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A Behavioral Analysis of Food Businesses in Surakarta City in Applying for Badan POM Registration Number

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ABSTRACT

Purpose – This paper seeks to to analyze the factors influencing the behavior of food business actors in applying for Badan POM registration number, using the Theory of Planned Behavior (TPB) framework.
Methodology/approach – The research employs a quantitative method through a survey of 44 food business actors in Surakarta who already possess an Badan POM registration number. The sampling technique used is convenience sampling, and the data were analyzed using Structural Equation Modeling (SEM) with the SmartPLS software.
Findings – It was found that the attitude toward the behavior variable has a significant direct effect on behavior. The perceived behavioral control variable significantly affects behavior, but indirectly, with behavioral intention as a mediator. Meanwhile, subjective norm does not have a significant influence on behavior, either directly or indirectly. Behavioral intention, as a mediating variable, significantly influences behavior..
Novelty/value – Understanding the procedures, fulfilling the facility and infrastructure requirements, and having internet access are important factors in shaping the behavior of food business actors when submitting an application for a Badan POM registration number.

INTRODUCTION

Food safety is a fundamental public health concern and a prerequisite for sustainable economic development. In Indonesia, Indonesian Food and Drug Authority (Badan POM) requires all processed food products to obtain a Registration Number (Nomor Izin Edar/ NIE) as proof of safety and quality assurance. However, compliance among micro, small, and medium enterprises (MSMEs) remains low. In Surakarta, for instance, out of more than 1,000 food-related MSMEs, only 57 have secured an NIE. This compliance gap highlights the need to understand the behavioral factors influencing food business actors' decisions to apply for NIE. Existing literature shows a global trend toward strengthening food safety governance, yet MSMEs often face barriers such as limited resources, lack of awareness, and procedural complexity. While the Theory of Planned Behavior (TPB) has been widely applied to explain behavioral patterns in areas such as halal certification, waste management, and sustainable consumption, little is known about its relevance to regulatory compliance in Indonesia's food sector.

This creates both theoretical and practical research gaps: the limited validation of TPB in public service contexts, and the lack of empirical evidence to guide policymakers in promoting food safety compliance among MSMEs.

This study aims to analyze the behavioral determinants of MSMEs in applying for NIE using the TPB framework, focusing on the roles of attitude, subjective norms, perceived behavioral control, and behavioral intention. The novelty of this research lies in its application of TPB to the regulatory compliance process of food MSMEs in Indonesia, thereby extending the theory's scope while providing evidence-based recommendations for policymakers. The findings are expected to enrich academic discussions on behavioral compliance and support the development of effective strategies to enhance food safety governance at the MSME level. This research is both original and current, as it specifically examines food MSMEs in Surakarta and their behavioral drivers toward Badan POM registration number, an area that remains underexplored in academic literature. Although TPB has been applied in previous research, its use in the local regulatory context and its policy implications for food safety in Indonesia remain limited. Therefore, this article contributes theoretically by deepening the understanding of TPB in regulatory behavior and practically by offering insights for public policy on food safety compliance

LITERATURE REVIEW

This study adopts the Theory of Planned Behavior (TPB) developed by Ajzen (1991) as the main theoretical framework to analyze the behavior of food business actors in applying for the Indonesian Badan POM registration number. TPB has been widely used and validated in various contexts, such as Ajzen and Driver's (1991) study on leisure behavior and Vanany et al.'s (2020) research on halal food consumption in Indonesia. Furthermore, Pratikno et al. (2023) demonstrated the relevance of TPB in the context of halal certification for MSMEs, which conceptually aligns with this study's regulatory focus.

Attitude toward the behavior refers to the degree to which an individual has a favorable or unfavorable evaluation of performing a particular action (Ajzen, 2005). In the context of MSMEs applying for food product registration, attitude is influenced by entrepreneurs' perceptions of the benefits (e.g., consumer trust, market access, and regulatory protection) versus the perceived costs (e.g., time, resources, and bureaucratic complexity). Prior research has shown that a positive attitude significantly predicts intention to adopt food safety and halal certification practices (Vanany et al., 2020; Pratikno et al., 2023). Thus, a favorable perception of NIE registration is expected to increase the likelihood that food business actors will pursue compliance.

Subjective norm refers to the perceived social pressure to perform or not perform a behavior, particularly from peers, family, or authoritative bodies (Ajzen, 1991). For MSMEs, encouragement from industry peers, consumer demand, or regulatory agencies may influence compliance behavior. However, several studies have found that subjective norm plays a weaker or inconsistent role compared to other TPB variables (Pan & Liu, 2024; Li, 2025). In food safety regulation, entrepreneurs may rely more on resource availability and perceived benefits rather than social influence. Nonetheless, understanding subjective norm is essential, as social legitimacy and consumer expectations can create indirect pressure to comply.

Perceived behavioral control captures the extent to which individuals believe they have the necessary resources, opportunities, and capabilities to perform a behavior (Ajzen, 2005). For MSMEs, this includes financial resources, knowledge of regulations, technical infrastructure, and administrative support. Studies highlight that PBC is one of the strongest predictors of both intention and behavior,

particularly in regulatory and compliance contexts (Wang et al., 2024; Pan & Liu, 2024). In Indonesia, MSMEs often face structural barriers such as limited access to capital or lack of technical training, making PBC a critical determinant of their decision to apply for NIE.

Behavioral intention represents an individual's motivation or readiness to perform a behavior (Ajzen, 1991). In TPB, intention is considered the most immediate antecedent of behavior, mediating the effects of attitude, subjective norm, and PBC. Previous studies consistently confirm the mediating role of intention in contexts such as halal certification (Pratikno et al., 2023) and environmental behavior (Pan & Liu, 2024). In food safety regulation, an entrepreneur's intention to apply for NIE is expected to strongly predict whether they will follow through with the actual application process.

Behavior is the actual action taken by entrepreneurs to comply with food safety regulations, specifically applying for an NIE. According to Ajzen (2005), behavior must be clearly defined in terms of action, target, context, and time. In this study, the behavior is defined as the act of submitting an application for food product registration to Badan POM. Research has shown that actual behavior is shaped not only by intention but also by the presence of facilitating or constraining conditions, making PBC and intention critical in predicting outcomes (Ajzen, 1991; Wang et al., 2024).

Based on the Theory of Planned Behavior (Ajzen, 1991), this study proposes a model where attitude, subjective norm, and perceived behavioral control directly influence behavioral intention, which in turn predicts actual behavior. Attitude and PBC are also hypothesized to have direct effects on behavior, while intention serves as a mediator.

The manuscript aligns well with the objectives and scope of journals focused on public management, policy, entrepreneurship, and regulatory studies. A similarity check confirms that the content does not exceed the 25% similarity threshold, and thus the article is considered original and suitable for academic publication

METHOD

This research uses a quantitative method with a survey design. A total of 54 food MSMEs in Surakarta served as the population, and a sample of 44 respondents was obtained using convenience sampling, considering availability and willingness to participate. Data were collected via structured questionnaires consisting of indicators derived from TPB constructs. Data analysis employed Structural Equation Modeling (SEM) using SmartPLS version 4.0.

Table 1. Operational variable

Variable	Indicator	Questioner	Code
Attitude Toward the Behavior (Ajzen, 2005), (Pratikto et al. 2023), (Vanany et al. 2020)	*Perceived Usefulness* (Taylor and Todd, 1995)	By having a registration number from Badan POM, my business's reputation will improve.	AT 1
		Having a registration number from Badan POM will increase consumer trust in my product.	AT 2
		I believe that having a registration number from Badan POM will help me expand my market.	AT 3
		The procedure for obtaining a registration number from Badan POM is easy to understand..	AT 4

	Ease of Use (Taylor and Todd, 1995)	The application for a registration number from Badan POM uses an online system and can be done relatively easily	AT 5
	Compatibility (Taylor and Todd, 1995)	Obtaining a registration number from Badan POM is consistent with my business's values and goals, which are to operate legally and in accordance with regulations..	AT 6
		Obtaining a registration number from Badan POM aligns with my business principle, which is to maintain the quality of safe and high-quality food.	AT 7
Subjective Norm (Ajzen, 2005), (Pratikto et al. 2023), (Vanany et al. 2020)	*Peer Influence* (Taylor and Todd, 1995)	Fellow business owners encouraged me to apply for a registration number from Badan POM.	SN 1
		Other business owners in my area already have a registration number from Badan POM or are currently applying for one.	SN 2
	Superior's Influence (Taylor and Todd, 1995)	The Cooperative and MSME Agency/PLUT and/or the Balai POM encouraged me to have a registration number from Badan POM.	SN 3
		Consumers of my product prefer products that have a registration number from Badan POM	SN 4
		My family supports me in having a registration number from Badan POM.	SN 5
Perceived Behavioral Control (Ajzen, 2005), (Pratikto et al. 2023), (Vanany et al. 2020)	*Self Eficacy* (Taylor and Todd, 1995)	I understand the procedure for applying for a registration number from Badan POM.	BC 1
		My team and I are capable of submitting the application for a registration number from Badan POM without needing the help of a consultant or third party.	BC 2
	Resource Faciliting Conditions (Taylor and Todd, 1995)	I have sufficient financial resources for the cost of obtaining a registration number from Badan POM.	BC 3
		I have facilities and infrastructure that comply with Badan POM standards.	BC 4
	Technology Faciliting Conditions (Taylor and Todd, 1995)	I have adequate devices (computer/laptop, etc.) and network connectivity to be used for applying for a registration number from Badan POM through the online system.	BC 5
		The online system for applying for a NIE from Badan POM has been able to accommodate the needs of business owners.	BC 6
Behavioral Intention (Ajzen, 2005), (Pratikto et al. 2023), (Vanany et al. 2020)	*Intention* (Ajzen, 2005), (Pratikto et al. 2023), (Vanany et al. 2020)	I will apply for a registration number from Badan POM for my other product.	BI 1
		If there are changes to the requirements for a registration number from Badan POM, I will meet those requirements so that my registration number remains valid.	BI 2
Behavior (Ajzen, 2005), (Pratikto et al. 2023)	*Behavior* (Ajzen, 2005), (Pratikto et al. 2023)	My product, which is distributed to the public, already has a registration number from Badan POM.	BR 1
		I maintain the status of the registration number from Badan POM for my product as a form of quality and safety control.	BR 2

RESULT AND DISCUSSION

The responding companies are located across all districts in Surakarta City. The distribution of respondents is as follows: Laweyan District accounts for 16%, Jebres District for 43%, Serengan District for 7%, Pasar Kliwon District for 9%, and Banjarsari District for 25%. With 19 respondents, Jebres District has the highest number of participating companies.

Based on the data processing results for outer loading using PLS-SEM, one data point has a value of less than 0.700. According to Heirs (2021), this data with range 0.400-0.700 can still be used as long as the AVE value is greater than 0.500 and the theoretical importance of the indicator is considered. The outer loading results are shown in table 2 and figure 1.

Table 2. Outer Loading

Variable	Item	Outer loadings	Cronbach's alpha	Composite reliability (rho_c)	Average variance extracted (AVE)
AT	AT 1	0.712	0.850	0.891	0.673
	AT 2	0.731			
	AT 6	0.905			
	AT 7	0.913			
BC	BC 1	0.799	0.857	0.904	0.703
	BC 4	0.750			
	BC 5	0.905			
	BC 6	0.891			
BI	BI 1	0.875	0.769	0.895	0.810
	BI 2	0.925			
BR	BR 1	0.990	0.981	0.991	0.981
	BR 2	0.991			
SN	SN 2	0.639	0.809	0.873	0.635
	SN 3	0.806			
	SN 4	0.870			
	SN 5	0.850			

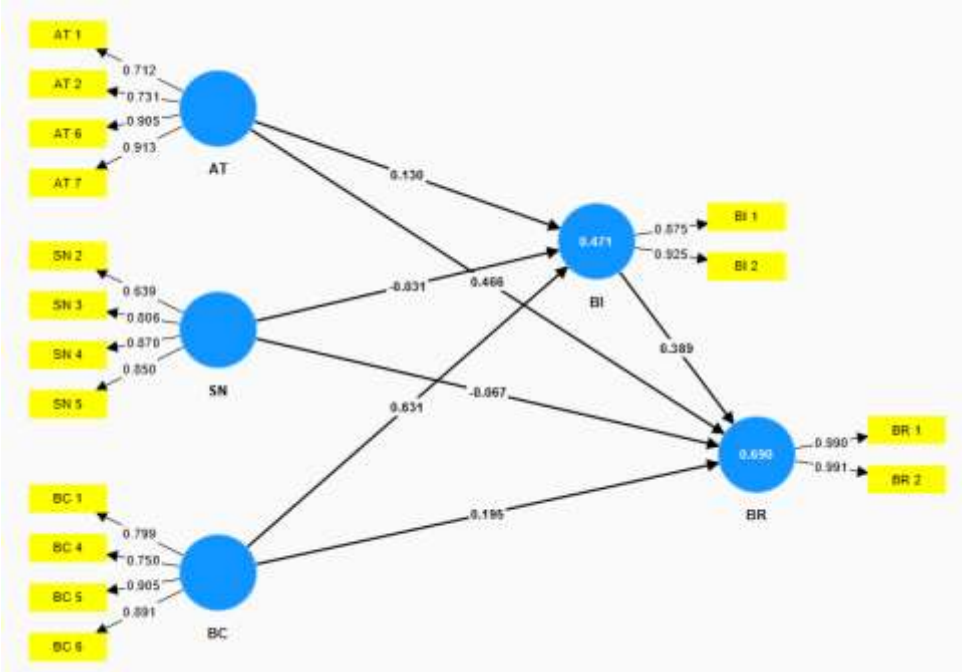

Figure 1. Graphical Output PLS-SEM Algoritm

From the perspective of Composite Reliability (CR), all constructs exceeded the minimum threshold of 0.700, as shown in Table 3. This indicates a very strong internal consistency among the indicators. This finding is further supported by Cronbach's Alpha values, all of which are above 0.700, reflecting a very high level of instrument reliability.

All constructs in this study showed satisfactory results in convergent validity, as indicated by the AVE values. The Average Variance Extracted (AVE) value for all constructs is above the minimum threshold of 0.500, indicating that more than 50% of the indicator variance can be explained by their respective constructs. The highest value is for the Behavior construct (0.981) and the lowest is for Attitude Toward the Behavior (0.673), both of which are still acceptable, as shown in Table 2.

The results of the discriminant validity test using the Fornell-Larcker criterion, as shown in Table 3, indicate that all constructs in the model meet the requirements for good discriminant validity. Each square root of the AVE value (displayed on the diagonal of the table) is higher than its correlation values with other constructs in the same row or column. For instance, the square root of the AVE for the Attitude Toward the Behavior (AT) construct is 0.821, which is higher than its correlations with other constructs such as Subjective Norm (SN) at 0.620, Perceived Behavioral Control (BC) at 0.533, Behavioral Intention (BI) at 0.477, and Behavior at 0.702. This indicates that each construct more strongly reflects its own indicators than it does the indicators of other constructs.

Table 3. Fornell Larcker Criterion

	AT	BC	BI	BR	SN
AT	**0.821**				
BC	0.533	**0.839**			
BI	0.447	0.678	**0.900**		
BR	0.702	0.660	0.697	**0.991**	
SN	0.620	0.699	0.491	0.549	**0.797**

Based on the test results shown in Table 5, the R-Square value for the Behavioral Intention construct is 0.471, while the value for the Behavior construct is 0.690. According to Ghozali's (2021) interpretation, the value for Behavioral Intention falls into the moderate category, while the value for Behavior is in the strong category. This means that the independent variables in the model are able to explain the variation in each dependent variable quite well.

An R square value of 0.471 indicates that 47.1% of the changes in Behavioral Intention can be explained by the exogenous constructs in the model. Meanwhile, an R square value of 0.690 indicates that 69.0% of the variation in Behavior is influenced by the preceding variables. These findings confirm that the structural model has adequate predictive power to explain the behavior and awareness of business actors regarding the application for BPOM's NIE.

Table 4. R Square

R	R-square
Behavioral Intention **(BI)**	0.471
Behavior **(BR)**	0.690

Based on the hypothesis testing results, three out of seven hypothesized relationships between the constructs were found to be statistically significant at the 5% level, characterized by t-statistics exceeding the critical value of 1.65 and P-values <0.05. Perceived Behavioral Control (BC) demonstrated the strongest direct influence on Behavioral Intention (BI) (coefficient 0.631, t=4.224), while the direct paths from Attitude Toward the Behavior (AT) → Behavior (BR) (coefficient 0.466, t=3.311) and Behavioral Intention (BI) → Behavior (BR) (t=2.469) were also significant. Conversely, the remaining four direct hypotheses were not supported. Furthermore, the analysis of indirect effects confirmed that Behavioral Intention (BI) significantly mediates the relationship between Perceived Behavioral Control (BC) and Behavior (BR) (coefficient 0.245, t=2.421); however, BI did not significantly mediate the other two tested paths (AT→BI→BR and SN→BI→BR). Statistical measurement using SEM PLS (Structural Equation Modeling Partial Least Squares) to determine Path Coefficients Bootstrapping and Specific Indirect Effect of the instruments, as shown in Table 5 and Table 6.

Table 5. Path Coefficients Bootstrapping SEM PLS

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
AT -> BI -> BR	0.051	0.051	0.081	0.626	0.532
BC -> BI -> BR	0.245	0.226	0.101	2.421	0.016
SN -> BI -> BR	-0.012	-0.001	0.083	0.148	0.883

Table 6. Specific Indirect Effect

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
AT -> BI	0.130	0.124	0.175	0.744	0.457
AT -> BR	0.466	0.463	0.141	3.311	0.001
BC -> BI	0.631	0.616	0.149	4.224	0.000
BC -> BR	0.195	0.202	0.171	1.140	0.254
BI -> BR	0.389	0.379	0.157	2.469	0.014
SN -> BI	-0.031	-0.006	0.200	0.157	0.875
SN -> BR	-0.067	-0.059	0.185	0.364	0.716

The Importance-Performance Map Analysis (IPMA) at the indicator level aims to identify the contribution and performance of each indicator to the target construct, which in this case is Behavior (BR). According to Hair et al. (2022), indicators that fall into the "Concentrate Here" quadrant should be prioritized for improvement because they have a high impact but low performance. The indicator-level IPMA for the Behavior construct is shown in quadrant breakdown displayed in Figure 2.

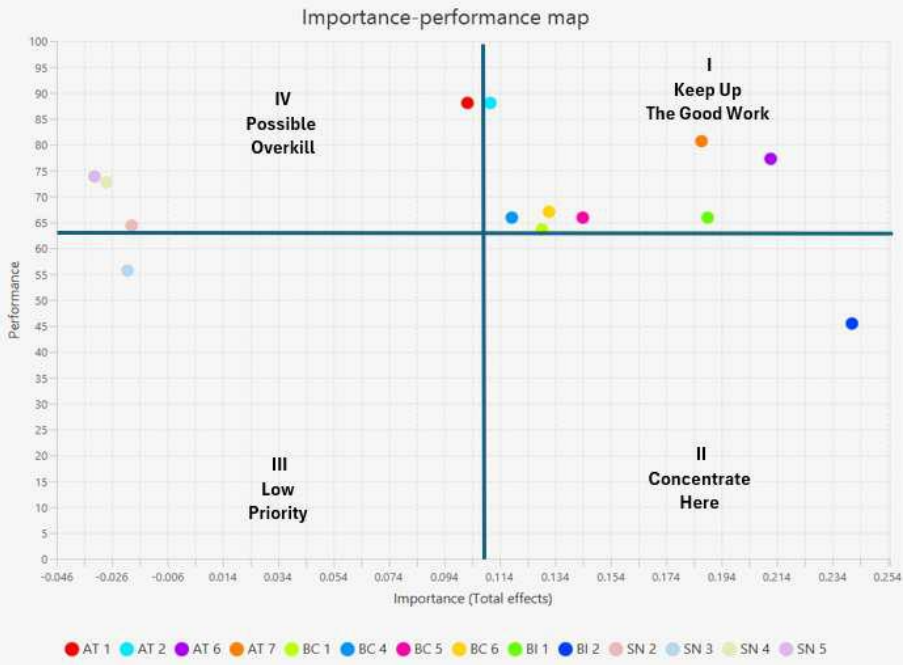

Figure 2. IPMA Indicator (Behavior) with Quadran Breakdown

DISCUSSION

The findings of this study provide important insights into the behavioral determinants of MSMEs in Surakarta in applying for the Indonesian FDA Registration Number (NIE). As shown in *Table 7*, the results indicate that attitude toward the behavior significantly influences actual behavior. This suggests that entrepreneurs who perceive NIE registration as beneficial in ensuring food safety, consumer trust, and market expansion are more likely to apply for registration. These findings are consistent with Wang, Zhao, and Pan (2024) highlighted that favorable attitudes toward green purchasing behavior positively shape consumer intentions in China. Together, these studies reinforce the role of attitude as a key predictor of compliance-related behaviors.

In contrast, subjective norm was found to have no significant effect on either behavioral intention or actual behavior (*Table 7*). This result diverges from prior studies, such as Li (2025), which emphasized that social expectations and cultural norms strongly influence the intention to use traditional medicine among pregnant women in China. Pan and Liu (2024) also confirmed that social norms are an important determinant of pro-environmental behaviors such as waste separation. The lack of significance in the present study suggests that, in the context of NIE application, external social pressure may be less influential than individual beliefs and resource availability. This divergence indicates that food entrepreneurs in Surakarta prioritize personal evaluation of benefits and constraints over conformity to social expectations.

Perceived behavioral control (PBC) showed a strong influence on behavior, but indirectly through behavioral intention (*Table 5*). This finding aligns with Ajzen's (1991) assertion that PBC not only predicts intention but can also affect behavior when individuals perceive high control over resources and capabilities. The mediating effect of intention is also consistent with the results of Pratikno et al. (2023), who found that intention plays a central role in bridging perceptions and actual halal certification behavior among MSMEs. Moreover, similar patterns have been reported in green consumerism studies, where intention mediates the effect of PBC on sustainable purchasing behavior (Wang et al., 2024). This confirms the robustness of TPB in explaining regulatory compliance behaviors.

Finally, the significant role of behavioral intention as a mediator between attitude, PBC, and behavior underscores its centrality in the TPB model. As indicated in *Table 7*, intention strongly predicts actual NIE application among food business actors. This is consistent with Pan and Liu (2024), who demonstrated that intention directly drives waste separation behavior, and with Ajzen (2005), who emphasized that intention represents the most immediate antecedent of human action. The strong mediation effect found in this study highlights that even when entrepreneurs have favorable attitudes and adequate resources, their readiness to act is a necessary step before actual compliance occurs.

Overall, this study confirms the applicability of the Theory of Planned Behavior in analyzing food safety compliance among MSMEs in Indonesia. While attitude and PBC emerged as significant predictors, the insignificance of subjective norm represents a contextual nuance that differs from findings in consumer behavior and environmental domains. This difference suggests that regulatory compliance among entrepreneurs may be more individually driven and resource-dependent, rather than shaped by social pressure. These findings not only enrich the theoretical discourse on TPB but also provide practical implications for policymakers, particularly in designing interventions that enhance entrepreneurs' perceived benefits and resource accessibility rather than relying solely on social campaigns.

CONCLUSION

Attitude Toward the Behavior significantly influences the Behavior of food business operators in Surakarta City to apply for a Badan POM Registration Number. Perceived Behavioral Control significantly influences Behavior through Behavioral Intention as a mediator. Meanwhile, Subjective

Norm does not directly or indirectly influence behavior. Understanding the procedures, fulfilling the facility and infrastructure requirements, and having internet access are important factors in shaping the behavior of food business actors when submitting an application for a Badan POM registration number.

This research contributes to public policy development, particularly in promoting regulatory compliance and food safety among food MSMEs. Academically, the findings reinforce the relevance of the Theory of Planned Behavior in the context of public service studies. It is recommended that Badan POM increase education efforts and establish support programs to help MSMEs meet the resource requirements needed to obtain registration number, ensuring improved food safety standards.

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