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Technology Acceptance and Willingness to invest in Transportation Management System of Small and Medium Enterprise in Nakhon Pathom, Thailand

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Abstract

This research aims to examine the Technology Acceptance and Willingness to invest in the Transportation Management System of Small and Medium Enterprise in Nakhon Pathom, Thailand applying the Technology Acceptance Model (TAM). This research focused on analyzing the business operating of the organization in Nakhon Pathom, Thailand.

The researchers applied a quantitative research method, stratified sampling method; Data of 433 individuals relatively involved in business operating and at least two years-experience partial support from the transport management system were collected from seven different districts in Nakhon Pathom, Thailand.

Most of the respondent is female, aged between 31-45, High School- Vocational School educational background, manager level, and work in small enterprises (10 to 49 employees). Most of the respondent's average age is 44.231, and well-experienced in business. The perception toward TMS varies: the respondents consider themselves a moderate skill in technology, moderately concerned about its benefits and moderately enjoy working with TMS. The respondents strongly agreed with the benefits of the TMS technology; however, the respondents' opinion on the intended behavior was slightly lower. The age and working experience of the respondents are not significantly related to their willingness to invest in the TMS system. If users who understand the benefits a TMS system has and feel that the system is more user-friendly are more likely to not invest more in the TMS system, while its relevance to the workflow of the Transportation Management System results in users being more likely to invest in the system.

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1. Introduction

The Thai freight and logistics market is projected to register a growth rate of 6% during 2022-2027. Land transport is a primary domestic freight mode of transport in Thailand. As assessed, more than 80% of the total domestic transport is completed by street cargo. The major existing truck transport operators are small and lack the latest technologies. In addition, the vast majority of these trucks run empty on return trips, and assuming this is accurately evolved, truck transport has much space for development later on (Mordorintelligence.com, 2021). The logistics market landscape of Thailand is fragmented in nature, with a mix of global and local players. According to industry sources, DHL holds a significant position in the Thai logistics market. Other global players, such as CEVA, DB Schenker, Nippon Express, Expeditors, Yusen, and FedEx, have a significant presence in the market in specific segments (Mordor Intelligence, 2021).

Transportation management solutions have turned into a vital innovation to deal with transportation work, particularly in the time of disruption. When considering a TMS investment, logistics leaders should use this research (Muynck, 2020; Andreeva & Kozlova, 2017). A transportation management system (TMS) is an operations stage that utilizes innovation to assist businesses with arranging, executing, and optimizing merchandise's physical movement, both approaching and active, and ensuring the shipment is agreeable legitimate documentation is accessible. This framework is frequently essential for a supply chain management (SCM) system (Oracle, n.d.).

In Thailand, Small and medium-sized enterprises (SMEs) represent the vast majority of firms and employ the bulk of the domestic workforce. According to the Office of SMEs Promotion (OSMEP, 2019).

In 2020, Thailand will have roughly 3 million SMEs and start-ups, including community enterprises.

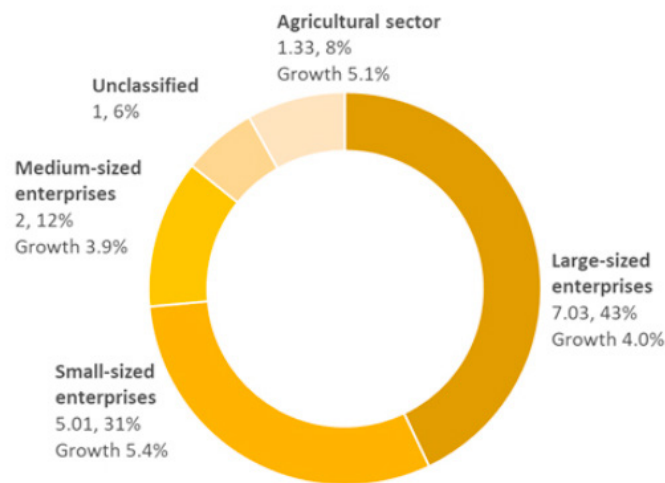


Fig. 1. SMEs contribution (Paweenawat, 2020).

Although SMEs contribute as much as 45% (or \$215 billion) to Thailand's gross domestic product (GDP) (Fig.1), their participation in international trade and global value chains (GVCs) remains limited (Paweenawat, 2020).

Nakhon Pathom, Thailand, lies on the deltaic plain of the Chao Phraya River, being an area to support the expansion of economic activities from Bangkok. A prosperous commercial center, Nakhon Pathom, is located 29 miles (47 km) west of Bangkok and has major road and rail connections (The Editors of Encyclopaedia Britannica, 2022). Nakhon Pathom Province is an important economic center of the country. The gross provincial product (GPP) value at the 2018 price equals 349,066 million baht, an increase from 2017 worth 329,508 million baht, equal to 19,558-million-baht, accounting for 2.13% of the gross domestic product (GDP). The provincial gross product value is higher than the national average of 215,336 million baht at 133,730 million baht, with the number 1 production sector being the industrial field with a proportion of 54.56% with a value of 190,441 million baht (Nakhon Pathom Provincial Industrial Office, 2021).

Small and medium-sized enterprises (SMEs) know the benefits of implementing a transportation management system; they may still question whether it is the right move. Small and medium-sized businesses are often left out of the digital transformation when solutions are overly expensive or complex. This research aims to investigate how small- and medium-sized enterprises (SMEs) in Nakhon Pathom, Thailand, adopt a transportation management system in a rapidly changing business environment.

Research Questions

What is the perception of small and medium enterprises in Nakhon Pathom, Thailand, towards the Transportation Management System?

Research Objectives

To examine Technology Acceptance and Willingness to invest in the Transportation Management System of Small and Medium enterprises in Nakhon Pathom, Thailand.

2.Literature Review

The technology acceptance model has been a hypothesis that is most generally used to clarify a singular's acknowledgment of a data framework (Surendran, 2012; Davis, 1989; Ushakov, 2014) utilized the Technology Acceptance Model to clarify the determinants of client acknowledgment of an expansive range of end-client registering. In the Technology Acceptance Model, perceived usefulness and ease of use impact individual intention to utilize technology. Perceived usefulness refers to an individual accepting that utilizing a specific solution would upgrade their work execution".

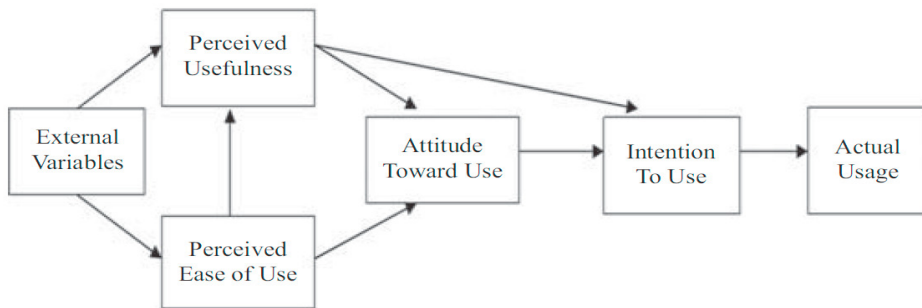


Fig. 2. Technology Acceptance Model (TAM) (Davis F., 1989)

Perceived ease of use refers to "the degree to which an individual accepts that utilizing a specific solution would be liberated from exertion" (Davis F., 1989). While all things considered, individuals might see innovation to be legitimate; simultaneously, they might see its utilization to be convoluted. The advantages of the innovation offset the endeavours of embracing it. Perceived ease of use was estimated to affect perceived usefulness straightforwardly. Both perceived usefulness and ease of use were hypothesized to be determined by external variables (Davis F. B., 1989).

3.Research Method

This research focused on analyzing the business operating of the organization in Nakhon Pathom, Thailand. The researchers apply a quantitative research method, stratified sampling method (Arnab, 2017; Ushakov et al., 2020). Data of 433 individuals relatively involved in business operating, and at least two years-experience partial support from the transport management system, were collected from seven different districts in Nakhon Pathom, Thailand: Mueang Nakhon Pathom District, Kamphaeng Saen District, Nakhon Chai Si District, Don Tum District, Bang Len

District, Sampran District, and Phutthamonthon during November 2021.

Tab. 1. Nakhon Pathom province, population, and sample)Office, 2019)

| | Mueang Nakhon Pathom District | Kamphaeng Saen District | Nakhon Chai Si District | Don Tum District | Bang Len District | Sampran District | Phutthamonthon | Total |
|------------|-------------------------------|-------------------------|-------------------------|------------------|-------------------|------------------|----------------|---------|
| Population | 280,482 | 128,568 | 111,658 | 48,871 | 94,239 | 213,646 | 42,572 | 920,036 |
| Sample | 133 | 59 | 54 | 21 | 43 | 102 | 21 | 433 |

G*Power 3)Faul, 2007(refers to the statistical power analysis program for the social sciences, selecting the proper sample size based on statistical analysis. Sample size calculated from G power 3.1.9, Linear Multiple regression, the sufficient sample size must be greater than 312. Three academics in social science adequately reviewed the questionnaire. The questionnaire was framed on a five-point Likert scale ranging from rating 1)strongly disagree(to rating 5)strongly agree(, and a ten-point rating scale, rating 1)poor(to rating 10)best()Toor, 2021(, was used to collect data divided into two parts: the demographic of individuals and business operating. Data were analyzed using the descriptive, logistic regression, Pearson correlation.

4. Research Result

Tab. 2. Demographic and background

| Demographic and background | | Frequency | Percent |
|----------------------------|--|-----------|---------|
| Gender | Male | 220 | 50.8 |
| | Female | 213 | 49.2 |
| | Total | 433 | 100.0 |
| Age | Between 16-30 | 49 | 11.3 |
| | Between 31-45 | 180 | 41.6 |
| | Between 46-60 | 173 | 40.0 |
| | 60 and above | 31 | 7.2 |
| | Total | 433 | 100.0 |
| Education | Primary School- Secondary School | 65 | 15.0 |
| | High School- Vocational School | 211 | 48.7 |
| | Bachelor Degree and above | 157 | 36.3 |
| | Total | 433 | 100.0 |
| Position in Business | Owner/ Shareholder | 55 | 12.7 |
| | Executive/ Director level | 55 | 12.7 |
| | Manager level | 323 | 74.6 |
| | Total | 433 | 100.0 |
| Business size | Micro enterprises)fewer than ten employees(| 115 | 26.6 |
| | Small enterprises)10 to 49 employees(| 132 | 30.5 |
| | Medium-sized enterprises)50 to 249 employees(| 104 | 24.0 |
| | Large enterprises employ 250 or more people. | 82 | 18.9 |
| | Total | 433 | 100.0 |

The distributions of gender, age, education, position in business, and business size between the various response groups are outlined in table 2. Most of the respondent is female, aged between 31-45, High School- Vocational School educational background, manager level, and work in small enterprises)10 to 49 employees(.

Tab. 3. Average age, experience, and respondent's perception toward TMS

| | | Minimum | Maximum | Mean | Std. Deviation |
|--|----|---------|---------|--------|----------------|
| Age | A | 23.00 | 77.00 | 44.231 | 10.151 |
| Working Experience | E | 1.00 | 50.00 | 14.206 | 9.213 |
| How would you rate your skill level with this technology or software?)0 poor - 10 excellent(| P1 | 2.00 | 10.00 | 6.252 | 1.800 |
| How well does TMS perform its function?)0 poor - 10 excellent(| P2 | 2.00 | 8.00 | 5.861 | 1.307 |
| TMS is User-friendly)0 not at all likely -10 Extremely likely(| P3 | 2.00 | 9.00 | 5.379 | 1.584 |
| How often do you use TMS in your workflow?)0 not at all likely -10 Extremely likely(| P4 | 2.00 | 10.00 | 6.674 | 1.812 |
| Willingness to invest in TMS)0 not at all likely -10 Extremely likely(| P5 | 1.00 | 10.00 | 5.143 | 2.481 |

Most of the respondent's average age is 44.231, and well-experienced in business. The perception toward TMS varies: the respondents consider themselves a moderate skill in technology, moderately concerned about its benefits and moderately enjoy working with TMS.

Tab. 4. Perceptions toward perceived usefulness, perceived ease of use, subjective attitude norm, and behavioral intention

| | Frequency | Percent | significant Level |
|--|-----------|---------|-------------------|
| Perceived usefulness of the transportation management system)TMS(| 4.218 | 0.6135 | strongly agree |
| 1. TMS will enhance business to accomplish tasks | 4.4157 | 0.55522 | strongly agree |
| 2. TMS reduces obstacles in business operating | 4.4203 | 0.56005 | strongly agree |
| 3. TMS increases the team's productivity | 4.3811 | 0.68063 | strongly agree |
| 4. TMS enhances business core competitive advantage | 3.9469 | 0.6451 | agree |
| 5. TMS is worth investing | 3.9261 | 0.62664 | agree |
| Perceived ease of use of the transportation management system)TMS(| 4.2767 | 0.6116 | strongly agree |
| 6. TMS is user's friendly | 4.3141 | 0.68598 | strongly agree |
| 7. TMS does not require much effort | 4.3788 | 0.54409 | strongly agree |
| 8. It is easy for me to become skillful at using TMS | 4.4365 | 0.52375 | strongly agree |
| 9. If any TMS software problem occurs, I think I can fix it | 3.9492 | 0.61404 | agree |
| 10. I know necessary to use TMS | 4.3048 | 0.69014 | strongly agree |
| Attitude toward the transportation management system)TMS(| 4.3132 | 0.6131 | strongly agree |
| 11. I look forward to those aspects of my job that require me to use TMS | 4.0855 | 0.55661 | agree |
| 12. My customer would benefit from TMS | 4.4111 | 0.56279 | strongly agree |
| 13. My business partner, coworker, would benefit from TMS | 4.3025 | 0.84075 | strongly agree |
| 14. My business partner coworker have positive feelings towards the use of TMS | 4.4134 | 0.54646 | strongly agree |
| 15. I have positive feelings towards the use of TMS | 4.3533 | 0.55889 | strongly agree |
| Subjective norm toward the transportation management system)TMS(| 4.1492 | 0.5998 | agree |
| 16. My business partner thinks that I should use TMS | 4.3118 | 0.63266 | strongly agree |
| 17. My employee think that I should use TMS | 4.1363 | 0.46388 | agree |
| 18. People who influence my behavior think that I should use TMS | 3.9469 | 0.65578 | strongly agree |

| | | | |
|---|--------|---------|----------------|
| 19. People who are important to me will support me to TMS | 3.9538 | 0.65806 | agree |
| 20. Business partners who are important to me will support me to TMS | 4.3972 | 0.58862 | strongly agree |
| Behavioural intention toward the transportation management system)TMS(| 3.8928 | 0.7403 | agree |
| 21. I intend to use TMS in future | 3.9076 | 0.62418 | agree |
| 22. I am willing to spend more time than I had planned on TMS | 4.3349 | 0.59792 | strongly agree |
| 23. I am about to upgrade TMS software in future | 3.6374 | 0.90277 | agree |
| 24. I am about to invest more money in TMS in future | 3.7206 | 0.91184 | agree |
| 25. I would recommend TMS to the other people | 3.8637 | 0.66486 | agree |

The perceptions of respondents toward perceived use fullness, perceived ease of use, attitude are strongly agreed, and perceptions of respondents toward subjective norm and behavioural intention are agreed. The respondents strongly agreed with the benefits of the TMS technology; however, the respondents' opinion on the intended behaviour was slightly lower.

Tab. 5. Correlations of the Average age, experience, and respondent's perception toward TMS

| | | Age | Experience | Willingness to invest in TMS |
|------------------------------|---------------------|--------|------------|------------------------------|
| Age | Pearson Correlation | 1 | .366** | -.006 |
| | Sig.)2-tailed(| | .000 | .905 |
| | N | 433 | 433 | 433 |
| Experience | Pearson Correlation | .366** | 1 | .009 |
| | Sig.)2-tailed(| .000 | | .852 |
| | N | 433 | 433 | 433 |
| Willingness to invest in TMS | Pearson Correlation | -.006 | .009 | 1 |
| | Sig.)2-tailed(| .905 | .852 | |
| | N | 433 | 433 | 433 |

** . Correlation is significant at the 0.01 level)2-tailed(.

The age and working experience of the respondents are not significantly related to their willingness to invest in TMS.

Tab.6. Multiple linear regression Model

| | P1 | P2 | P3 | P4 | P5 |
|-----------------------------------|---------|---------|---------|---------|---------|
| Willingness to invest in TMS)P1(| | | | | |
| Technology skill)P2(| -.124** | | | | |
| TMS performance)P3(| -.286** | .169** | | | |
| User Friendly)P4(| -.192** | .083 | .293** | | |
| Workflow related)P5(| .018 | -.027 | .278** | .330** | |
| Minimum | 2.00 | 2.00 | 2.00 | 2.00 | 1.00 |
| Maximum | 10.00 | 8.00 | 9.00 | 10.00 | 10.00 |
| Mean | 6.2517 | 5.8614 | 5.3788 | 6.6744 | 5.1432 |
| Std. Deviation | 1.79992 | 1.30675 | 1.58398 | 1.81243 | 2.58070 |
| Skewness | -.055 | .133 | -.094 | .340 | -.209 |
| Kurtosis | -.031 | -.133 | .229 | -0.989 | -.999 |

** . Correlation is significant at the 0.01 level)2-tailed(.

| Variable | b | t | sig t |
|-------------------------------|-------|--------|-------|
| Technology skill)P2(| -.088 | -1.326 | .185 |
| Perceive TMS performance)P3(| -.533 | -5.484 | .000 |
| User Friendly)P4(| -.252 | -3.126 | .002 |
| Workflow related)P5(| .203 | 2.883 | .004 |
|)Constant(| 8.819 | 12.170 | .000 |

Adjusted R2 =0.1086, SEE = 2.436, F= 14.161, Sig of f = .000

$$P1(= 8.819 + -.533)G1(+ -.252)G2(+.203)G3(+ \varepsilon$$

$$)0.725()0.066(0.097(0.081($$

$$R = 0.1182, \text{Adjusted } R^2 = 0.1086, \text{SEE} = 2.436, \text{F} = 14.161, \text{Sig of } f = .000$$

According to the table6, Perceiving TMS performance, user friendly negatively affects the willingness to invest in TMS. Workflow related positively affects the willingness to invest in TMS. Adjusted R2 =0.1086, SEE = 2.436, F= 14.161. If users who understand the benefits a TMS system has and feel that the system is more user-friendly are more likely to not invest more in the TMS system, while its relevance to the workflow of the Transportation Management System results in users being more likely to invest to the system.

5. Research Conclusions

Most of the respondent is female; aged between 31-45, High School- Vocational School educational background, manager level, and work in small enterprises)10 to 49 employees(.Most of the respondent's average age is 44.231, and well-experienced in business. The perception of TMS varies: the respondents consider themselves a moderate skill in technology, moderately concerned about its benefits and moderately enjoy working with TMS.

6. Discussion and recommendation.

The respondents strongly agreed with the benefits of the TMS technology; however, the respondents' opinion on the intended behaviour was slightly lower. The age and working experience of the respondents are not significantly related to their willingness to invest in the TMS system. If users who understand the benefits a TMS system has and feel that the system is more user-friendly are more likely to not invest more in the TMS system, while its relevance to the workflow of the Transportation Management System results in users being more likely to invest to the system.

It is more probable that when the respondents are satisfied with the benefits of TMS and feel that it is easy to use to some extent, they are more likely not to invest more in TMS. There may be some limitations that are worth studying in the future.

7. Acknowledgments

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