrated business licensing system was evaluated with the HOT-fit framework. Based on the user questionnaire, integrated business licensing system showed moderately high scores in human, organizational and technology aspects. As shown in Table 5, most of the hypotheses support the proposed model. The results of the construct analysis indicate that within the technological aspect of the research, system quality, service quality, and system usage positively affect user satisfaction with the system. Furthermore, information quality, user satisfaction, organizational structure, and environmental factors have a positive impact on system use.

Net benefit is strongly influenced by human factors. The results of this study indicate that user satisfaction is the most influential factor affecting the net benefit of the integrated business licensing system. This result is in accordance with those of previous studies [37], [38], [39]. The effectiveness of integrated business licensing system depends on the user participation of system adoption. High satisfaction encourages adoption and regular usage, which maximizes its utility. Positive experiences of using the system can encourage more business users to participate[40]. Additionally, system usage also contributes to its overall benefit. The system is designed to streamline processes, improve efficiency, and enhance accessibility. These benefits can only be achieved if users engage with the system as intended. Interconnected stakeholders such as businesses and government agencies can collaborate more effectively when they all use the system. User satisfaction (US) and system usage (U) were identified as key factors that enhanced effectiveness and benefits, particularly for government agencies. These findings might further indicate that Technological factors also indirectly determine the net benefit through user satisfaction and system usage. Specifically, system quality (SQ) and service quality (SEQ) positively influence user satisfaction, which is consistent with previous studies [39], [40], [41]. Additionally, information quality (IQ) positively impacts system usage (U), thereby indirectly affecting the net benefit. This activity can be carried out by utilizing new technology [42],[43], and providing user-friendly interfaces [44]. User satisfaction can also be improved by providing good service quality, being responsive to agencies' problems and needs, and providing multiple channels to interact and communicate problems or feedback [45]. System usage can be increased by improving the quality of the information provided. This can be achieved by enhancing the reliability of the information within the system [46].

Furthermore, this study examined the impact of organizational factors on the organization's net benefit. The results indicate that organizational factors such as organizational structure (ST) and organizational environment (EN) positively contribute to system usage (U). This finding is also reported in a previous study [47]. These organizational factors also have indirect effects on net benefit, underscoring their importance in optimizing the system's overall effectiveness and benefits. Some strategies can be used to enhance this factor. For example, increasing top management support [48], [49], financial incentives [50], and collaboration between organization entities [51], [52] can increase the willingness of users to implement the new e-government system.

Several hypotheses (H1, H3, H5, H7, H18, H19) were not supported in this study. System usage was not affected by system quality (H1) and service quality (H3), which is in accordance with previous studies [40], This is most likely caused by the use of integrated business licensing system that is mandatory. As a result, the users have no choice but using the system. H3 indicates that structure is not affected by system quality, as reported by Widiastuti (2020) [39]. This is possible since structural changes in government require deliberate organizational decisions and strategies that go beyond the system itself. H5 shows that information quality of the system does not influence the user satisfaction [53], [54], which is possible because users only use the information of the system to delegate the designated task. H18 and H19 indicate that structure and environment do not affect the net benefit of the system.

CONCLUSION

This study employed the HOT-fit model to evaluate the effectiveness of the integrated business licensing system, an integrated business licensing system in Indonesia, from the perspective of agencies. The findings of this study provide valuable insights for enhancing the effectiveness of integrated business licensing system and contributing to its continuous evolution. Ministry XYZ as the system administrator agency should focus on improving user satisfaction by enhancing system quality. This activity can be carried out by providing user-friendly interfaces, maximizing the availability and minimizing the error, and making the system more responsive, reliable, and interactive. User satisfaction can also be improved by providing good service quality, being responsive to agencies' problems and needs, and providing multiple channels to interact and communicate problems or feedback. Continuous evaluation and improvement efforts are essential to ensure that the system remains effective and responsive to the evolving needs of businesses and the government. The HOT-fit model can serve as a valuable tool for guiding these efforts and ensuring that the integrated business licensing system continues to play a pivotal role in fostering Indonesia's economic growth and development.

This research focused on the perspective of government agencies; therefore, the scope is limited. At the same time integrated government system is a complex phenomenon that is influenced by a wide range of factors. Future studies may explore the perspectives of other stakeholders, such as businesses and citizens, to obtain a more holistic understanding of the impact of integrated business licensing system on the entire ecosystem. Future research could also be done using qualitative approaches to explore issues that arise in the implementation of the system and provide a more comprehensive understanding.

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