# UBRU

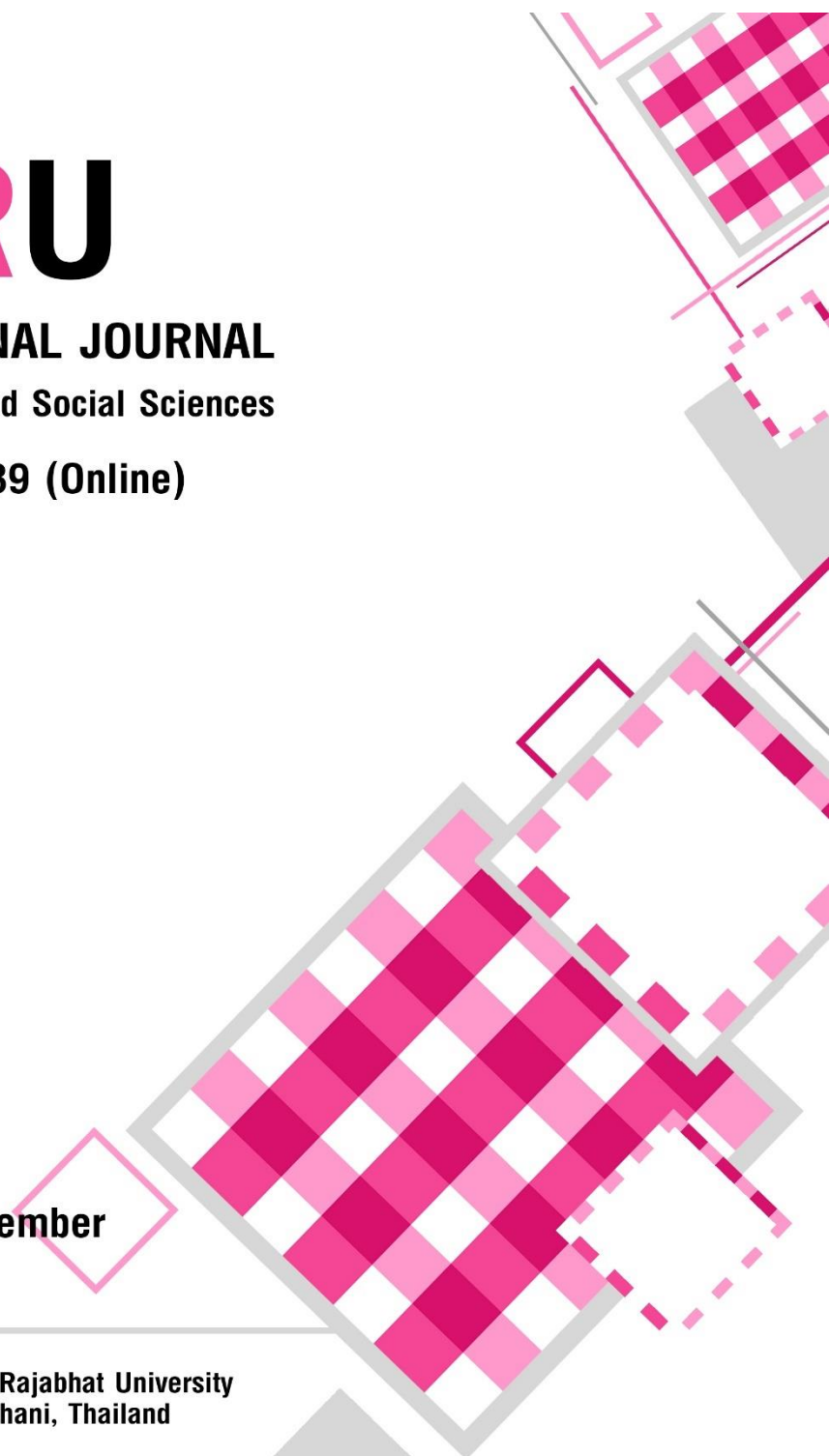## INTERNATIONAL JOURNAL

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**Objective**

As mentioned above the aim of this journal is to provide a platform and a means for disseminating and exchanging of knowledge and experience pertaining to academic advancement and research findings which may be beneficial for academy and society as a whole.

**Deadline - Period of Publication**

The UBRU INTERNATIONAL JOURNAL is a four-month academic journal (4 months per issue or 3 issues per year); the first issue is from January-April; the second from May-August; and the third from September-December.

# EDITORIAL

**Dear Valued Readers:**

As we gracefully step into the New Year 2 0 2 4, I seize this special moment to extend my heartfelt wishes to all of you. May this year be a tapestry of blessings, woven with threads of hope, safety, success, robust health, strength, prosperity, and empowerment. Time, as universally acknowledged, indeed flies. A year, spanning twelve swift months, often seems lengthy but invariably races by, almost unnoticed. In the swiftly passing year of 2023, we have diligently endeavored to serve our valued readers and contributors, calling for papers and articles to enrich our online journals. Our aim has been to elevate our academic platforms, offering enriching and insightful reading and research opportunities. We trust that our academic articles and studies have sparked your intellectual curiosity, enhancing your perception, experience, attitude, interest, vision, and worldview.

Once again, we cordially invite our readers and contributors to submit their scholarly articles and studies for publication in our journal. For submissions and further information, please visit us at ThaiJo system at https://so04.tci-thaijo.org/index.php/ubruij

We sincerely hope you find our online journal not only meaningful and engaging but also relevant and applicable in your academic and professional pursuits. Your continued cooperation and contributions are highly anticipated and deeply appreciated.

Asst. Prof. Dr. Pimook Somchob

Editor

# Contents

# Proposed of Using Speech Recognition Technology to Detect Read Aloud in Thai Tone Indications for Primary Education Students

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## Abstract

This academic article has objectives were 1. to study the techniques in data analyzing of speech recognition systems techniques to detect Thai Tone Indications for primary education students, and 2. to study the result of speech recognition systems techniques to detect in Thai Tone Indications for primary education students. Sample group in this research were 30 primary education students in Grades 4 – 6 of Wat Na Klang School in Nakhon Sawan Province, Thailand. Research tools was speech recognition systems techniques to detect reading aloud skills in Thai tonal conjugation.

Results showed that,

1.the three techniques involved in sound analysis consisted of Spectrogram Sound Wave Change, Wavelet Transform Audio Format Conversion, and two sets of data similarity comparison techniques named Dynamic Time Warping (DTW). The researchers used three techniques in analysis and comparison for making the more similar to the sound signal than using a single technique in analytics.

2. the result of using speech recognition system to detect reading aloud in Thai Tone Indications showed results of pronunciation practice and compared the similarity of audio signals that after using the technique in 5 analytical times, the largest average result was 93.52 Percent, the least average result was 87.75 Percent, and the total average result was 90.66 Percent.

**Keywords:** Sound Wave, Thai Tone Indications, Speech Recognition, Primary Education Students

## Introduction

At present, Information Technology is playing a wide role in various fields, especially education by applying in various ways including the use of computer-assisted teaching, mixed media systems, information systems, database systems, and the Internet, etc. Due to the impact of advances in Information Technology, the format or method of educational management has changed from the traditional education that was based on teachers or teachers as the center of learning. knowledge to individual education, focusing on technology to promote self-learning, emphasizing morality and ethics (Malaiwong, 1997). Speech Recognition is a technology that allows a computer to function like a human cognition process and to correctly identify interests.

For example, it enables a computer to recognize information from a sound and a computer digitizes it which can be analyzed or processed (Korpunyapipat, 2015)

Learning any language, whether a native language or a foreign language, starts with learning the listening and pronunciation skills first, and whether language acquisition is successful or not depends on your ability to lead. to use effectively able to communicate successfully in the use of language for communication, pronunciation is very important (Naiyaphat, 2005). Thai language is the official language that all elementary school students must read and write according to the indicators and learning content in the core learning of the Basic Core Curriculum, B.E. 2551, presented that "Thai language is a national identity, a cultural treasure that creates unity, and enhances the personality of the nation to be Thai person, and also a tool for seeking information and experiences to develop knowledge as well as to use in career development is a valuable treasure worthy of preservation and continuation of the Thai nationality forever" (Ministry of Education, 2020). Thai language has contents, namely linguistic rules that language users must know and use the language correctly. In addition, literature and literature, as well as children's play songs Nursery rhymes, riddles, folk songs, folk literature Be part of the culture Which is valuable to the study of Thai language, so must study literature. language wisdom that convey feelings, thoughts, values, traditions The story of the past society and the beauty of language. in prose poems Poetry to appreciate the pride of what the ancestors have accumulated and inherited until now (Phamontri, 2015). However, it must be admitted that Thai educational policies do not have preparations or plans to deal with various emergency situations when comparing normal classroom teaching with the form established by the state. that it is not as effective as learning in the classroom because each learner is given the opportunity to access different educational information, which is in line with Panto (2020) saying that poor learners The family did not have enough income to support the educational materials. Or some schools are located in remote rural areas without access to the Internet or electricity, thus causing these children to lose learning opportunities. In addition, the Secretariat of the Education Council (2023) also stated that most of the learners lack parents. In providing advice or monitoring, because parents have to go out to work outside, while their children have to study by themselves at home, may make students not interested in their studies in the form held. Boonnithi (2021) said that the academic performance or chievement of students often depends on reading ability, especially reading spelling of students in the first grade, which is an important basis for starting reading practice to developing advanced reading skills all from reading spelling. almost all words The teachers are very necessary to develop activities and teaching styles to promote the spelling of students with problems with problems that have higher problems because when students can read, they will send to other skills as well. To help develop reading and spelling abilities, there are many ways that teachers need to find a process that best suits the context and problems of the students.

Thai letters, although they are fixed sound marks but there are many words that have problems with how to pronounce them. In the practice of reading Thai words, if the learner does not have the correct skills and understanding of tonal conjugations, it will cause misunderstandings and confusions, resulting in miscommunication or misunderstandings due to changes in the language. Tonal sounds in reading have the effect of changing the meaning of words (Na Nakorn, 1981). Hence, learning Thai language of Thais' Primary Education Students showed the significance that most of them have problems in Reading and Writing especially Tonal Diversion and Tonal Writing (Watcharasukhum, 2013; Thodthankun and Chansuwan, 2016; Dipatee and Narapongkasem, 2018; Cholkerkkait, 2018; Poosawad, 2018; Mardyusoh and Tornram, 2020)

The importance above shows that in learning management, teachers or instructors need to train learners to develop more clear practical skills through practicing pronunciation skills and learning skills of students. Students must be studied as a guideline for future student development. The researcher therefore would like to investigate the model and techniques in speech recognition to enhance practice of reading aloud in Thai Tone Indications for young learners

## Objective

1. to study the techniques in data analyzing of speech recognition systems techniques to detect Thai Tone Indications for primary education students.
2. to study the result of speech recognition systems techniques to detect in Thai Tone Indications for primary education students.

## Literature Review

In order for us to correctly conjugate Tone Marks or Intonation Marks, we must first understand the different parts of Tone Marks or Intonation Marks. In word formation, the key components of a word are initial consonants and vowels which are the most elementary component in some words, there may be spelling and orthography adds the beginning. However, the indispensable is the consonants, there are 44 Thai consonants according to the main textbooks in Thai which dividing these consonants into 3 groups, called "Three in Arithmetic" or "Tayyang" (Thonglor, 1972) that explaining as follows:

Three in arithmetic is a group of letters that are separated into groups of 44 consonants, namely High Consonants, Middle Consonants, and Low Consonants.

There are 11 High Consonants letters: ข ฃ ฉ ฐ ถ ผ ฝ ศ ษ ส ห

There are 9 Middle Consonants letters: ก จ ค ต ฏ ฎ บ ป อ

There are 24 Low Consonants letters: ค คม ง ช ซ ฌ ญ ฑ ฒ ณ ท ธ น พ ฟ ภ ม ย ร ล ว ฬ ฮ

The classification of consonants into 3 groups is based on the sound is important that is any consonant has not been conjugated with a high accent is classified as a high-voiced letter. Any consonant that has not been conjugated into a low accent is classified as a low-voiced consonant. We use all 3 groups of tone indications or tonal conjugations, dividing the tones into 2 types:

1. Tonality has a form which refers to the tonal tone that has a clear pitch mark above the letter. There are 4 forms: low tone, falling tone, high tone and rising tone. Tonal tone is called low tone, falling tone, high tone and rising tone, respectively such "ครุ่น" "คลื่น" "เกล้า" "ใกล้" "จ๊ะ" etc.

2. Formless tones is sounds that have a high and low melody according to the group of Thai characters formless tonal form can be read aloud, such as "นา" "หนะ" "นาก" "นะ" "หนา" etc.

From the above, there are 5 tonal in Thai language: mid tone, low tone, falling tone, high tone and rising tone, respectively, we use tones to distinguish the meaning of words in Thai as can be seen from the following example which not cover in all form of tones.

Example
[See "สี"]+ mid tone = 'Color สี'

[See "สี"]+ low tone =  'Four สี่'

[See "สี"]+ falling tone  = 'tooth สี้'

[See "สี"]+ high tone = 'To die (in Chinese meaning) สี๊'

[See "สี"]+ rising tone = 'Color สี'

Zsiga and Nitisaroj (2007) studied the acoustic phonetics of Thai tonal sounds and concluded that Ordinary tone (M) is characterized by the middle pitch. The low tone (L) is characterized by descending from the lowest beginning to the lowest end of the pitch. The falling tone  (F) is characterized by a high pitch, then clearly moving up and down. The high tone (H) has a high pitch beginning and then rises with a slight curve. The rising tone (R) tone begins at a low pitch, then curves down to near the bottom of the pitch and then curves upward.

The research on the acoustic phonetics of tone indications in Thai is very useful in further developing the speech recognition system and pronunciation training for foreigners including pronunciation training for people with pronunciation impairment, such as research by Nasani (2003) and Suriyasophapan (2003) showed that People without larynx should practice pronouncing Master and Junior tones, etc.

In speech processing, speech recognition is applications to analyze utter of speech which commonly used by researchers (Kershet and Bengio, 2009) Speech recognition is concerned with the words being spoken (Kikel, 2019) and is useful for people with various group of people, such as those with problems in speaking who find reading the words difficult or who have difficulties recognizing and spelling words, such as dyslexia people (Hanifa, Isa and Mohamad, 2017). Since speech recognition deals with converting audio into text, its effectiveness depends heavily on the language and the text corpus (Sharma, 2019). On the other hand, speaker recognition is to identify the person who is speaking. Pitch, speaking style, and accent are some of the features that contribute to the differences (Kikel, 2019). Speaker recognition technology has been used in various applications, such as biometric, security, and even human-computer interaction. Speech recognition in terms of recognition, purpose (in recognizes what is being said and converts them into text), focus (to identify and digitally record what the speaker is saying and Vocabulary of what is being said by the speaker and turns the words into digital texts), and application (Speech to text) (Biometric Today, 2018).

There are many algorithms for speech recognition, Dynamic Time Warping or DTW is one of algorithm based on dynamic programming which provides a temple matching for different lengths of pronunciation. It is a nonlinear warping technique and used more widely that requires less data and can be used as the most proficient and simple speech recognition algorithm (Zhi-Qiang et. al. 2019).

## Research Methodology

This research titled the effects of effects of using speech recognition technology techniques to detect read aloud in Thai tone indications or tonal conjugations of young learners. There are operating procedures as follows:

1. Procedures for conducting research

1.1 Survey to collect information on problems in learning Thai tone indications or tonal conjugations. by using a questionnaire on the opinions of teachers and students

1.2 Learn about speech recognition technology

1.3 The sound obtained from the data collection of the sample was analyzed and compared with the conversion of each sound technique.

1.4 Apply each technique to analyze the results.

2. Scope of research

2.1 Demographic scope and target group in collect sound data.

2.1.1 The population used in the research was primary school students of Wat Na Klang School Academic Year 2021

2.1.2 The target group used in this research were 30 students in grades 4 - 6 at Wat Na Klang School (in Nakhon Sawan Province, Northern Part of Thailand), academic year 2021.

2.2 Scope of content

The data used to survey the students' problems with reading aloud in Thai tone indications or tonal conjugations consisted of words that were tonal formless, the tonal sounds match the tonal form, and the tone that does not match the tonal form in total of 100 words, and researchers collected sound data using 35 words that the students often mispronounce which categorized into 15 formless tones, 12 tones matching the tonal form, and 12 tones. whose sound does not match the tonal form 8 words.

3. Tools used in conducting research

3.1 Working data

3.1.1 The student's sound data obtained by collecting sound data using 35 words that students often mispronounced.

3.1.2 Data Analysis Program

3.2 Working equipment

3.2.1 Computer

3.2.2 Mobile phone

3.2.3 Techniques used in data analysis

3.2.3.1 Spectrogram technique

3.2.3.2 Wavelet Transform Technique

3.2.3.3 Dynamic Time Warping (DTW) Technique

3.2.4 Microsoft Excel

3.2.5 Any Video Converter Ultimate Program

3.2.6 Free MP3 Cutter Program

3.2.7 Praat Program

3.2.8 MATLAB program

3.2.9 Audio data

4. Method of collecting data

Step 1: Explore the problem of tonal words that are often mispronounced.

Step 2: After surveying, collect sound data using 35 words that students often mispronounce.

Step 3: To collect audio data, researchers asked for cooperation from students in the Thai language department. There was 1 male and 1 female each to collect the prototype sound data and collect the sample group's sound data by practicing the pronunciation for a total of 5 times.

Step 4: Analyze the sound data and compare it with the original sound to find a prototype in the same age range of students in Grades 4 - 6 before analyzing the data.

5. Data analysis

Researchers conducted the research in work steps are as follows:

Step 1: Understanding the Problem, researcher has studied the relevant research and has studied the problem of reading aloud and Thai tone indications or tonal conjugations, and study techniques used for analyzing various audio signals, Sound Wave Dynamics, Spectrograms, Wavelet Transforms, Analogy of Sequences that differ in time or speed, Dynamic Time Warping (DTW).

Step 2: Data Understanding, researchers studied the available data and considers the feasibility of data analysis. In collecting the data, researchers surveyed the students' problems with reading aloud and changing the Thai tone indications or tonal conjugations as in Table 1, Table 2 and Table 3 as follows:

**Table 1:** A Tonal Formless

| Thai Words | | | Tone indications |
|---|---|---|---|
| คา (Ka) | มา (Ma) | เดือน (Duan) | Mid Tone (Tone 1) |
| ขาด (Kard) | จาก (Jak) | หลบ (Lop) | Falling Tone (Tone 2) |
| ฆาต (Kard) | แรด (Rad) | พูด (Pood) | Falling Tone (Tone 3) |
| รัก (Rak) | พัก (Pak) | ฟัด (Fad) | High Tone (Tone 4) |
| หนา (Nar) | ขา (Kha) | สวย (Suay) | Rising Tone (Tone 5) |

**Table 2**: A tone that matches the tonal form

| Thai Words | | | Tone indications or (Writing Form) | Tone indications (Sound Form) |
|---|---|---|---|---|
| ข่า (Kha) | สง่า (Sa-Nga) | หมี่ (Mee) | Falling Tone (Tone 2) | Falling Tone (Tone 2) |
| ก้อง (Kong) | จ้า (Jar) | ป้า (Par) | Falling Tone (Tone 3) | Falling Tone (Tone 3) |
| โต๊ะ (Toh) | แก๊ส (Gas) | กั๊ก (Kak) | High Tone (Tone 4) | High Tone (Tone 4) |
| แต๋ว (Taew) | จ๋า (Jar) | ปิ๋ม (Pim) | Rising Tone (Tone 5) | Rising Tone (Tone 5) |

**Table 3**: A tone that do not matches the tonal form

| Thai Words | | | | Tone indications (Writing Form) | Tone indications (Sound Form) |
|---|---|---|---|---|---|
| ว่า (War) | ค่า (Kar) | ง่า (Ngar) | โล่ง (Long) | Falling Tone (Tone 3) | Falling Tone (Tone 3) |
| ย้อน (Yorn) | พ้อง (Pong) | ฟ้า (Fah) | ค้ำ (Kam) | High Tone (Tone 4) | High Tone (Tone 4) |

Step 3: Data preparation is the importing of raw data that has been converted into data that will be used in the next step, as shown in Figure 1.
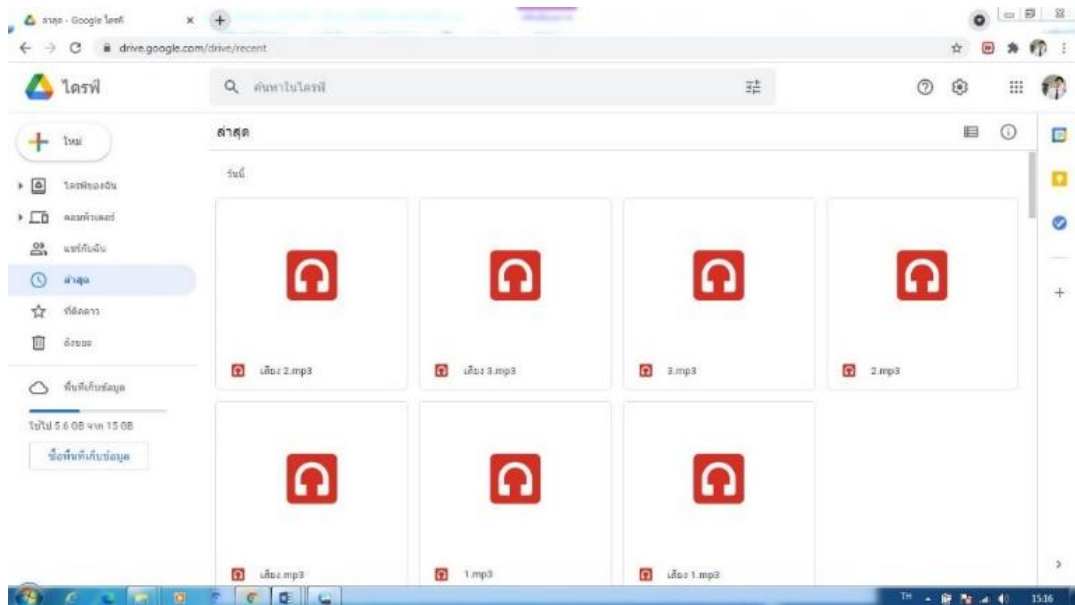


**Figure 1:** Sample of audio data from data collection

Selecting the appropriate variables for analysis and converting all variables to the same format to prepare the data for modeling can be divided into 3 sub-steps as follows:

1. Convert the resulting audio data into a .wav audio file using Any Video Converter Ultimate as shown in Figure 2.
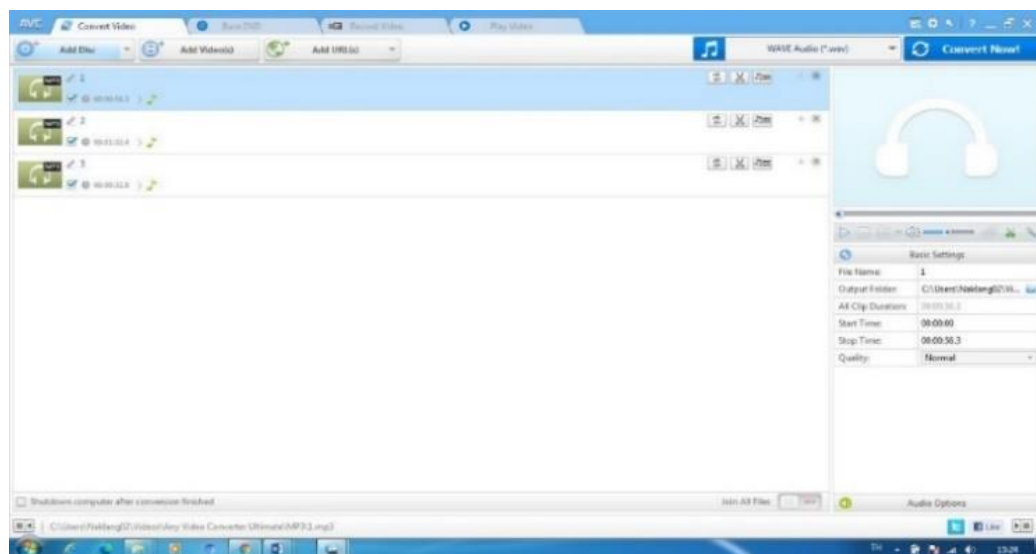


**Figure 2:** Convert the audio to .wav file format.

2. Cut the converted audio into words by the researcher using Free MP3 Cutter program as shown in Figure 3.
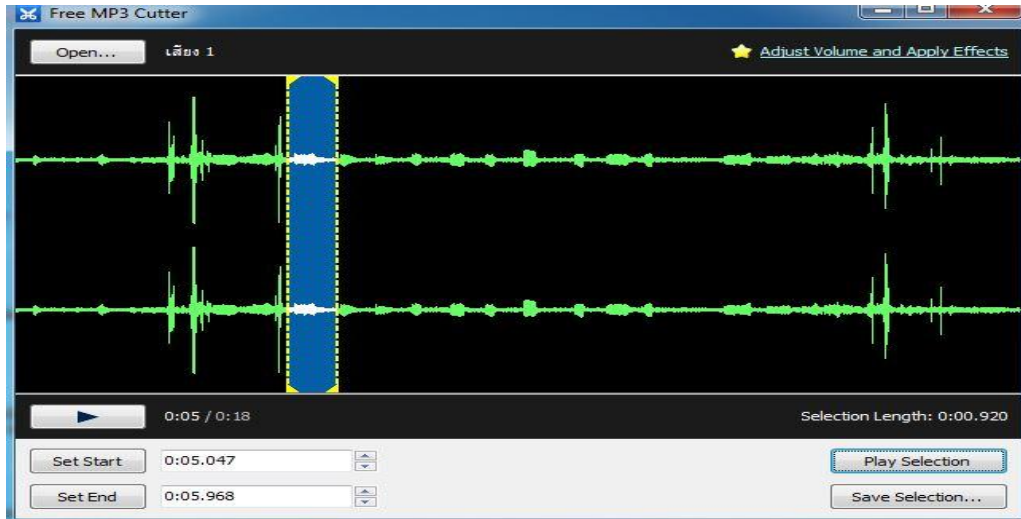


**Figure 3:** Cutting audio into words

3. Grouping the tonal words in each form and the sounds that have been cut into words and analyzed as shown in Figure 5.
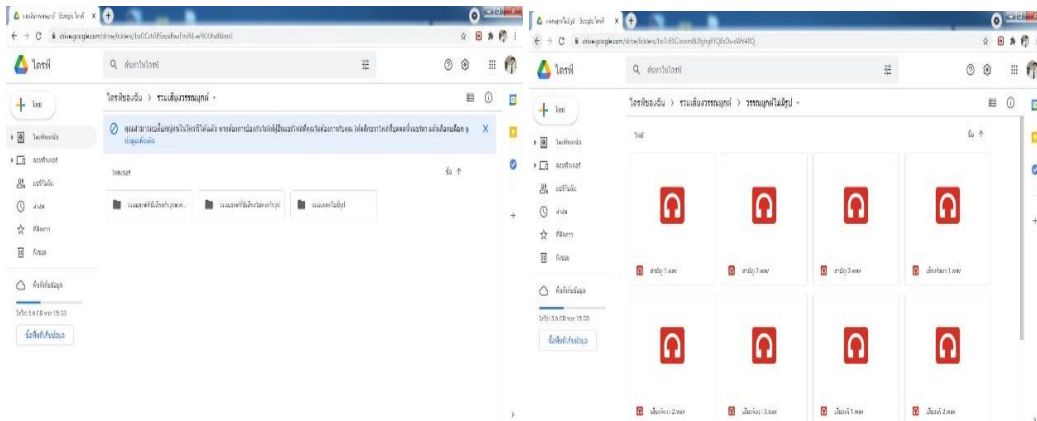


**Figure 4:** The tonal groups in each picture and the sounds that have been cut into words.

Step 4: Data analysis is the use of transcoded and cut-to-word audio data to compare sound similarity analysis with the following steps.

1. The researcher chose Praat and MATLAB programs for data analysis as shown in Figure 5.
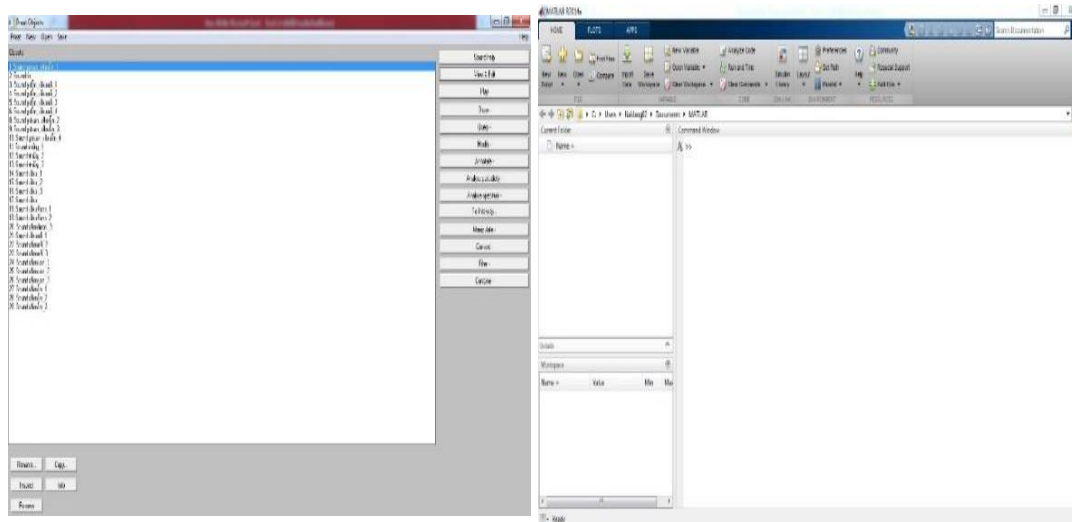


**Figure 5**: Praat and MATLAB programs.

2. Researchers took the data from the audio that has been converted and cut into words to analyze the techniques as follows: Spectrogram technique to consider the position of time, shape and size of the signal together with Wavelet Transform audio format conversion technique to convert the signal before comparing the similarity of the two data sets by using the Dynamic Time Warping (DTW) technique to measure the similarity between the sound signals.

3. Researchers took the converted and cut audio data and analyze by the Spectrogram technique to determine the position of time, shape, and size of the signal as shown in Figure 6.
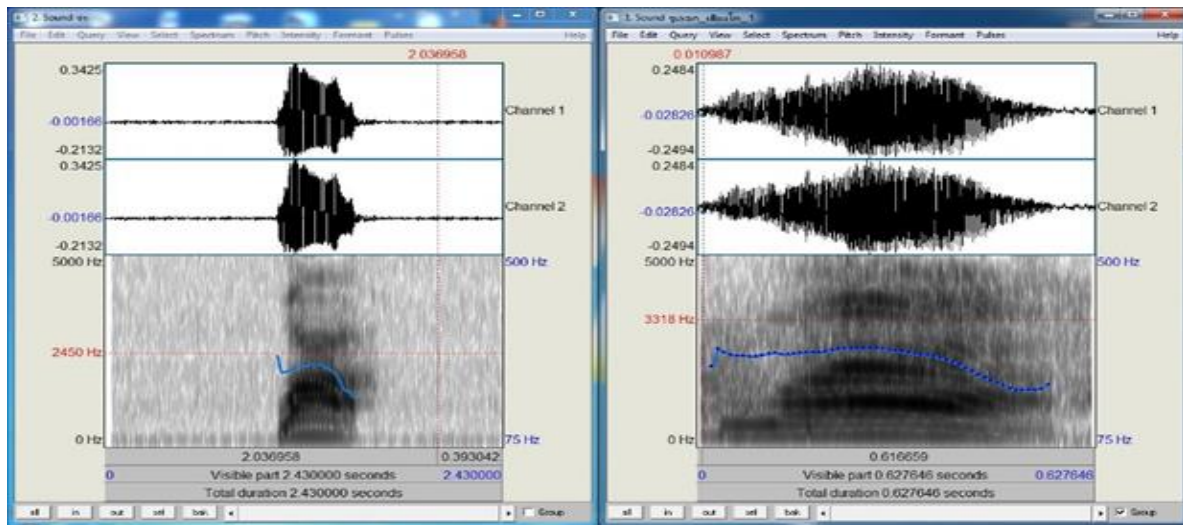
**Figure 6:** Spectrogram analysis.

4. Researchers took audio data that has been converted, and cut audio data, and analyzed with Wavelet Transform technique by compressing the original audio signal and sample to convert the existing signal accordingly before comparing the similarity of the data as shown in Figure 7.
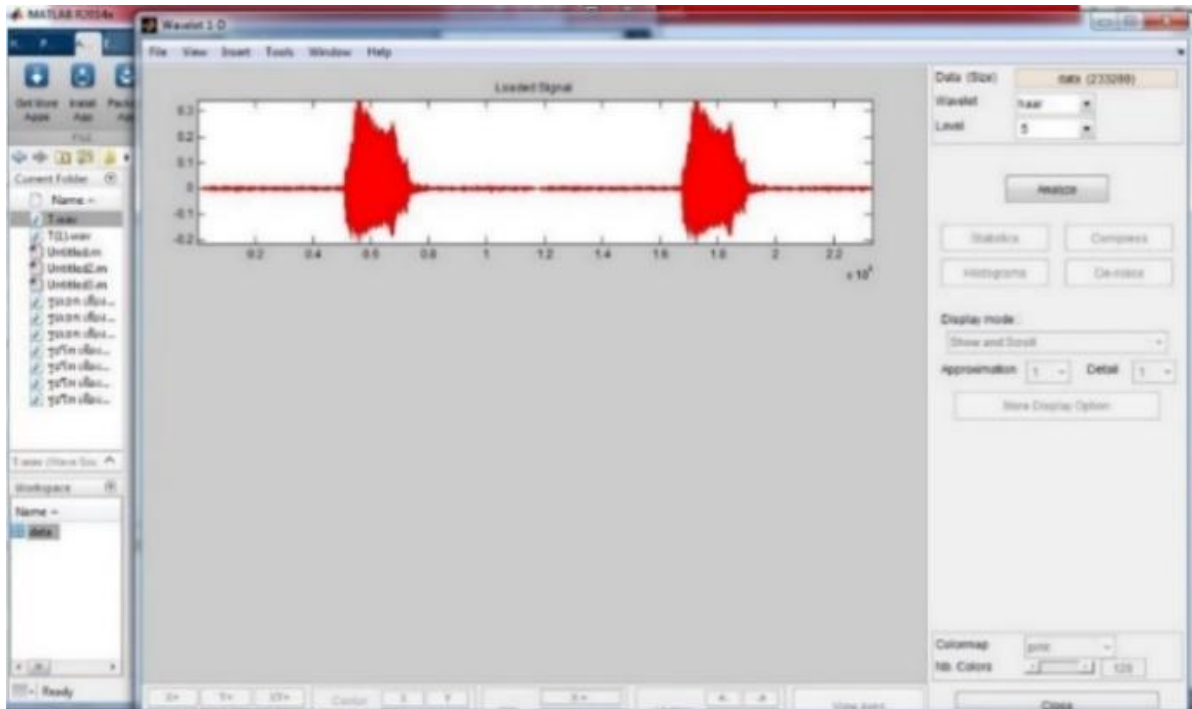


**Figure 7**: Analyze Wavelet Transform

5. Similarity analysis of 2 sound signal sets by using Dynamic Time Warping technique to find similarity of 2 data sets as shown in Figure 8.
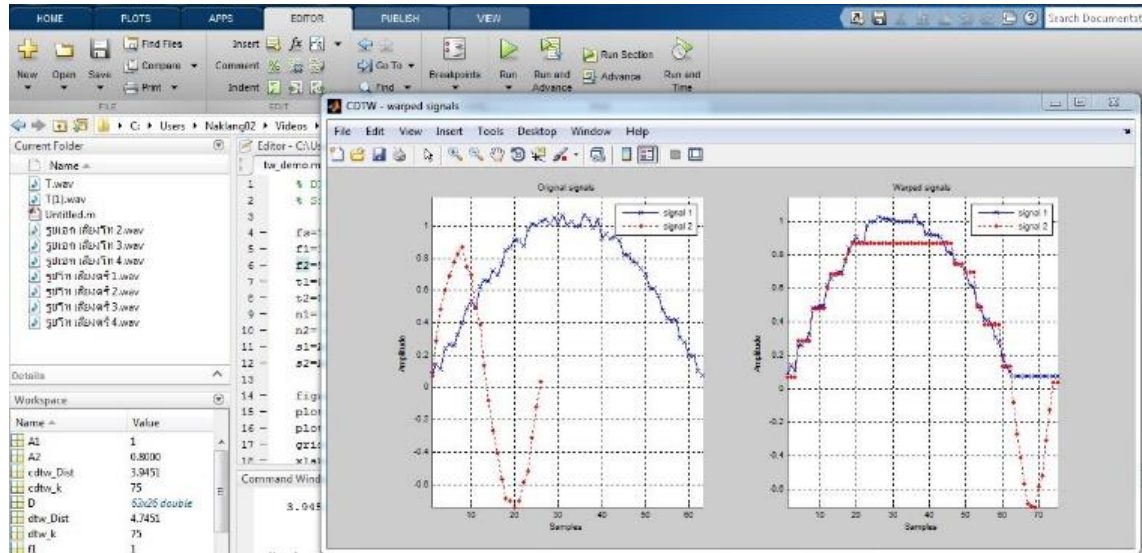


**Figure 8**:  Similarity analysis of Dynamic Time Warping sound signal sets.

6. Deployment Phase

In this paper, a speech recognition system technique was used to help in detection of reading aloud and translating Thai Tones for young learners. Researchers used various techniques to analyze sound signal sets which could be applied with teaching other languages to help in problem solving with reading aloud and also serve as a guideline for developing a system or technology that helps in teaching language in the future.

## Research Findings

### Results of Data Analysis
Researcher presented the research results according to the following objectives:

Part 1 to study the techniques in data analyzing of speech recognition systems techniques to detect reading aloud skills in Thai tone indications or tonal conjugations for young learners

**Table 4.** Sound similarity results used by each technique together in the analysis.

| Analytical Techniques | | | Sound Signal Resemblance (Percent) |
|---|---|---|---|
| *Spectrogram* | *Wavelet Transform* | *Dynamic Time Warping* | |
| ✓ | | | 67.32 |
| ✓ | ✓ | | 81.14 |
| ✓ | ✓ | ✓ | 93.84 |

From Table 4 shows the similarities of the sound signals used by each technique together. The first technique used was the sound wave spectrogram technique to determine the position of time, shape and size of the sound signal. 67.32 Percent, the next order will be the use of sound wave spectrogram technique together with Wavelet Transform sound format conversion technique to convert the existing sound properly to have a sound signal similarity equal to 81.14 Percent, the last order will be using the Wavelet Transform technique to optimize the existing signal before using the Dynamic Time Warping (DTW) technique to measure the similarity of two audio data sets. Together, each technique was able to compare and show that the sound similarity was 93.84 Percent higher.

Part 2 to study the effect of speech recognition systems techniques to detect reading aloud skills in Thai tone indications or tonal conjugations.

**Table 5** Results of pronunciation training and comparison of sound signals

| No. | Results of pronunciation training and comparison of sound signals (number of times) | | | | | Average 5 times (Percent) |
|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | |
| 1 | 86.21 | 88.22 | 87.12 | 89.03 | 90.50 | 88.22 |
| 2 | 90.39 | 90.93 | 92.68 | 93.79 | 93.82 | 92.32 |
| 3 | 91.87 | 92.79 | 93.76 | 93.82 | 93.84 | 93.22 |
| 4 | 86.48 | 88.87 | 87.62 | 89.94 | 90.97 | 88.78 |
| 5 | 87.95 | 89.97 | 90.59 | 91.42 | 93.14 | 90.61 |
| 6 | 88.91 | 89.17 | 90.29 | 91.52 | 93.74 | 90.72 |
| 7 | 88.98 | 89.95 | 91.98 | 92.80 | 92.88 | 91.31 |
| 8 | 85.98 | 86.45 | 89.01 | 91.21 | 92.42 | 89.01 |
| 9 | 85.98 | 88.87 | 87.96 | 90.94 | 91.98 | 89.15 |
| 10 | 92.95 | 93.22 | 93.79 | 93.82 | 93.84 | 93.52 |
| 11 | 86.98 | 88.06 | 89.91 | 91.95 | 92.91 | 89.96 |
| 12 | 90.92 | 92.23 | 92.98 | 93.79 | 93.88 | 92.76 |
| 13 | 86.91 | 89.91 | 90.30 | 91.52 | 93.74 | 90.48 |
| 14 | 86.98 | 88.16 | 89.91 | 91.92 | 92.95 | 89.98 |
| 15 | 90.95 | 93.22 | 93.79 | 93.82 | 93.84 | 93.12 |
| 16 | 85.56 | 85.82 | 87.19 | 89.18 | 91.02 | 87.75 |
| 17 | 86.91 | 89.91 | 91.38 | 92.82 | 93.84 | 90.97 |
| 18 | 85.98 | 88.66 | 89.41 | 91.89 | 92.88 | 89.76 |
| 19 | 84.98 | 87.66 | 89.21 | 91.82 | 92.41 | 89.22 |
| 20 | 87.50 | 89.85 | 90.88 | 91.82 | 93.84 | 90.78 |
| 21 | 89.57 | 90.85 | 91.89 | 92.98 | 93.82 | 91.82 |
| 22 | 85.50 | 86.62 | 87.19 | 90.23 | 92.71 | 88.45 |
| 23 | 86.98 | 88.66 | 89.21 | 91.92 | 92.82 | 89.92 |
| 24 | 90.97 | 91.97 | 92.98 | 93.82 | 93.84 | 92.72 |

| No. | Results of pronunciation training and comparison of sound signals (number of times) | | | | | Average 5 times (Percent) |
|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | |
| 25 | 89.98 | 90.93 | 91.68 | 92.89 | 93.62 | 91.82 |
| 26 | 85.50 | 86.62 | 89.19 | 90.33 | 92.61 | 88.85 |
| 27 | 89.92 | 91.86 | 92.98 | 93.79 | 93.84 | 92.47 |
| 28 | 85.98 | 86.66 | 89.11 | 91.51 | 92.82 | 89.22 |
| 29 | 83.71 | 89.91 | 91.38 | 92.82 | 93.84 | 90.33 |
| 30 | 90.12 | 91.76 | 92.98 | 93.79 | 93.84 | 92.49 |
| **Total Average** | | | | | | **90.66** |

From Table 5 the results of the pronunciation exercises and the analogy of the sound signals were compared. After using various techniques together to analyze 5 times, the average result is 93.52 Percent, the lowest mean is 87.75 Percent, and the total mean is 90.66 Percent.

## Discussion

### Discussions

1. The results of a study on the data analysis techniques of the speech recognition system to detect reading aloud and translating Thai tone indications or tonal conjugations for young learners found that the techniques involved in sound analysis consisted of Sound Wave Transformation technique, Spectrogram technique, Sound Wavelet Transform technique, and Dynamic Time Warping (DTW) similarity comparison technique by using the researcher have used various techniques together for analysis and comparison. A greater resemblance to an audio signal than using a single analysis technique. From the study of sound similarity by using various techniques together to analyze the similarity of the sound signal, the first technique used is the sound wave spectrogram technique to determine the position of time, shape and size of the signal to have a signal similarity. Votes accounted for 67.32 Percent. The next step will be to use the sound wave spectrogram technique together with the sound wavelet transform technique to convert the existing signal accordingly to have a sound similarity equal to 81.14 Percent. Sound wave spectrogram in combination with Wavelet Transform to optimize the existing signal before using Dynamic Time Warping (DTW) to measure the similarity of two audio data sets. By using each technique together, the analyzer can compare and show that the sound signal similarity is 93.84% higher. Translating sounds to homogeneous sounds for data analysis and is a method that has been effectively applied to speech recognition and signal processing (Korpunyapipat, 2015).

2. The results of using the speech recognition system to help practice reading skills in Thai tone indications or tonal conjugations for primary school students found that the results of practicing pronunciation and comparing the similarity of sound signals after using various techniques were analyzed 5 times. The highest average result was 93.52 Percent, the lowest average result was 87.75 Percent, the total average result was 90.66 Percent. The results of using the speech recognition system to detect reading aloud and translating Thai Tones for young learners found that the results of the pronunciation practice and the comparison of sound signals were similar. After using various techniques together to analyze 5 times, the average result is 93.52 Percent, the lowest mean is 87.75 Percent, the total average is 90.66 Percent,

consistent with teaching Thai language at present. with the use of technology and innovation in teaching and learning to help solve problems as well as to develop learners to learn effectively (Sinthaphanon, 2 0 0 9 ). This result related to Malangpoo, Philuek, and Pomsamrit (2022) finding which showed that using speech recognition technology help teachers in detect the error of pronunciation in teaching Chinese speaking of Thai students

## Conclusions

This research were to study the techniques in data analyzing of speech recognition systems techniques to detect reading aloud skills in Thai tone indications or tonal conjugations and to study the effect of speech recognition systems techniques to detect reading aloud skills in Thai tone indications or tonal conjugations, results shows that the technique in used for detect students' Thai Tonal Conjugation consisted of three techniques which involved Spectrogram Sound Wave Change Techniques, Wavelet Transform Audio Format Conversion Techniques, and Dynamic Time Warping (DTW). After experiment phase by using 30 students, it showed that the developed Speech Recognition Technology techniques can be used to detect students read aloud in Thai tone indications or tonal conjugations. Moreover, the next phase, researchers will develop the application which using this technique as the systems to detect how students read aloud and record in database.

Due to the limited sample size and other limitations of the lab setting experiment, these studies did not provide strong results that support the hypotheses that gestures help people comprehend and memorize information. Gestures were found beneficial for only one type of stimuli (mechanical systems) and an overall effect on memory test scores across text and diagram stimuli. Even though the effect of gestures was not significant between different types and formats of stimuli, it was in the right direction. Future research with more sensitive measurements could further explore gestures for thinking.

## Suggestion

Suggestions for future research are as follows:

1. Future research should include additional variables that influence real earning management. These could include factors such as effective corporate governance, the type of audit firm, audit fees, and issues related to real earning management in relation to the operational performance of businesses, represented by financial ratios.

2. This study focused solely on companies listed on the Market for Alternative Investment (MAI). Therefore, future studies should expand the sample to include companies listed on the Stock Exchange of Thailand (SET), which are larger, have diverse investment forms, and a variety of shareholder structures.

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# Educational on Detection Process of Phasatpung Pattern (Honeycomb) in Mudmee Silk of Thailand Local Weaving Community

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## Abstract

This research aims to develop a process to detect Prasatpung pattern (honeycomb) in Mudmee Thai silk from the network of weaving community enterprise in northeastern region of Thailand. The process is using image processing by analyze histogram and using sliding window technique to segment and detect Prasatpung pattern. Data had been processed was traditional Phasatpung pattern of Mudmee silk, collected by capturing the pattern images with digital camera and phone camera in total of 885 images. Benchmarked results had showed that the accuracy of pattern segmentation was 43.73% and the accuracy of pattern detection was 68.99%. Due to complications of pattern of Mudmee silk, the segmenting and detecting process could represent only at moderate level of accuracy.

**Keywords:** Image segmentation, Image detection, Phasatpung pattern, Mudmee silk

## Introduction

Thailand has one of the most booming textile industries in the world. As of 2020, the Thailand textile market was valued at $8085.0 billion, with estimations that by 2028 it will reach $11097.9 billion (Verified Market Research, 2021). To be where it is today, the Thai textile industry has endured many years marked by the advancement of skills for high-quality products. Regarding the historicity of the industry, archeological excavation has provided evidence that the prehistoric Thai people learned to use natural fiber to make clothing and other useful materials, an ability that advanced through the Sukothai and Ayudhaya periods to the modern time (Hayami, 1998). This growth was not smooth, as the industry experienced declines in the early nineteenth century due to the imposition of treaties which opened it to colonial interferences. Other compounding issues that stunted the industry were poor relevant experience and the use of simple technology that made Thailand unable to compete with other countries in the international textile trade (Intarakumnerd & Lecler, 2010). Later on, textile products from the Thai textile industry could be traded with other regions or neighboring countries such as Burma, China, England, and Laos as more relevant skills and methods of production were acquired (Hayami, 1998).

While the early periods of the Thai textile industry entailed the application of simple methods of production like throw-shuttle handlooms, it continued to experience expansion so that cloth weaving evolved to include production outside of the scope of the household. This growth was mostly enabled by the importation of modern tools of production such as textile machines, looms, and spindles from Germany, initially for textile to be used for military purposes (Suphachalasai, 1994). Later on, privately owned modern textile mills were established to respond to shortages of materials during the Second World War, in the process catapulting entrepreneurship in the industry. Since then, the Thai textile industry has had to fight through various setbacks such as the collapse of production as a result of competition from low-cost imported cotton textiles from Pakistan, while on the other hand policy measures such as the Investment Promotion Act introduced in 1960 helped to propel growth by encouraging investment in the Industry (Suphachalasai, 1994).

For the Thai textile industry, silk production has remarkably been one of its strongest abilities. Although the art of silk making is said to trace its origin to a Chinese legend that goes as far back as C.2696 BCE, evidence suggests that Thailand may have had a long history with silk (Martins, 2019). Nevertheless, modern silk production has likely been introduced in Thai by the Chinese through maritime trading routes, although it was not until 1861 CE when sericulture and silk production was encouraged by King Chulalongkorn by starting a silk production facility close to Bangkok (Martins, 2019). However, because of factors such as a lack of proper technical skills among silk farmers and cocoons of inferior quality, Thai silk production was affected as Chinese silk was considered more highly prized. In the 1950s and 1960s, the perception of Thai silk received a boost when the American architect Jim Thompson popularized the commodity in the international market, thereby causing the industry to boom (Diethelm Travel Group, n.d.). Today, Thai silk has found great appeal in the international market, characterized by many designs and styles.

Prasatpung pattern (honeycomb) is the unique pattern of Mudmee silk, originated from traditional ceremony called Boon Prasatpung (make merit to local spirits) which also called Boon Tondogpuang in northeastern region of Thailand. This ceremony had been inherited in many areas in Thailand, including among people in Ubon Ratchathani province. They believed that Prasatpung figure will allocate places for their loved ones in the afterlife. They have been inherited this tradition and other cultural heritages from one generation to another. The Prasatpung pattern is also called Sinmeeyai found in Mudmee silk which is the unique pattern that can only be found in this area. People from many villages had formed weaving community enterprise to produce outstanding products including glass bead pattern from ebony dye, Jokdao cloth, Homkid cloth and, the Prasatpung pattern in Mudmee silk which is the unique pattern created by natural dye. Since most of weavers in weaving community are elders, their production is intended to preserve the folk wisdom that had been inherited from the ancients. Until now, they don't have neither equipment nor technique that can verify the authentication of Prasatpung pattern instead of their eyesight and experiences.

Therefore, researchers had a concept of developing process to detect Prasatpung pattern in Mudmee silk. This concept can be used to create guideline utilizing information technology system to detect Prasatpung pattern and to preserve cultural heritage that inherited from generation to generation.

## Objective

This research intended to develop method to detect Prasatpung pattern in Mudmee silk from network of weaving community enterprise in northeastern region of Thailand.

## Research Methodology

This research was combined with 2 parts: testing data and detecting Prasatpung pattern from presented principle as per following details. Data that had been used for this research was original Prasatpung pattern data. Collecting by capturing still images with digital camera and mobile camera with assistance from people in Nong Bo Subdistrict. Total images were 885 images as shown in figure 1.



**Figure 1**: Collecting data by capturing still images with digital camera and phone camera

Detecting Prasatpung Pattern: There were 5 major processes, preprocessing, binary image conversion, histogram calculation, segmentation, and detection. As shown in figure 2.
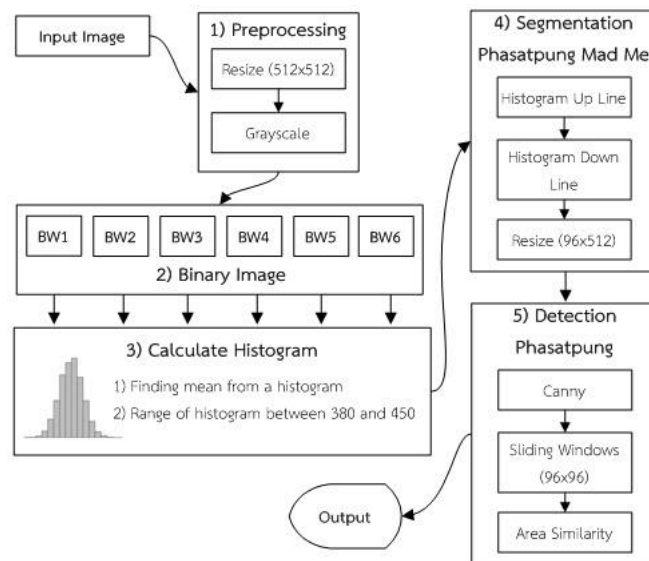


**Figure 2**: Prasatpung pattern detecting process

1. Preprocessing, this is primary process that preparing images to be the most suitable for utilization and to have enough performance before detecting process as per these following steps: 1) Resize images to have suitable size and ease to process. Researchers had set image size to 512 by 512 pixels. 2) Converting to greyscale. This process will convert images from RGB color mode to greyscale within range 0-255 as per equation (1)

$$Y = 0.3R + 0.59G + 0.11B \quad (1)$$

Therefore  $Y$  represented grey value at determined pixel
$R$  represented red value at determined pixel
$G$  represented green value at determined pixel
$B$  represented blue value at determined pixel

2. Binary image conversion since exposure values can affect performance of pattern detection, researchers invented method to convert greyscale image to binary image with many values, total of 6 values. To determine the most effective binary value. As shown figure 3:
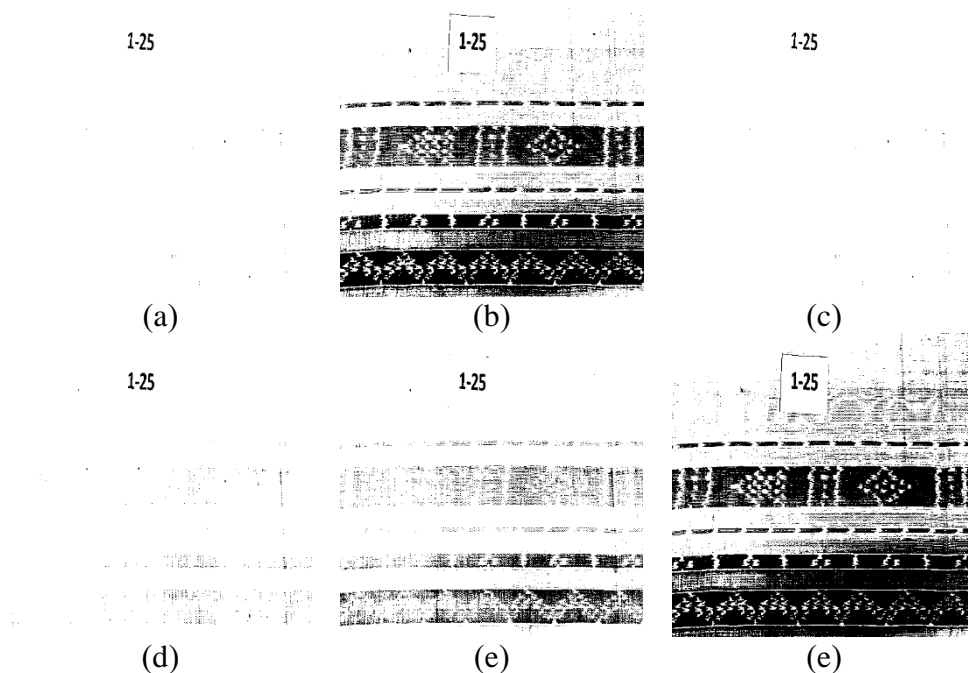


**Figure 3**: Binary image conversion

Figure 3 showed binary image conversion with command im2bw from Matlab 2015b application. Image (c) and (d) had been added command imadjust to adjust image intensity by setting parameter low_in to 0.5, 0.6, 0.7 and parameter high_in to 0.6, 0.7, 0.8, accordingly

3. Histogram calculation was process that converting binary image in each brightness to histogram. A histogram is a graph shows brightness by representing the frequency, a horizontal axis had value of 1-512 and a vertical axis had frequency of pixels. The appropriated average value for image should be 380-450 pixels. Image with low average value was too dark and image with high average value was too bright.

4. Prasatpung pattern segmentation was process separated part with pattern from without pattern.1) Defining upper line of Prasatpung pattern by considering the histogram. Comparing the cumulative frequency values for each horizontal axis row by row, starting from the core of the image (row 256 to row 1) and compare the lowest cumulative frequencies. Then stop searching when the lowest cumulative frequency was achieved. 2) Defining lower line of Prasatpung pattern. This process was similar to define upper line but comparing from row 256 to row 512 instead. 3) Adjusting image size. After defined upper ling and lower line of the image, researchers will crop only interesting area and resize it ro 96 by 512 pixel as in figure 4.



|               (a)               |          (b)          |
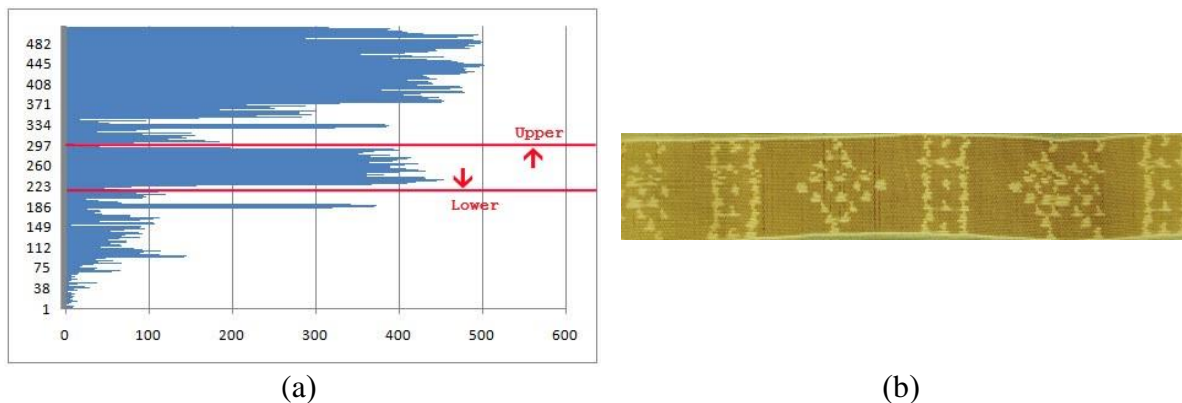
**Figure 4:** (a) Histogram. Upper line and lower line. (b) Prasatpung pattern segmentation.

5. Detecting Prasatpung pattern, this process was to detect area as followed: 1) Finding edge of image with Canny method (Canny, 1986), this method used Gaussian filter to find so it can control image resolution and image denoiser. This process will be applied to template of pattern and image from segmentation process as shown in (a) and (b). 2) Sliding window technique was process that shifting image from the first pixel in horizontal axis by one pixel at a time. As shown in figure 5. 3) Area similarity. Images will be evaluated while shifting window to compare area similarity value with the template. The most value will be considered Prasatpung pattern. As shown in equation 2.

$$S_{area} = \frac{2n(A_1 \wedge A_2)}{n(A_1) + n(A_2)} \quad (2)$$

While     $A_1$ is template, $A_2$ is window

              $n(A)$ is pixel equal to 1 (white)



(a)                            (b)

(c)
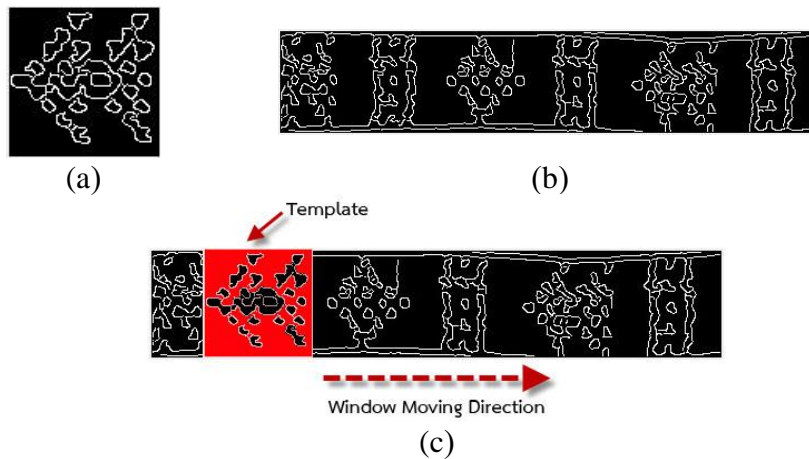
**Figure 5**: (a) Template, (b) Border line, (c) Sliding Window technique


## Research Findings

This development of detecting Prasatpung pattern in Mudmee silk was developed by Matlab 2015b application. Research result showed in 2 parts containing segmentation and detection. Accuracy rate can be evaluated from equation 3. Accuracy rate of pattern segmentation was at 43.73%. Accuracy rate of pattern detection was at 68.99%. The accuracy rate of pattern segmentation was negligible due to unclear pattern which cannot be distinguished between fabric color and pattern. Distorted fabric pattern had caused incorrect definition of upper line and lower line. While brightness falling on Mudmee silk was still an uncontrollable factor.

$$Accuracy = \frac{No.\ of\ Correctness}{No.\ of\ Test\ Data} \times 100 \quad (3)$$

While  *No. of Test Data*  is data of Mudmee silk image
  *No. of Correctness* is amount of verified data



(a)                                                     (b)
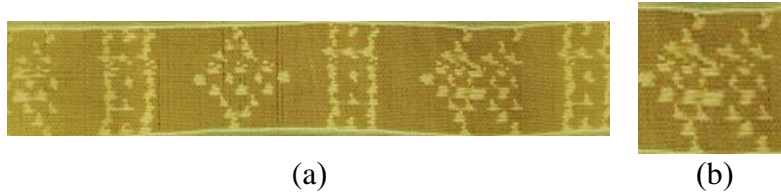
**Figure 6:** (a) Result of segmentation (b) Result of detection



(a)                                                     (b)

(c)                      (d)                      (e)                      (f)
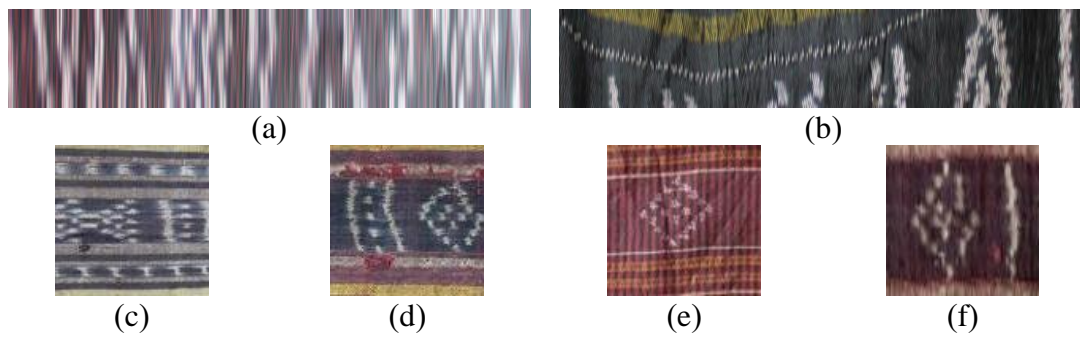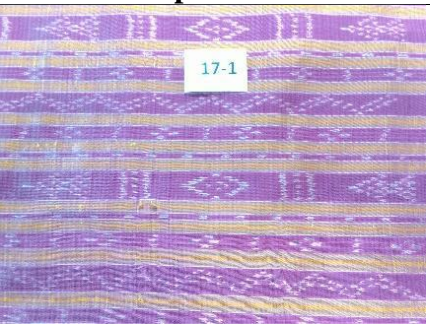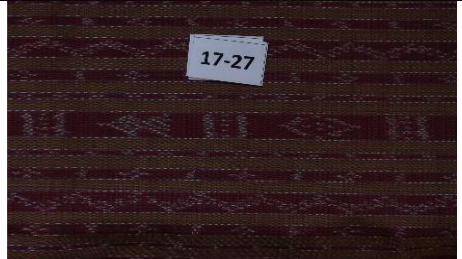
**Figure 7**: (a)-(b) Error in segmentation (c)-(f) Error in detection

**Table 1** Photography format with all components of Mudmee silk, Prasartpung pattern. Compositing with Prasartpung pattern, Eeih pattern, Compkao pattern, Koh pattern, and Krajup pattern. Specified on image quality, image exposure, and type of camera.

| Image specification | Type of camera | |
|---|---|---|
| | **Professional camera** | **Mobile phone camera** |
| 1. Image with all components. Image quality set at the highest resolution. Image exposure set to very bright. |  |  |

| | | |
|---|---|---|
| 2. Image with all components. Image quality set at the highest resolution. Image exposure set to moderate brightness. |  |  |
| 3. Image with all components. Image quality set at the highest resolution. Image exposure set to dark. |  |  |
| 4. Image with all components. Image quality set at medium resolution. Image exposure set to very bright. |  |  |
| 5. Image with all components. Image quality set at medium resolution. Image exposure set to moderate brightness. |  |  |
| 6. Image with all components. Image quality set at medium resolution. Image exposure set to dark. |  |  |

| | | |
|---|---|---|
| 7. Image with all components. Image quality set at the lowest resolution. Image exposure set to very bright. | 17-25 | 17-25 |
| 8. Image with all components. Image quality set at the lowest resolution. Image exposure set to moderate brightness. | 17-26 | 17-26 |
| 9. Image with all components. Image quality set at the lowest resolution. Image exposure set to dark. | 17-27 | 17-27 |

## Discussion/Conclusion

Recognition of Phasatpung pattern has made significant strides in recent years and attracted a lot of interest. The two main kinds of weave pattern recognition techniques are texture-based statistical approaches and database/model-based techniques. From research result of detecting Prasatpung pattern in Mudmee silk showed that images are recognized through a series of image enhancement techniques, such as the color-encoding algorithm by Martins 2019 application model. It can be applied to recognize pattern of fabric images but this process had faced many challenges due to handmade coloring of pattern. The suggested model has potential for the textile and fashion industries because it can be trained with fewer parameters at a lower computational cost. Therefore, researchers hope this research will be useful and inherit preserve cultural heritage from generation to generation.

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# Institutional Strategy Planning to Develop The Marketability of The Doctor of Philosophy Degree Program Universities in Bangkok

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## Abstract

The objectives of this research are 1. To study marketing mix factors that affect decision-making. Apply to study for the Doctor of Philosophy degree. Master's degree program Universities in Bangkok and sustainable national development 2. To study the comparison of selection decisions. Apply to study for the Doctor of Philosophy degree. Master's degree program Universities in Bangkok and sustainable national development, classified according to personal factors. It is a mixed method research (Mixed Methods) with research tools including questionnaires/interviews. With the population, New students studying at the graduate level in 2022 at Bangkok Thonburi University. Metharat University North Bangkok University Rattana Bundit University sample group The researcher does not know the exact population. Therefore, W.G. Cochran's formula for not knowing the population size was used, with a confidence level of 95 percent and an error level of 0.05, for a total of 385 people, and a purposive random sampling method was used. The group of information providers includes the management team and course instructors. The data collected from the questionnaire were then analyzed using descriptive statistics. Including the average Standard deflection and inferential statistics such as t-tests, F-tests, and regression analysis to analyze the content and then use the information gathered from documents/literature/interviews. The results of the research found that 1) the results of the analysis of the level of the factors The marketing mix, price side ($\bar{x} = 4.38$), followed by product side ($\bar{x} = 4.36$), affects decision making. Apply to study for the Doctor of Philosophy degree. Master's degree program Most universities in Bangkok area 2) Occupation Average monthly income different ages There is a difference in deciding to apply to study in the Doctor of Philosophy and Master of Philosophy degree programs at universities in Bangkok, with statistical significance at the .05 level.

**Keywords:** Marketing strategy planning, Doctor of Philosophy degree program, universities in Bangkok area

## Introduction

Developing the quality of Thai graduates is an urgent matter that must be taken care of and resolved by all relevant sectors. The education sector in the country can produce personnel to meet the needs of the labor market and users (Cooke, 2007). Therefore, ensuring the quality of graduates is of national importance for four reasons: (1) the quality of graduates in Higher education institutions, developing graduate quality, is an urgent matter that must be taken care of and solved by all relevant sectors. The education sector in the country (Verreynne, 2005) can produce personnel to meet the needs of the labor market and users (Akaram, Wicha, Khembuppha, Jimanung, Phonjharuean, and Phonginwong, 2019) Quality assurance of graduates is therefore of national importance for 4 reasons: (1) the quality of graduates of higher education institutions. Patterson, A. Master Degree Marketing & Sales Management (Doctoral dissertation, University of Applied Sciences). And graduate students are often different. which will cause damage to Thailand in the long run (2) the competitive qualities of educational provision and the quality of graduates in the country (3) higher education institutions need to develop international knowledge to be accepted internationally (4) Higher education institutions need to build confidence. We can produce quality graduates (Kamarazaly, 2014)

Thammasat University's employment survey. The survey results showed that 71.33% (3,643 people) were unemployed, 1.53% (78 people), and 27.14% (1,386 people) when analyzed in detail. The main reasons why graduates decide to continue their studies They want to work at the level of higher education. This is 40%, then 27% of parents or guardians and another 33% .From the statistics above The demand for graduate studies is likely to increase (Moses, 2015) in line with the expansion of the labor market in ASEAN. Focus on quality work. Proficient, especially in English Is a medium in ASEAN Therefore, universities in Thailand will meet competitors in ASEAN such as Singapore and Malaysia, which have higher potential and language skills. If the institution does not adjust the curriculum to match the competition from that country Thai educational standards May be lower than the standards of competing countries Quality of education is something that the education business must pay attention to and find a way. Because the work of these institutions is the graduates who are an important force in the future (Sima, 2022), the quality of the graduates reflects their abilities. Public universities will have to face semi-autonomous services To have flexibility and freedom in management, one must also adapt. For this reason, marketing strategies to attract new graduates to the main target groups of higher education institutions is one strategy for managing higher education institutions (Balta, 2008)

This research article aims to study and improve marketing capabilities (Ferrell, Hartline, and Hochstein, 2021) Universities in the Bangkok area, Ph.D., Doctor of Philosophy Doctor of Philosophy and Master of Philosophy degrees regarding needs and expectations for decision-making. Apply for a degree in the Doctor of Philosophy program. Master's degree program for further study Bangkok Thonburi University Metharat University Noor Bangkok University Rattanabundit University To apply this knowledge to executives. and benefits that will occur to the academic circle or society in the future

## Objective

1. To study marketing mix factors that affect decision making. Apply for the Doctor of Philosophy degree program. Master's degree program universities in Bangkok

2. To study the comparison of decision making. Apply for the Doctor of Philosophy degree program. Master's degree program Universities in Bangkok Classified according to personal factors

## Literature Review

1. Product is what your business wants to sell to consumers and must be what consumers want. The products here may be goods or services. which must be useful (Utility) and create value (Value) for consumers Responds well to use and creates satisfaction with consumers. This reason will help the product to be sold. (Goi, 2009)

2. Price is the value or value of the product expressed in terms of money. The price is considered the first thing that consumers or users compare products from each brand. The consumer will compare the value received to see whether it is appropriate for the price or not. Therefore, as a business owner and entrepreneur, you should always set the price to suit what consumers receive before releasing the product to the market. The price can be determined by considering the following related factors: Cost - material cost, production capacity cost. Cost of packaging, cost of location, salary of staff or employees, and costs of advertising both online and offline (such as shooting ads, and doing online advertising) Competitors' prices - Prices should be set to be appropriate or similar. In order not to make too many comparisons, (Azzadina, Huda and Sianipar, 2012)

3. Distribution channel (Place) is a factor related to the location and format of the service location. We must consider the suitability of our products to add value to the business. which must be analyzed from 2 elements as follows The format of the place where products or services are sold – must be determined according to the suitability of the product or service provision. and the target group of users or consumers which various formats such as what kind of products should be sold at which locations, supermarkets, fresh markets, convenience stores, roadside stalls, various online channels such as E-Commerce websites, Facebook Pages, Instagram, etc. Store locations Must first analyze who the target customers of the business are. Are there competitors or stores with the same or similar products or services in the area? Then decide on the location of the store (Išoraitė, 2016).

4. Marketing promotion (Promotion) is communication between businesses and consumers. To stimulate sales through various channels and strategies to help, whether it be using Digital Marketing strategies and Social Media Marketing strategies, which include shooting ads, creating Facebook pages, using influencers, or thinking about promotions by channel. various ways They are all interesting methods of marketing promotion. Through marketing promotion tools such as advertising (Advertising), selling using sales staff (Personal Selling), direct marketing (Direct Marketing), news and public relations (Publicity and Public Relations), sales promotion (Sale Promotion) (Satit, Tat, Rasli, Chin, and Sukati, 2012)

Fulton and Maddock (1998). Leadership is motivation and motivation is leadership. It is important for leaders to address the underlying emotions and drive motivation. The author of this book not only provides guidelines for motivating people. But it also trains them to lead others. They developed an 11-level human motivation structure that defines and explains motivation. They then show how leaders can use motivational hierarchies to solve complex problems in the workplace. The result is a blueprint that will help executives in all types of organizations manage more effectively. And at the same time they did. To motivate and lead those who depend on them for guidance and guidance.

4P Elements (Marketing Mix) Now that we know the meaning, let's take a look at the 4P elements of the marketing mix. Consisting of 4 factors: Product, Price, Place, and Promotion, the 4P (Marketing Mix) principle or marketing mix is a concept of 4 factors that a business must analyze to help plan marketing work, which 4P will consist of Product (product), Price (price), Place (distribution channel) and Promotion (sales promotion). The 4 factors mentioned above will help every businessman and marketer to analyze strategies. in detail to create the most growth for the business

**Research Conceptual Framework**
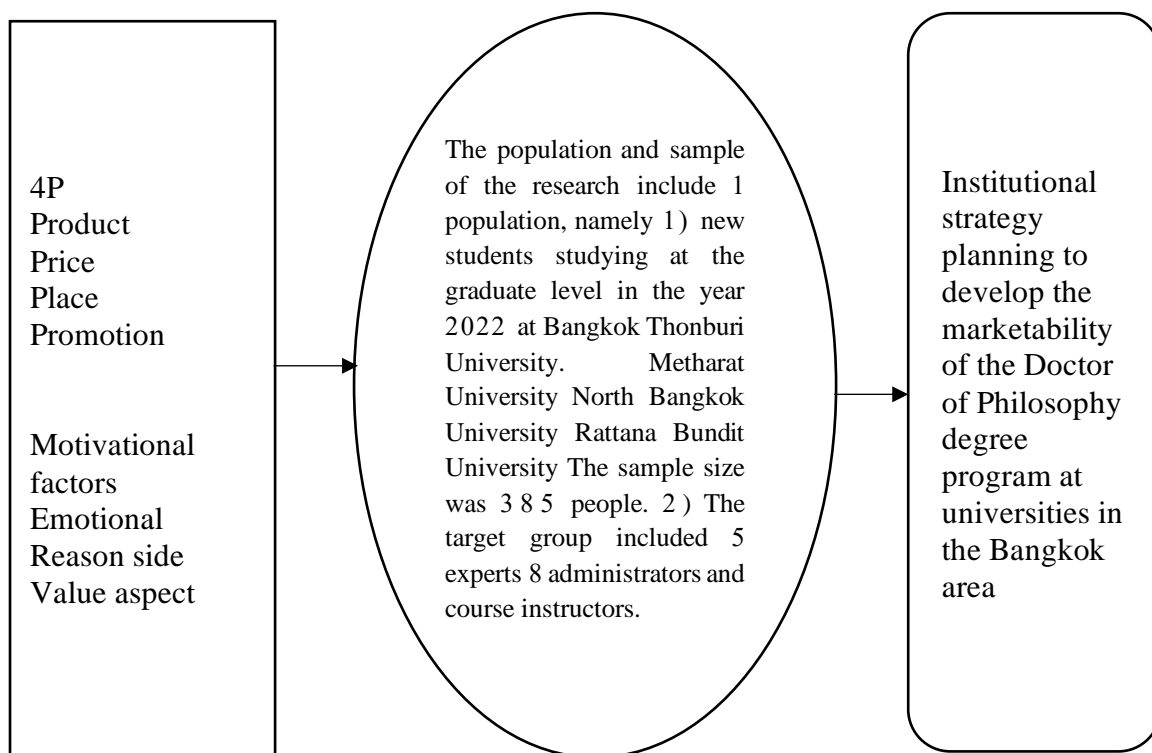


**Figure 1:** Research Conceptual Framework

## Research Methodology

This research is a research that combines qualitative and quantitative research (Mixed Methods) with the following research methods.

1. Population and sample groups in the research include:

1.1 Population includes 1) new students studying at the graduate level in 2022 at Bangkok Thonburi University. Metharat University North Bangkok University Rattana Bundit University

1.2 Sample group The researcher determined the sample size because the exact population was not known. Therefore, it can be calculated from W.G. Cochran's formula for not knowing population size, with a confidence level of 95 percent and an error level of 5 percent (Kanlaya Wanichbancha, 2017). A sample size of 385 people was obtained and a purposive sampling method was used from the public. In Bangkok

1.3 Target groups include 5 experts (Connoisseurship) and group 2) high-level personnel in Bangkok Thonburi University Metharat University Noor Bangkok University Rattana Bundit University It is a team of administrators and course instructors, semester 2, academic year 2022, totaling 8 people.

2. Research tools include 1) interview form (Interview) 2) questionnaire (Questionnaire) 3) other quantitative questionnaires (Questionnaire) consisting of

Part 1: General status of respondents including gender, age, education level, status, occupation, and average monthly income. It is a checklist with 6 items.

Part 2: Questionnaire regarding marketing mix factors, 13 items, and motivation, 9 items, totaling 22 items, is a 5-level rating scale and

Part 3 is a question about decision-making. Apply for a degree in Doctor of Philosophy or Master of Philosophy at a university in Bangkok. There are 5 questions. The questionnaire is a 5-point estimation scale and other suggestions are open-ended.

The researcher brought a questionnaire to find out the quality of the tools, including 1) bringing an expert questionnaire and proceeding with improvements and corrections according to the recommendations. 2) The revised questionnaire was presented to 5 experts to check the consistency of the content by estimating the consistency of the objectives with the questions (Index of Item–Objective Congruence: IOC). ) (Saiyot and Saiyot, 2000) found that there was an IOC value between 0.80–1.00 and 3) testing the tool with a population that was not a sample of 30 sets, with the results of the evaluation having a discriminatory power between 0.25 –0.75 and find the confidence value of the questionnaire using (Cronbach, 1951; Cited in Srisa-at, 2015), which the confidence evaluation results have a confidence value of 0.95.

3. Data collection includes collecting data from

1) Primary Data is data obtained from in-depth interviews with target groups and using questionnaires. Data collection in this research includes:

(1) Primary data The researcher collected data using a questionnaire. Using purposive sampling with questionnaires from those applying for a degree. Doctor of Philosophy, Master of Philosophy program, universities in the Bangkok area, 385 students, and the questionnaires were separated only for the complete version until the number of samples set was complete, and the questionnaires were used to analyze the data with various statistical values.

(2) Secondary Data is information obtained from collecting various documents (Document Research) such as books, textbooks, academic documents, research and related electronic media, etc.

4. Data analysis includes data analysis divided into 2 parts: 1) qualitative data analysis By using information obtained from in-depth interviews with target groups and collecting information from various documents to analyze in terms of content (Content Analysis) 2) Use the obtained information to analyze the data. Using a statistical package Using descriptive statistics such as mean values. Standard deflection and inferential statistics, including t-tests, F-tests, and regression analysis.

5. Statistics used in the research include a ready-made descriptive statistics program consisting of percentage (Percentage), mean (Mean), standard deviation (Standard Deviation), and inferential statistics such as T-test, F-test, and analysis. Regression

## Research Findings

**Objective 1** The research results found that Marketing mix factors that affect decision making Apply for the Doctor of Philosophy degree program. University Master's Program in Bangkok

**Table 1** shows the average values. and standard deviation of marketing mix factors. Motivational factors In deciding to apply to study in the Doctor of Philosophy and Master of Philosophy degree programs at universities in Bangkok.

| factors | $\bar{x}$ | S.D. | level value |
|---|---|---|---|
| Marketing mix factors | | | |
| Product/Curriculum | 4.36 | 0.70 | Highest |
| Price/expenses for studying | 4.38 | 0.61 | Highest |
| Places/channels for applying to study | 4.29 | 0.67 | Highest |
| Marketing promotion | 4.23 | 0.64 | Highest |
| **Total** | **4.31** | **0.46** | **Highest** |
| Motivational factors | | | |
| Emotional | 4.20 | 0.73 | Highest |
| Reason side | 4.38 | 0.52 | Highest |
| Value aspect | 4.23 | 0.73 | Highest |
| Total | **4.30** | **0.45** | **Highest** |

From Table 1, it is found that the results of the analysis of the overall level of marketing mix factors have the highest average level ($\bar{x}$ = 4.31), arranged from highest to lowest, namely price ($\bar{x}$ = 4.38), followed by Down are the product side ($\bar{x}$ = 4.36), place/study application channels ($\bar{x}$ = 4.29), and marketing promotion side ($\bar{x}$ = 4.23), respectively. For the motivation factor, it was found that the average values were arranged from high. Going to find the least are Rational motivation ($\bar{x}$ = 4.38), values motivation ($\bar{x}$ = 4.23), and emotional motivation ($\bar{x}$ = 4.20), respectively.

**Objective 2** Results of a comparative study of decision making Apply for the Doctor of Philosophy degree program. Master's degree program Universities in Bangkok Classified according to personal factors

**Table 2** shows the results of the comparison of selection decisions. Apply to study in the Doctor of Philosophy or Master of Philosophy degree program at a university in the Bangkok area.

| Personal Factors | t/F | Sig. |
|---|---|---|
| Sex | 1.018 | .310 |
| Age | 15.305* | .000 |
| Education level | 6.704* | .004 |
| Status | 1.947 | .054 |
| Occupation | 45.731* | .000 |
| Monthly income | 30.552 | .000 |

*At the significance level .05

From Table 2, it was found that the sample group was Educational levels, occupations, and average monthly incomes vary. There is a difference in deciding to apply to study in the Doctor of Philosophy and Master of Philosophy degree programs at universities in Bangkok, with statistical significance at the .05 level.

**Table 3** shows the results of the regression equation analysis. of factors affecting decision making Apply to study in the Doctor of Philosophy or Master of Philosophy degree program at a university in Bangkok.

| Variable | b | SEE. | β | t | Sig |
|---|---|---|---|---|---|
| Constant (a) | 3.880 | 0.224 | | 17.306* | .000 |
| Products/Course (X1) | -0.139 | 0.042 | 0.291 | -3.297* | .001 |
| Price/expenses for studying (X2) | -0.172 | 0.036 | 0.181 | -4.782* | .000 |
| Place of application channel (X3) | 0.163 | 0.053 | 0.113 | 3.068* | .002 |
| Marketing promotion (X4) | -0.026 | 0.028 | 0.144 | -0.928 | .354 |
| Rational motivation (X5) | 0.046 | 0.034 | 0.167 | 1.361 | .174 |
| Emotional motivation (X6) | 0.257 | 0.049 | 0.267 | 5.243* | .000 |
| Value Motivation (X7) | -0.080 | 0.046 | 0.215 | -1.730 | .084 |
| R= 0.443 $R^2$ = 0.197 $R^2$ Adjust = 0.196  SEEest = 0.39619  F=13.177  Sig. = .000* | | | | | |

*Statistically significant at the 0.05 level.

From Table 3, the research results found that The marketing mix of products/curriculum (X1), price/expenses for studying (X2), location, application channels (X3), and emotional motivation (X6) affect the selection decision. Apply for a course Doctor of Philosophy, Master of Philosophy degrees, universities in Bangkok area Bangkok Thonburi University Metharat University Noor Bangkok University Rattanabundit University Statistically significant at the .05 level, all 4 variables can explain changes in selection decisions. Apply to study in the Doctor of Philosophy and Master of Philosophy degree programs at universities in the Bangkok area, receiving 19.70% and writing a forecast equation in the form of raw scores as follows.

$$\hat{Y} = 3.880 - 0.139\ X_1 - 0.172\ X_2 + 0.163\ X_3 + 0.257\ X_6$$

### Qualitative analysis results

Part 2: Analyze the importance of each person involved in developing a marketing strategy. of Bangkok Thonburi University Metharat University North Bangkok University Rattanabundit University and test the hypothesis that executives have the average level of importance in creating marketing strategies for educational institutions. Bangkok Thonburi University Metharat University North Bangkok University Rattanabundit University are very high. It is expected that marketing strategies in each area include product (course), price (costs throughout the course), location, and field to promote personal marketing. Physical presentation is more important.

From the study, it was found that product strategy factors can be classified into two groups: the most important level is the focus on the number of students in the Doctor of Philosophy program. And of the least important factor, the founder's reputation is the most important factor.

From the study, it was found that factors such as price strategy, credit, and educational fees Prices for information services and dormitories It is all of the above factors. Pricing strategy is important to any marketing strategy. The cost of the Internet and other services is not so significant.

From the study, it was found that the convenience of traveling is a factor. modern library The educational institution is beautiful. Affiliated institutions are studying The beauty of school buildings and classrooms The rest of the above is Just as important to a marketing strategy as the internet. Availability of parking The factors of internet service and the adequacy of parking and sports stadiums are not important.

The study found that the importance of factors in marketing promotion strategies is only one factor. Only the most important educational funds are at the highest level. Other factors are at very important levels. The least important factors are quality assessments and institutional rankings.

Returning to the Commission's advisors Course recommender representative Curriculum guidance representative Media exposure Television and media relations, journals and compensation factors in the form of advice fees and commissions. Advice on media exposure and press releases in journalism is very important and most

Part 3: Analyze student opinions on the importance of each strategy and analyze data to test hypotheses. It is expected that strategies for increasing marketing capabilities in each area will affect decision-making. Apply to study in the Doctor of Philosophy and Master of Philosophy degrees at Bangkok Thonburi University. Metharat University North Bangkok University Rattana Bundit University will be very important

In summary, there are 7 strategies: product strategy (course), price strategy (costs throughout the course), location strategy, and marketing promotion strategy. Individual process physical presentation All are influences on decision making. Apply for study at Bangkok Thonburi University Metharat University North Bangkok University Rattanabundit University

The most influential decision strategies are product strategy and consideration of various factors. The strategy that has the least influence on decision-making is the location strategy.

## Discussion/Conclusion

Results from research objective 1 found that the level of marketing mix factors, price, and product affect decision making Apply to study for the Doctor of Philosophy degree. Master's degree program the most universities in the Bangkok area. This may be because Educational institution administrators place importance on product (curriculum), price (costs throughout the course), location, and field to promote personal marketing. Physical presentation is very important. and is considered a strategy of Bangkok Thonburi University Metharat University North Bangkok University Ansamchan University Can be divided into 2 groups: the most important and the level that is very important for those who influence the strategy of Bangkok Thonburi University Metharat University North Bangkok University Ansamchan University has the most Rectors and Vice-Rectors. Vice-Rector for Academic Affairs The dean and personal director who have the least strategic role are in the academic department, which is consistent with (Sudjanya, 2023) that the research results found that the Level of opinion on the 7Cs of consumer perspective marketing factors that affect the decision of Chinese students to study at universities in the Kingdom of Thailand. Overall, it was at the highest level (= 4.51). When considering each aspect, it was found that the aspect with the highest average (= 5.00) was: 1. Chinese students desired that universities in the Kingdom of Thailand have a system that allows students to apply for Registration can be made through the website. 2. The university should have personnel who are friendly and have an understanding of Chinese culture. 3. Chinese students need convenient ways to contact and inquire, including online channels and walking in to contact them in person. and can easily travel to the university office There is a clear responsible agency. They received good and friendly service. 4. Chinese students value that the cost of studying is not high compared to those in the People's Republic of China. which parents feel is worth the investment to study. and having a simple payment system and there is a clear payment certification document. Next, the aspect with an average (= 4.94) is 1. Chinese students want a curriculum that meets their needs. 2. Chinese students want the university to have explanations in Chinese. that clearly explains the steps regarding registration, and the lowest is the side with an average (= 1.35) which is that Chinese students desire that universities in the Kingdom of Thailand provide shuttle service to process VISA (Worapongpat, 2021) Study on Factors affecting the strategic management process of administrators at Rajamangala University of Technology in Thailand were found to be Executive leadership Educational innovation and technology Good governance and participation Creation of consciousness and human resource management Should be focused and given importance and consistent with (Worapongpat, Phakamach, Choothong and Tuachob, 2020) the study of The Role of Knowledge Management in Digital Education พบว่า Educational organizations are required to overcome the new challenges, especially the changing nature of the enhanced dynamism, digital disruption and complexity of the requirements from the education al organizations. One of the current strategic philosophies assisting educational organizations to develop strategic capabilities dealing with uncertainty is knowledge management (KM). Through the systematic acquisition, creation, sharing, and use of knowledge, organizations develop, renew and exploit their knowledge-based resources, thereby allowing them to be proactive and adaptable to external changes and attain competitive success. KM is the technique of using the information and knowledge that is supplied to, generated by and inherent in any organization or institution, to improve its performance. This paper focused on the KM in organization, major categories of KM roles, implications of learning theories on KM on digital educational organizations, applying KM in

digital education, KM model in digital educational organizations and the future of KM in educational organizations.

The results from research objective 2 found that the average monthly income of different ages has a significant impact on the decision to apply to study in the Doctor of Philosophy and Master of Philosophy degree programs at universities in Bangkok. This may be due to students' opinions regarding various factors. that influences the decision of Bangkok Thonburi University Metharat University North Bangkok University Ansamchan University The study was divided into 7 strategies, including product price, location, and marketing promotion. The most influential factors include celebrity founders, teachers, and the image of the institution. Teaching equipment Diversity in subjects and the number of graduate students, which is consistent with (Treemethasunthon and Tanprasert, 2023) study of marketing mix factors and online marketing communication tools that affect the decision-making process for choosing to study a master's degree program. of students at Southeast Bangkok College, it was found that 1) the sample students gave importance to the process of deciding to study the master's program at Southeast Bangkok College, namely being aware of the problems Searching for information decision-making Evaluation of alternatives and post-selection behavior 2) Sample students gave their opinions on marketing mix factors, including product factors. Marketing promotion factors Distribution channel factors price factors and opinions on online marketing communication tools, including content marketing Social media marketing, and marketing through internet search engines, and 3) marketing mix factors and online marketing communication tools that affect the decision-making process of students choosing to study a master's degree program at Southeast Bangkok College. with multiple regression analysis statistics Together they can explain the decision-making process for choosing to study a master's program for students at Southeast Bangkok College. The results of this research can be applied as a strategy for selecting further education for private university students related to marketing mix factors and online marketing communication tools and (Worapongapt, 2022) a study on Social media administration behavior of the faculty of education influencing the decision to participate in activities of the faculty of education Bangkok Thonburi University found that the findings are: 51-100 users are average number of Line members that each user has; most users make appointment online with each other 1-2 times; most users use Line for their academic and occupational activities as well as sports and recreational activities as well as multi-school activities; after-class these users use Line to record their memorable moments. These users are only medium-leveled in their appreciation of how they use Line to contribute to ecological conservation activities. Looking at each of the items individually, there is a high-level appreciation in all of them. The high-level appreciation is in searching for networks, then membership and usage. and accordingly with (Worapongpat and Chuthong, 2020) study of Innovation in higher education institutions found that designing new learning spaces Teaching and learning media that can be reused at no cost. Interdisciplinary Access Adjusting organizational culture for innovation It is a partnership between teachers and students. Challenges in innovation in higher education administration include: Designing new learning environments to support teaching and learning Mobilizing resources for wider access and improving quality Digital transformation to support teaching and teachers Policy on creating collaborative partnerships for educational change

**New Knowledge From Research**
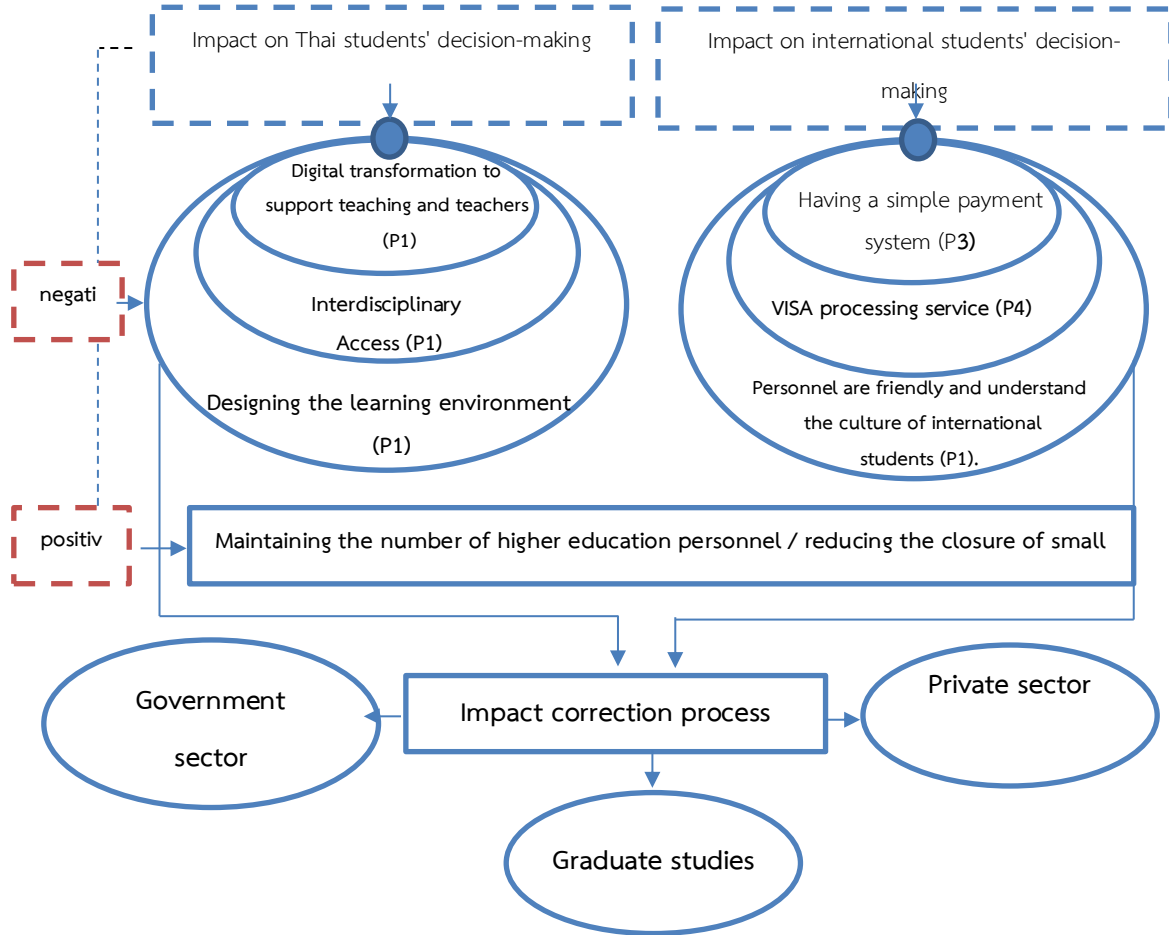


**Figure 2:** New Knowledge from Research

From a study of the impact of institutional strategies in developing the marketing capabilities of the Doctor of Philosophy degree program of a university in Bangkok, it was found that the knowledge can be summarized in the following diagram.

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# Real Earning Management, Governance Structures and Cost of Equity of the Companies Listed on the Market for Alternative Investment (MAI)

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## Abstract

The purpose of this research was to investigate the influence of the real earning management on governance structure and cost of equity as well as the influence of the governance structure on the cost of equity through real earning management. The research method was quantitative research. The samples were selected by collecting the finance reports of the companies registered in the Market for Alternative Investment (MAI) from the year 2016 to 2020. The data collected in this study were analyzed using the Structural Equation Model (SEM).

The results of the study were found that the development of the casual relations of the real earning management, the governance structure towards the cost of equity was appropriate and in congruence with the empirical data and the governance structure on the part of shareholders who had influences on the cost of equity, the proportion of the audit committee who were knowledgeable and skillful on finance and accounting, had influences on real earning management and real earning management had influences on the cost of equity with statistical significance at level 0.05.

**Keywords:** Real Earning Management, Structures of Shareholders, Audit Committee, Cost of Equity

## Introduction

Administrators are those who are responsible for doing and presenting a financial report to stakeholders, so they are able to use their consideration to do the financial report which is an opportunity to make earnings for themselves and friends. Healy and Wahlen (1999) claim that the earning management has created misunderstanding about operating the company among the stakeholders since the administrators use their discretion in doing the financial report and the business governance structure in order to modify the financial report.

Generally, earning management is divided into two types consisting of earning management through accrual earnings management (AEM) occurring when the administrators make decision to modify the financial data to create misunderstanding about operating the company outcomes (Dechow & Skinner, 2000; Healy & Wahlen, 1999; Jones, 1991) while the

administrators will do real earning management (REM) through regular activities using sales techniques, over production, discretionary expenses and earnings from the sales of fixed assets (Roychowdhury, 2006; Brown, Chen, & Kim, 2015; Graham, Harvey, & Rajgopal, 2005; Zang, 2012). Upon reviewing the past study of Ali and Kamardin. (2018), it was found that administrators had tendency to modify the earnings through the accrual earnings management (AEM) and the real earning management (REM) since there are strict accounting standards, laws, and rules or regulations of the governing offices, high quality of auditing, changing of sources of funds from internal to external markets, and using an international financial report system (IFRS).

Governing is a kind of mechanism in decreasing behavior of earning management of the administrators. The structure of the shareholders is important and influential on the governance and important for protecting investors (Djankov et al., 2008). The major shareholders have the right to vote in governing or have authority in controlling the business, have important roles in management policy making including having a big stake in the business. The shareholders give emphasis on the benefits and survival of the business in the long run but more on making their own benefits rather than external investors. A part from the structure of the shareholders who are the governing mechanism, the audit committee are also the governing mechanism for the utmost efficient business management. The committee mechanism is an important part in governing, auditing of the representative or administrative operation, and the efficiency of the committee will affect the business to be more effective (Fama & Jensen, 1983; Brennan, 2006) creating more reliability in the good controlling system of the business, especially in making and presenting the financial report (Bedard, Chtourrou, & Courteau, 2004). A sound governing will be able to decrease the cost of equity because it is a process of decreasing advantages of administrators towards investors, shareholders and stakeholders using internal data (La Porta et al., 2000).

Based on the aforementioned, the researchers realized the significance of the tendency of modifying the accrual earnings management (AEM) to be the real earnings management (REM). Thus, the researchers were interested in studying the relationship of the real earning management (REM), governance structure of the shareholders, audit committee, and the cost of equity of the companies listed at MAI stock market which offered opportunity for medium and small businesses to raise funds with emphasis on the businesses with high growth and tendency to grow well in the future.

## Objective

1. To investigate the influence of the governance structure towards the cost of equity.

2. To investigate the influence of the governance structure towards real earning management.

3. To investigate the influence of the real earning management towards the cost of equity

4. To investigate the influence of the governance structure towards the cost of equity through real earning management.

## Literature Review

Shareholders play a number of roles in businesses, being both stakeholders, governors, and influencers towards the motivation for administrators to manage earnings. Studies have shown that the shareholder structure in each form reflects that internal business governing has influences in making the motivation for the administrator to manage the data of earnings and profits in the report (Ball, Robin, & Wu, 2003; Fan & Wong, 2002; Wang, 2006). The earning management could be less or more depending on the power of governing of the shareholders. The earning management would increase if they want to seek for personal advantages, and would decrease if they want to protect investors (Djankov et al., 2008; Leuz, Nanda, & Wysocki, 2003). Based on a study of Bradbury, Mak, and Tan (2006), it was found that the shareholders were institutional investors with high proportion of investment and with the relationship in the same directions of the accrual earnings in administrators' discretion. However, Sarkar, Sarkar, and Sen (2008) did not find that the shareholders being investors had the relationship with the accrual earnings in view of the administrators at statistical significance level. Foreign shareholders could decrease the agency costs and increase the value of the company through spreading of positive impacts (Douma, George, & Kabir, 2006; Ferreira & Matos, 2008) by decreasing the company's cost (Bekaert & Harvey, 2000) through appropriate investment promotion for research and development (David et al., 2006) via influences of doing businesses (Yanadori, 2004; Mun & Jung, 2013). In the same manner, Ferreira and Matos (2008) and Aggarwal et al. (2011) found that the company's value increased significantly with the foreign investors. Chung, Ho, and Kim (2004) found that the foreign shareholders in Japan had an efficient inhibition of taking chances in management and decreasing of accrual earnings in view of administrators in the company with positive profits Guo et al. (2015) and with the proportion of higher foreign shareholders taking part in earning management less than in other companies. The businesses with the highest shareholder structure by family groups had more earning management than other companies by means of sales activities (Phattaranawig, 2012).

The structure of shareholders has impact on the cost of equity. Hayat et al. (2018) found that the proportion of the shareholders being the institutions has positive relationship with the cost of equity in the United States of America; however, in China the relationship is negative. While Masood (2014) did not find the relationship at a significant level between the proportion of the institutional shareholders but found that the structure of the shareholders with clusters of companies had negative relationship with the cost of equity. Nevertheless, Ahmad et al. (2018) did not find the relationship significantly. Ashbaugh, Collins, and LaFond (2004) found that the cost of equity had positive relation with the structure of the shareholders at 5% and above. Surifah, Ifah Rofiqoh, and Krismiaji (2019) studied the structure of the shareholders and found that it had impact on the cost of equity except those who were government organizations. Gao et al. (2020) examined the relation of hi-tech companies registered in the stock market in China, it was found that when compared with temporary institutional investors, the stabilized institutional investors intending to invest in a long term could effectively decrease their capital. Dakhlaoui and Gana (2020) showed the negative evidence between the clusters of ownership and the cost of equity. Muslim and Setiawan (2021) found that the structure of ownership of the institution and foreign countries had impact towards the capital of the shareholders.

The audit committee play roles in assisting the company committee in reviewing or examining the financial report including internal control of the business in order to ensure that the business has a good control system in making and presenting the financial report (Bedard, Chtourrou, & Courteau, 2004). The external audit committee will be able to examine the work of the administrators independently, enabling decreasing the representative problems and decreasing motivation in administrators' earning management (Fama, 1980; Fama and Jensen, 1983). At the mean time Xie, Davidso, and DaDalt (2003) and Peasnell, Pope, and Young (2005) did not find the relationship at the significant level between the proportion of the independent audit committee, having the audit committee and accrual earnings management. Apart from being independent, knowledge and expertise in specific fields play an important part in work operation helping to decrease administrators' earning management via an evaluation of the knowledge and ability, independence of the auditor on accounting issues in items requiring discretion and other accounting issues (Bedard, Chtourou, & Courteau, 2004). DeZoort and Salterio (2001) stated that important errors on the financial report would increase when the audit committee were knowledgeable and skillful in accounting and finance (Bedard, Chtourou, & Courteau, 2004). The proportion of the committee having knowledge and skills on accounting and finance may they be certified auditors, finance analysts or having experience on accounting, had the relationship in an opposite way with the accrual earning depending on the administrators' judgement. (Xie, Davidson, & DaDalt, 2003; Bédard, Chtourou, & Courteau, 2004). However, the studies by Rahman and Ali (2006); Lin, Li, and Yang (2006) did not find the relationship at the significant level between the audit committee having knowledge and skills in accounting and finance and the accrual earning based on the administrators' discretion and modifying new items in the financial report.

Based on the review of the past studies, it was shown that the majority of the studies aimed at investigating the relationship between the audit committee and the accrual earnings management. Lenard et al. (2016) demonstrated that the weak point in an internal control of the companies in the United States had a positive relationship with the real earning management (Jarvinen and Myllymaki, 2016). Revealing of the weak point on internal control forced the administrators to lower negative reaction on marketing of the stakeholders by participating in the real earning management.

Previously, not many studies were conducted on real earning management which had influences on the cost of equity. The real earning management had a positive influence on the cost of equity (Dechow, Sloan, & Sweeney, 1996; Utami, 2005) which was in line with the studies by Francis et al. (2004), Gray, Koh, and Tong (2009) and Aboody, Hughes, & Liu (2005) who reported that the earning management through accrual earning management resulted in an increase of the cost of equity. Kim and Sohn (2013) found that the real earning management had positive relationship with the cost of the equity. Surifah, Ifah Rofiqoh, and Krismiaji (2019) examined the influence of the real earning management and the cost of equity of the companies registered at the stock market in Indonesia, it was found that the real earning management affected the cost of equity. Gao et al. (2020) examined the relationship of the Hitech companies registered at the stock market in China, it was found that the relationship towards the cost of equity was negative. However, McInnis (2010) reasoned that modifying the earnings to be smooth did not affect the cost of equity.

## Conceptual Framework
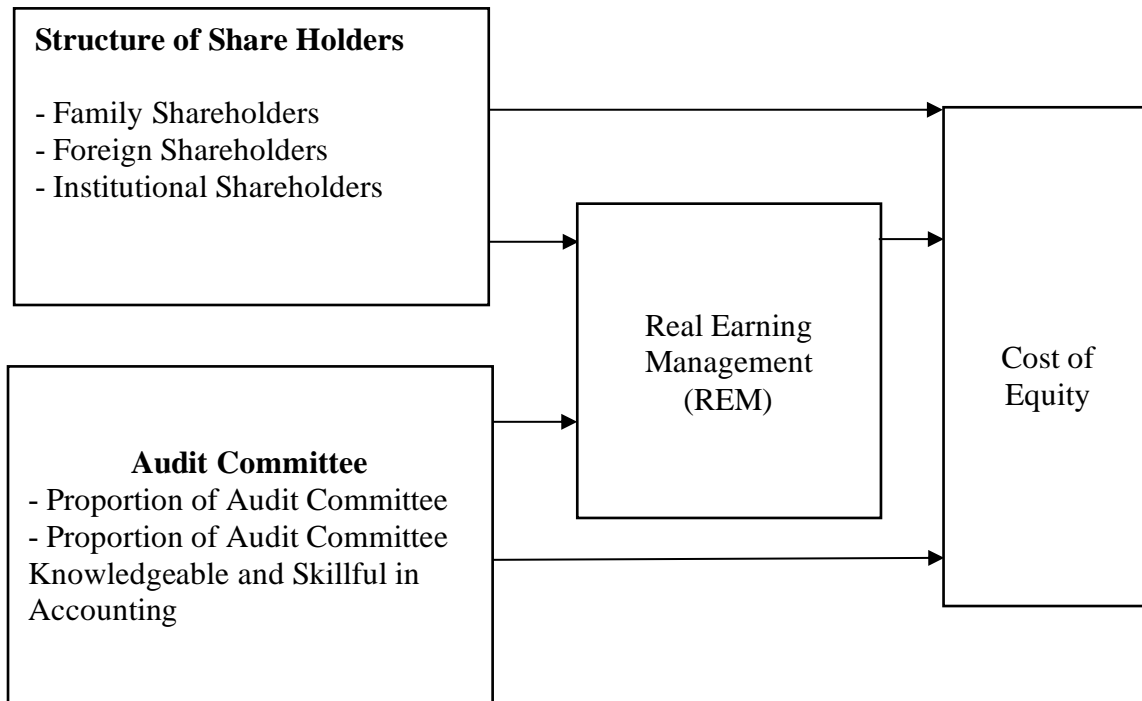


**Figure 1:** Conceptual Framework

## Research Methodology

### Population and Samples

The population for this study consisted of 180 companies registered at the MAI stock market during 2016 – 2020 (Stock Market of Thailand, 2021). The research samples were 62 companies (310 firm year) selected based on the criteria excluding financial industry companies, the companies to be revoked, the companies on restoration, service industrial company groups, and the companies with incomplete data.

### Research Instruments

This quantitative research was constructed and developed based on the conceptual framework derived from the collection of secondary data, related studies and literature reviews, data analysis using inferential statistics and influence analysis using path analysis by AMOS program.

**Data Collection**

The data for the study were collected from the secondary sources, namely: annual data forms (56-1), annual and financial reports in the website of the Stock Exchange of Thailand (www.or.th), website of the Office of Governance Committee and Stock Market (www.sec.or.th) and the website of SETSMERT (SET Marketing Analysis and Reporting Tool).

**Assessment of Research Variables**

In this study the dependent variables were the cost of equity in the model form of computation using Capital Asset Pricing Model: CAPM.

$$K_e = R_f + \beta_i(R_m - R_f)$$

Where $K_e$ refers to the cost of equity; $R_f$ is the risk free rate; $R_m$ is rate of return on the market portfolio, and $\beta_i$ is the beta of the security.

The intermediate variables that linked and relayed the influence of causal factors at the origin to the destination were the real earning management using the form of Roychowdhury (2006) which assessed the real earning management through three equations, namely: estimation of abnormal cash flow from operations, estimation of abnormal discretionary expenses, estimation of abnormal production costs, and the variable affecting the real earning management.

Estimation of abnormal cash flow from operations:

$$CFO_t/A_{t-1} = \alpha_0 + \alpha_1 (1/A_{t-1}) + \beta_1 (S_t/A_{t-1}) + \beta_2 (\Delta S_t/A_{t-1}) + \varepsilon_t \qquad (1)$$

Where $CFO_t$ is the cash flows from operations at the period t; $A_{t-1}$ is the total assets at the end of the period t-1; $S_t$ is the annual sale of the period t; $\Delta S_t$ is the change in the sales relative to the prior period.

Estimation of abnormal discretionary expenses:

$$DISEXP_t / A_{t-1} = \alpha_0 + \alpha_1 (1/A_{t-1}) + \beta_1 (S_{t-1}/A_{t-1}) + \varepsilon_t \qquad (2)$$

Where $DISEXP_t$ is the total discretionary expenditures during the period t; $S_{t-1}$ is the annual sale of the period t-1.

Estimation of abnormal production costs:

$$PROD_t/A_{t-1} = \alpha_0 + \alpha_1 (1/A_{t-1}) + \beta_1 (S_t/A_{t-1}) + \beta_2 (\Delta S_t/A_{t-1}) + \beta_3 (\Delta S_{t-1}/A_{t-1}) + \varepsilon_t \qquad (3)$$

Where $PROD_t$ is the sum of the cost of goods sold and changes in inventory during the year.

According to Ferentinou and Anagnostopoulou (2016), REM measurements can be calculated as one combined measure by multiplying abnormal CFO and DISX values by -1 and adding the abnormal PROD to one equation.

$$REM = ABCFO(-1) + ABDISX(-1) + ABPROD$$

Where REM is the real earning management; ABCFO is the abnormal cash flows from operations; ABDISX is the abnormal discretionary expenses; ABPROD is the abnormal production costs.

The governance structure consisted of structure of the shareholders being the proportion of family shareholders, proportion of foreign shareholders, proportion of institutions, and the audit committee. What to be assessed was the proportion between the audit committee and the proportion of the audit committee having knowledge and skills on finance and accounting.

## Research Findings

1. An analysis of correlation coefficient (Pearson correlation) in order to find the relationship of the independent variables, namely: the relationship of the family shareholders, foreign shareholders, institutional shareholders, and the audit committee considering the number of the audit committee and the number of the audit committee having knowledge and skills on finance and accounting, it was found that the relationship was not more than the set criterion of 0.65 as recommended by Burns and Grove (1993), causing no multicollinearity problem, thus being able to test the research hypothesis by an analysis of structure equation in the next stage.

2. Result of Structural Equation Modeling Analysis on the Assumption

The result of an analysis of the correlation coefficient on the causal relationship using over identified model based on the literature review and related studies, it was found from the beginning of the model on real earning management, governance structure and the cost of equity that it was not appropriate, not being in line with the set criteria, making the model of the study inconsistent with the empirical data. Therefore, a model consistent with the empirical data had to be developed. The result of which was in Figure 2 and the original empirical model was consistent with the theory and passed the evaluation criteria of the model as in Table 1.
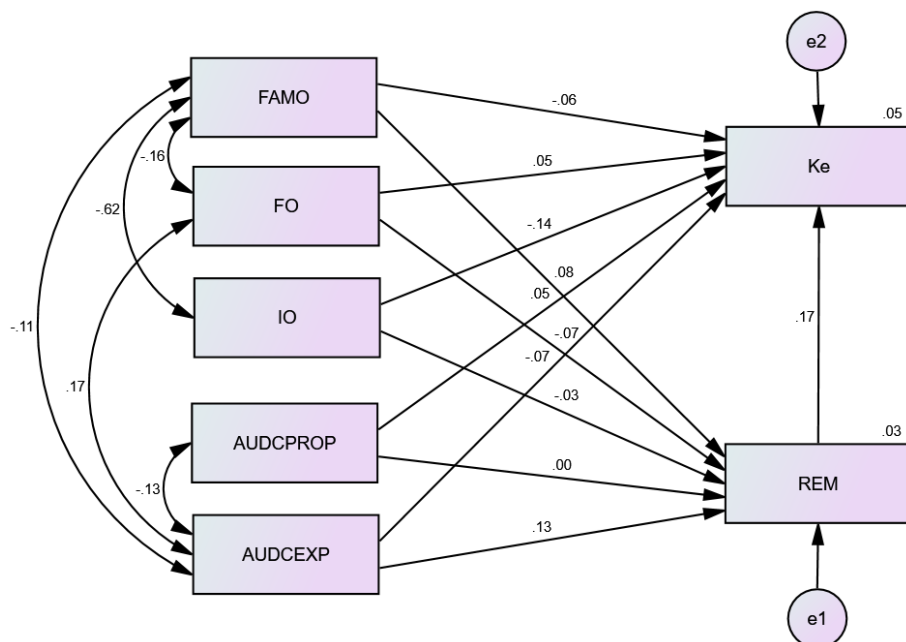


**Figure 2:** An Analysis Model Using Path Analysis after Adjusting

| | |
|---|---|
| FAMO | = Proportion of family shareholders |
| FO | = Proportion of foreign shareholders |
| IO | = Proportion of institutions shareholders |
| AUDCPROP | = Proportion of audit committee |
| AUDCEXP | = Proportion of the audit committee having knowledge and skills on finance and accounting |
| REM | = Real earnings management |
| Ke | = Cost of equity in the model form of computation using Capital Asset Pricing Model: CAPM |

**Table 1** Criteria and Result of Consistency by Theory and Empirical Data

| Indicator | Model Fit | Research Result | Judgement |
|---|---|---|---|
| P – Value | P > 0.05 | 0.348 | Consistent / Passed |
| $x^2$/df | < 2 | 1.119 | Consistent / Passed |
| GFI | > 0.95 | 0.995 | Consistent / Passed |
| AGFI | > 0.95 | 0.971 | Consistent / Passed |
| RMSEA | < 0.05 | 0.020 | Consistent / Passed |
| HOELTER | > 200 | 612 | Consistent / Passed |

After adjusting the model of relationship structure of the variables, it was found that there was good relationship between the variables. Therefore, the relationship model was used to find direct effect: DE, indirect effect: IE, and total effect: TE as in Table 2.

**Table 2** Direct effect, Indirect effect, and Total effect

| Predictor Variable | Dependent Variables | | | | | |
|---|---|---|---|---|---|---|
| | Ke | | | REM | | |
| | DE | IE | TE | DE | IE | TE |
| FAMO | -0.063 | 0.011 | -0.052 | 0.065 | - | 0.065 |
| FO | 0.053 | -0.012 | 0.041 | -0.071 | - | -0.071 |
| IO | -0.143* | -0.005 | -0.148 | -0.031 | - | -0.031 |
| AUDCPROP | -0.016 | -0.018 | -0.033 | -0.106 | - | -0.106 |
| AUDCEXP | 0.079 | -0.022 | 0.057 | -0.133* | - | -0.133 |
| REM | 0.168* | | 0.168* | | | |

  * Significant at level .05

From Table 2 above, considering the direct influence of the real earning management, governance structure consisting of the structure of family shareholders, foreign shareholders, institutional shareholders, and the audit committee assessing the proportion of the audit committee and the proportion of the audit committee having knowledge and skills on finance and accounting, it was found that the institutional shareholders had direct influence in an opposite direction towards the cost of equity equal 0.143. However, the real earning management had influence towards the cost of equity equal 0.168 with statistical significance at level .05. But the audit committee having knowledge and skills on finance and accounting had influence towards the real earning management in an opposite direction equal 0.133 with statistical significance at level .05.

## Discussion/Conclusion

The study of the real earning management, governance structures, and the cost of equity of companies listed on the Market for Alternative Investment (MAI) found that:

To investigate the influence of the governance structure towards the cost of equity

1.The study on the influence of governance structure on the cost of equity capital found that the governance structure, particularly in terms of institutional shareholder composition with a higher proportion, significantly and inversely affects the cost of equity. This aligns with Hayat et al. (2018)'s research, which observed that companies in China with a higher proportion of institutional shareholder are associated with lower cost of equity. This could be because institutional shareholders prioritize investment, governance, and value creation, leading investors to perceive lower risk and thus require a lower return on investment.

2. A study on the influence of governance structure on real earning management found that the governance structure, particularly the composition of the audit committee in terms of the proportion of the audit committee having knowledge and expertise on finance and accounting, significantly and inversely affects real earning management. This finding aligns with Marra, Mazzola, and Prencipe (2011), who observed a negative relationship between the financial and accounting expertise of the audit committee and real earning management. It suggests that companies with audit committees possessing financial and accounting expertise tend to have lower levels of real earning management. This underscores the importance of having audit committee members with financial and accounting skills to reduce real earning management, in line with the recommendations of the Securities and Exchange Commission that companies should have at least one audit committee member with expertise in finance and accounting.

3. A study on the impact of real earning management on the cost of equity found that real earning management significantly and positively influences the cost of equity. This aligns with the research by Francis et al. (2004), Gray, Koh, and Tong (2009), and Aboody, Hughes, and Liu (2005), which reported that accruals earnings management increases the cost of equity. Similarly, Kim and Sohn (2013) studied the positive relationship between real earning management and the cost of equity. Furthermore, Surifah, Ifah Rofiqoh, and Krismiaji (2019) examined companies listed on the Indonesian Stock Exchange and found that real earning management impacts the cost of equity. This suggests that real earnings management by executives leads to a higher cost of equity. This might be because investors perceive companies that earnings management as having financial reports that do not reflect their actual operational performance, leading to higher investment risk and thus requiring higher expected returns (cost of equity).

4. A study examining the influence of governance structure on the cost of equity through real earning management found that the governance structure, in terms of shareholder composition with a significant institutional shareholder proportion, directly impacts the cost of equity significantly but does not significantly directly influence real earning management. Analyzing the causal relationship path of institutional shareholder composition on the cost of equity through real earning management reveals an increased total effect. In contrast, the governance structure relating to the audit committee, particularly the proportion of audit committee having knowledge and expertise on finance and accounting, significantly impacts real earning management but does not have a significant direct effect on the cost of equity. When analyzing the causal relationship path of audit committee having knowledge and expertise on finance and accounting on the cost of equity through real earning management, the total effect decreases. This indicates that companies with both institutional shareholder

structures and audit committee having knowledge and expertise on finance and accounting tend to have reduced real earning management. As real earning management decreases, the cost of equity also reduces, likely because all stakeholders have increased trust in the company and perceive it as less risky, thus requiring a lower return to compensate for the reduced risk.

## Suggestion

Suggestions for future research are as follows:

1. Future research should include additional variables that influence real earning management. These could include factors such as effective corporate governance, the type of audit firm, audit fees, and issues related to real earning management in relation to the operational performance of businesses, represented by financial ratios.

2. This study focused solely on companies listed on the Market for Alternative Investment (MAI). Therefore, future studies should expand the sample to include companies listed on the Stock Exchange of Thailand (SET), which are larger, have diverse investment forms, and a variety of shareholder structures.

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# The Impact of Online Word-of-Mouth
# from Multi-Platform on Product Sales

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## Abstract

This Article aimed to study 1. the comprehensive impact of various dimensions of online word-of-mouth (WoM) from a single e-commerce platform on product sales. 2. the impact of integrating social media platforms' online WoM on product sales. 3. the most important online WoM factors that affect product sales. The number of comments and picture reviews, the star rating of fourteen skin care products from the JD e-commerce platform, and the number of comments from the third-party social media platform Xiaohongshu are selected as the dimension of online WoM. 20578 valid samples of WoM from JD and Xiaohongshu are captured by crawler programs. The sample data is processed and analyzed by SPSS. The research results were found as follows:

1. The number of comments and image reviews from the JD e-commerce platform significantly impacts product sales. This means that consumers are more inclined to choose products with a large number of comments and image reviews when purchasing skincare products online. High-quality product image reviews are intuitive and persuasive, provide more detailed product information, give consumers a more authentic understanding of the product, and are crucial for attracting more potential consumers' attention and trust.

2. The JD star rating has no significant impact on product sales. Because all the products have relatively high average rating scores which leads consumers to overlook the small difference in ratings among products.

3. The number of comments from the third-party social media platform Xiaohongshu significantly impacts product sales. This means that consumers like to search for products across different platforms to understand the products comprehensively. More comments mean that the products have gained recognition from purchased consumers which will attract and stimulate more potential consumers to make purchasing decisions.

**Keywords:** online word-of-mouth; product sales; social media platforms; e-commerce platform

## Introduction

With the increasing improvement of basic internet resources, people's activities have become more inclined or even dependent on the internet. According to the 51st "Statistical Report on the Development of China's Internet" released by the China Internet Network Information Center (CNNIC), by the end of December 2022, The number of online shopping users in China has reached 845 million, accounting for 79.2% of the total number of netizens. (CNNIC, 2023). Therefore, the online shopping model has become a purchasing method with long-term development potential. With the large-scale application of massive intelligent internet devices and applications, consumers can easily comment on purchased products or services in the online shopping platform or the third platform after online shopping which forms online word-of-mouth(WoM). Online WoM is a new form of WoM compared with traditional WoM and has gradually become an important factor affecting consumer purchasing behavior. So it has attracted the attention of many scholars (Xiaoqian & Yuemei, 2021). According to research (Leeflang et al., 2014), 90% of consumers will read online comments before purchasing a product and read at least 4 comments, meanwhile, 67% of consumers are influenced by user-generated content (i.e., material uploaded by users on social media) to make purchase decision. It can be seen that online WoM, as an important component of internet information, has a crucial impact on consumers' purchasing intentions and behavior.

Hu Yaqi used a stepwise regression method to explore the impact of online comments on agricultural product sales based on the Taobao e-commerce platform. The results indicate that the number of comments and visual reviews significantly promotes agricultural product sales, while the number of negative reviews significantly reduces product sales, and the length of reviews has no significant impact on product sales (Hu & Lin, 2021). Lakshman, D. found that both numerical and textual comments have a positive impact on sales performance. So online comments have a positive impact on overall sales performance (Lakshman, 2021). With the popularization and application of social software, in addition to shopping websites, social media platforms have also become important channels for consumers to share purchased products and experiences. From social media platforms, potential consumers can easily obtain comments about product attributes and service quality that are important for experiential products which give consumers a comprehensive understanding and judgment only after being purchased and experienced by consumers. Consumers prefer to read a large number of WoM about products from multiple platforms before making purchase decisions about whether to purchase the corresponding products and services. Research has shown that online WoM is an important source of quality information for experiential products before sale (Liao & Huang, 2016). In the field of experiential products, customers tend to trust WoM information on third-party platforms. The usefulness of third-party platforms perceived by consumers is higher than that of sellers' platforms, and there is a significant difference (Li & Ren, 2015). Therefore, this paper focuses on not only the influence of online WOM factors on product sales from a single e-commerce platform but also on integrating online WOM from a third social media platform.

In addition, with the improvement of people's consumption level and the emphasis on appearance, women are more inclined to choose suitable skincare products for skin care by online shopping. Based on this background, this paper selects typical experiential products (facial essence in skincare products) as the research object, uses crawler programs to obtain online WoM data of skincare products from e-commerce platforms and social media platforms, makes a multi-dimensional analysis of online WoM, analyzes and evaluates the impact of online WoM factors on the sales of skincare products.

## Objective

1. To study the comprehensive impact of various dimensions of online WoM on a single e-commerce platform.

2. To research the impact of integrating social media platforms' online WoM on product sales.

3. To study and identify the most important online WoM factor that affects product sales.

## Literature Review

### Social Marketing

Social media or social media (social media) refers to electronic media. It is a medium that allows the general public to participate in creating and exchanging various opinions via the Internet. These media are owned by companies that provide services through their websites such as Facebook, High-Five, Twitter, etc. states that social media is a technology. Computers facilitate the sharing of ideas and information through the creation of virtual networks and communities. Social media works on the Internet and allows users to quickly communicate electronic content including personal information, videos, and photos. Users engage with social media through tablets or smart computers. smartphone via software or web application The purpose of social media marketing is to showcase your business on social media and use it as a way to communicate your message to potential consumers. The main goal of social media marketing is to: promote companies and individuals can find many other benefits from social media marketing (eMarketing Institute, 2018).

### Types of social media

Modern social media can be divided into nine categories, each with its characteristics depending on who is expected to use it (SEOPressor, 2021).

1. Social networks (Social media) are social media where you can connect with people with similar interests and backgrounds. The Yodnikhom social networks include Facebook, Twitter, and Instagram. They are considered platforms that allow you to connect with friends, family, or those interested in various brands. This social network allows the sharing of ideas. Upload photos and videos and join groups of interest.

2. Bookmarking sites are web-based services for Internet users. By sharing bookmarks on a provider's website to collect, store, categorize, search, and especially share the website or its content with interested others. A great feature is that users can "tag" likes. link, which makes searching easier, and share them regularly with their followers, such as Pinterest, Flipboard, Diggs, StumbleUpon, etc.

3. Social News is a newsgroup website that allows users to post news links and more to external articles. News and website content are submitted by users and promoted to the homepage through a user-voted ranking system. The one with the most votes will be displayed, for example, Reddit, Digg, and Current TV.

4. Media Sharing is a website that allows users to share various types of media, divided into two types: Image sharing and video hosting websites You can upload photos, data files, and songs to share with members. With the ability to create a profile and the option to comment on photos or videos uploaded, the platform allows anyone to create, curate, and share their creativity. Can chat with YouTube, Vimeo, 4shared, Flickr, Pinterest, etc.

5. Microblogging (Microblogging) A blog is a website that has a content format similar to an online diary, with a comments section and links to other related websites. Microblogging

is the posting of short-written messages. This may include links to websites, products, or services, including Twitter, and Facebook.

6. Blog comments and forums are websites that allow users to participate in discussions by posting and sending messages. Commenting on blogs will be more or less according to the response. Google has a popular blogging website, Blogger. For forums, there are many forms, such as sports forums, games forums, health forums, and various knowledge that arises from. The members come to exchange knowledge. Most of them are in the form of asking questions and answering questions, which if it is interesting, will continue to gain followers. An e-forum community with many Thai users, such as the Pantip website (www.pantip. com) that is often called Pantip Cafe

7. Social review sites or social media review sites such as TripAdvisor, Yelp, and FourSquare, for example, searching for new products or new restaurants. The user will go to the review. Review sites like TripAdvisor show reviews of communities, places, and experiences that can help you make informed decisions. Businesses can use it to understand customer perspectives, both good and bad, to improve.

8. Community Blogs, including Tumblr, and Medium, are blogs that give the community a space to express their opinions and their voices on stories shared on the platform.

9. Sharing Economy Networks include Airbnb, Pantheon, and Kickstarter. This network is for sharing things users want, such as searching for accommodations or various activities.

**Conceptual Framework**

The research models on online WoM vary due to different research perspectives and variables. From a research perspective, some scholars conducted research on the impact of the perceived usefulness of online comments, while others focused on the influencing factors of consumer purchase decisions. In this study, we mainly focus on product sales, namely how online WoM affects product sales. This study divides the collected data indicators into product indicators and online WoM indicators based on different attributes. Then, according to research needs and actual situations, product sales are used as the dependent variable, and online WoM indicators are used as independent variables to study the moderating effect of online comments from cross platforms on product sales. Based on the selected variables, the theoretical model is determined as shown in the figure1:

**Independent Variables**                                   **Dependent Variables**

| **The Impact of Online Word-of-Mouth from Multi-Platform on Product Sales**<br>-Online Word-of Mouth<br>-Purchase Intention | ⇨ | Purchasing Sales Products<br>Providing Product Information<br>Sharing Consumer Experiences |
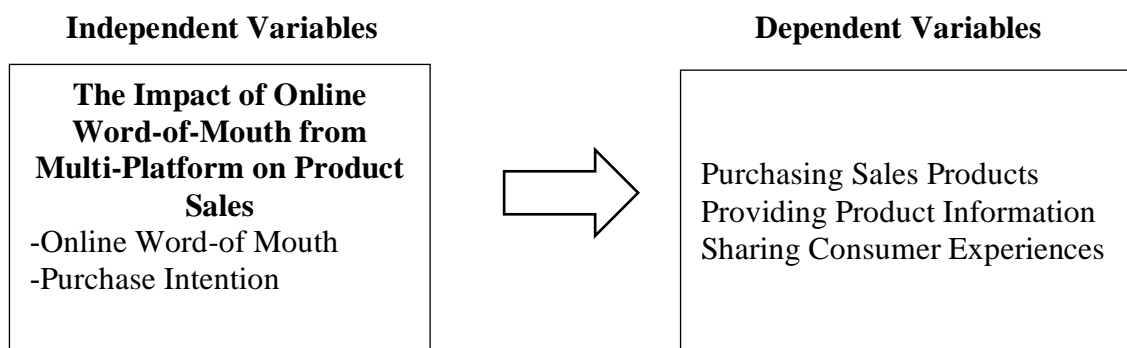
**Figure 1 :** Conceptual Framework

From Figure 1 the researcher has investigated and analyzed learning using cloud-based in U-Learning environment to develop or synthesize as a learning model. Then the learning model is evaluated for appropriateness before using for learning management in order to compare the learning achievement before and after teaching.

**Research Hypothesis**
1. Influence of single e-commerce platform online WoM on product sales.
H1a: The more the number of comments in the e-commerce platform comments, the greater the impact on product sales, and it is a positive relationship.
H1b: The more image comments in the e-commerce platform reviews, the greater the impact on product sales, and it is a positive relationship.
H1c: The more star ratings in e-commerce platform reviews, the greater the impact on product sales, and it is a positive relationship.
2. Influence of integrating social media platform online WoM on product sales.
H2a: The higher the number of comments on social media platforms, the greater the impact on product sales, and it is a positive relationship.

## Research Methodology

1. Research design
1) Review the existing literature and research status both domestically and internationally.
This study reviews existing literature from three aspects: the usefulness of online WoM, the impact of online WoM on consumer decision-making, and the impact of online WoM on product sales.
2) Build a multi-dimensional WoM model.
Based on existing literature research, this study identifies the independent variables included in the research model, learns the quantification methods of each variable, and ultimately constructs a research model and proposes research hypotheses.
3) Extracting WoM information.
Firstly, select appropriate data sources. Then, develop a crawl in Python to get the data required for this study. Finally, process the data and get the sample data.
4) Empirical analysis to conclude.
The sample data is input into the model for analysis using SPSS software. After statistical analysis, the proposed hypothesis in the previous section is verified to be true or false, and the final empirical conclusion is drawn.
5) Suggestions and Prospects
Based on empirical research conclusions, this study provides opinions on the product online WoM management and consumer purchasing decision-making and presents future research directions.

2. Population and Sample

  1) This paper mainly focuses on experiential products (facial essence in skin care products).

  2) The selected sample data (online WoM) mainly comes from JD Mall product comments and Xiaohongshu notes.



**Figure 2:** JD Mall Online Comments



**Figure 3:** Referring and sharing experiences on the Xiaohongshu platform

3. Research Instruments

This study will adopt a quantitative research method. Develop a data crawler program in Python to capture data related to essence products from JD and Xiaohongshu, and save the collected information to a local folder. Develop a data processing program in Python to process and analyze the collected data, and then use SPSS to perform statistical analysis on the sample data.

4. Data Collection

This paper uses web crawler technology to obtain JD e-commerce website data and third-party platform Xiaohongshu comment data, and the crawler program is mainly developed in Python. This study selects 14 skincare products and obtains the relevant data from daily comments on the self-operated platform of JD and Xiaohongshu. The specific time of the samples is from June 26, 2023 - July 25, 2023. After the original data is captured, the existing data is processed, and invalid samples are eliminated. In the end, a total of 20,578 samples of valid comment data were obtained, including 10,433 samples from JD and 10,145 samples from Xiaohongshu. For the sake of research rigor and data reliability, daily product sales and online WoM data are collected for facial essence products of each brand. The final structured data content is: comment ID, product title, total number of comments, and number of image reviews, star rating from JD and comment time, note title from Xiaohongshu.

5. Data Analysis:

(1) Variable design. 1)Dependent variable: product sales. 2) Independent variable: The independent variables in this study mainly include the number of comments, star ratings, and images from JD e-commerce platform-related products, as well as the number of comments on Xiaohongshu platforms.

(2) Descriptive statistical analysis. Using statistical software SPSS for analysis.

(3) Correlation analysis. Use the Pearson correlation analysis matrix to preliminarily test whether there is a correlation between each independent variable and between the independent variable and the dependent variable. We can analyze which variables are significantly correlated with sales from the results of correlation analysis.

(4) Hypothesis test. Regression model construction and hypothesis test results.

$$sales = w_1 x_1 + w_2 x_2 + w_3 x_3 + w_4 x_4 + b$$

Among them: sales represent product sales, W is the index weight, x is the value of each independent variable, and b is an offset constant.

## Research Finding

1. Influence of single JD e-commerce platform online WoM on product sales.

1) Descriptive Statistical Analysis Results

**Table 1** Descriptive Statistics Analysis on JD

|  | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Num of JD's Comments | 420 | 1.00 | 149.00 | 26.2959 | 23.08164 |
| Num of JD's Image | 420 | 0.00 | 116.00 | 21.0136 | 22.01581 |
| Star rating of JD | 420 | 3.67 | 5.00 | 4.8946 | 0.17118 |
| Sales volume of products | 420 | 25.00 | 330.00 | 138.5986 | 80.00129 |
| Valid N (listwise) | 420 |  |  |  |  |

The descriptive statistical analysis results show that on the JD platform, there is a certain degree of difference in the total number of product comments and image comments. Some products have received relatively more user discussions, while others have fewer comments. Most products have achieved high star ratings on the JD platform.

2) Correlation Analysis Results

**Table 2** Correlation analysis on JD

| | | Num of JD's Comments | Num of JD's Image | Star rating of JD | Sales volume of products |
|---|---|---|---|---|---|
| Sales volume of products | Pearson Correlation | .831** | .790** | -0.007 | 1 |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.910 | |
| | N | 420 | 420 | 420 | 420 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | | |

After conducting Pearson correlation analysis, there is a significant correlation ($P<0.05$) between the number of comments on JD, the number of image reviews, and sales. There is no significant correlation between star rating and sales volume ($P>0.05$).

3) Regressive Analysis Results

**Table 3** Model goodness of fit on JD

| Model | R | $R^2$ | Adjusted $R^2$ | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .838a | 0.703 | 0.700 | 43.84348 |
| a. Predictors: (Constant), Star rating of JD, Num of JD's Image, Num of JD's Comments | | | | |
| b. Dependent Variable: Sales volume of products | | | | |

From the results in the above table, the following conclusion can be drawn: $R^2$ (Coefficient of determination) = 0.7, which means that the fitting degree of the model is 70%. The independent variables of the model (number of comments, number of image reviews, star rating) relatively well explain the changes in product sales.

**Table 4** Analysis of variance on JD

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 1317807.863 | 3 | 439269.288 | 228.518 | .000b |
| | Residual | 557452.776 | 419 | 1922.251 | | |
| | Total | 1875260.639 | 416 | | | |
| a. Dependent Variable: Sales volume of products | | | | | | |
| b. Predictors: (Constant), Star rating of JD, Num of JD's Image, Num of JD's Comments | | | | | | |

From the significance test results in the table above, it can be seen that the F-value of the significance test is 228.518, and the significance level (Sig.) P=0<0.05, indicates that the entire regression model is highly significant overall.

**Table 5** Regression coefficients on JD

| Model | | Unstandardized | Coefficients | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | -2.913 | 74.908 | | -0.039 | 0.969 | | |
| | Num of JD's Comments | 2.172 | 0.249 | 0.627 | 8.739 | 0.000 | 0.199 | 5.018 |
| | Num of JD's Image | 0.839 | 0.260 | 0.231 | 3.226 | 0.001 | 0.200 | 4.999 |
| | Star rating of JD | 13.639 | 15.232 | 0.029 | 0.895 | 0.371 | 0.965 | 1.036 |
| a. Dependent Variable: Sales volume of products | | | | | | | | |

From the T-test results, it can be seen that the number of comments and image comments has a significant impact on sales (P<0.05), and the regression coefficients are both positive, indicating a significant positive impact on sales. The regression coefficient of the number of comments is greater than the number of image comments, indicating that the number of comments has a greater impact. Star rating has no significant impact on sales (P>0.05). The maximum value of the variance inflation factor (VIF) for each variable is 5.0, which is much less than 10, indicating that there is no collinearity problem between the independent variables.

2. Influence of Integrating Social Media Platform(Xiaohongshu) online word of mouth on Product Sales.

1) Descriptive Statistical Analysis Results

**Table 6** Descriptive Statistics Analysis on Xiaohongshu（XHS）

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Num of JD's Comments | 420 | 1.00 | 149.00 | 26.2959 | 23.08164 |
| Num of JD's Image | 420 | 0.00 | 116.00 | 21.0136 | 22.01581 |
| Star rating of JD | 420 | 3.67 | 5.00 | 4.8946 | 0.17118 |
| Num of XHS's Comments | 420 | 1.00 | 107.00 | 23.5034 | 17.63427 |
| Sales volume of products | 420 | 25.00 | 330.00 | 138.5986 | 80.00129 |
| Valid N (listwise) | 420 | | | | |

The results of the descriptive statistical analyses show that there is a significant difference in the level of discussion about the products covered by Xiaohongshu. This wide range of distribution may reflect the differences in popularity and attention of different products among users. As a social media platform, Xiaohongshu may be influential in brand communication and product promotion.

2) Correlation Analysis Results

**Table 7** Correlation analysis Integrating  XHS

| | | Num of JD's Comments | Num of JD's Image | Star rating of JD | Num of XHS's Comments | Sales volume of products |
|---|---|---|---|---|---|---|
| Sales volume of products | Pearson Correlation | .831** | .790** | -0.007 | .129* | 1 |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.910 | 0.026 | |
| | N | 420 | 420 | 420 | 420 | 420 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | | | |
| *. Correlation is significant at the 0.05 level (2-tailed). | | | | | | |

After conducting Pearson correlation analysis, it was found that there was a significant correlation (P<0.05) between the number of comments on JD, the number of image comments, the number of comments on Xiaohongshu, and sales volume, while there was no significant correlation (P>0.05) between star rating and sales volume.

3) Regressive Analysis Results

**Table 8** Model goodness of fit Integrating XHS

| Model | R | $R^2$ | Adjusted $R^2$ | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .858a | 0.736 | 0.733 | 41.37400 |
| a. Predictors: (Constant), Num of XHS's Comments, Star rating of JD, Num of JD's Image, Num of JD's Comments | | | | |
| b. Dependent Variable: Sales volume of products | | | | |

From the results in the table above, it can be concluded that after integrating data from the social media platform Xiaohongshu, the $R^2$ increased, with $R^2$ (Coefficient of determination) = 0.73, indicating that the independent variables of the model (number of comments, number of image comments, star rating, and Xiaohongshu comments) relatively well explained the changes in product sales. The increase in R2 means that the model has stronger explanatory power for product sales.

**Table 9** Analysis of variance Integrating XHS

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 1380548.242 | 4 | 345137.060 | 201.621 | .000b |
| | Residual | 494712.397 | 415 | 1711.808 | | |
| | Total | 1875260.639 | 419 | | | |
| a. Dependent Variable: Sales volume of products | | | | | | |
| b. Predictors: (Constant), Num of XHS's Comments, Star rating of JD, Num of JD's Image, Num of JD's Comments | | | | | | |

In the regression model incorporating comments from Xiaohongshu, the F-value of the overall significance test was 201.621, and the significance level (Sig.) P=0<0.05. This means that the entire regression model is highly significant overall and can effectively explain product sales.

**Table 10** Regression coefficients Integrating XHS

| Model | | Unstandardized | Coefficients | Standardized Coefficients | t | Sig. | Collinearity | Statistics |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | -40.975 | 70.968 | | -0.577 | 0.564 | | |
| | Num of JD's Comments | 2.510 | 0.241 | 0.724 | 10.410 | 0.000 | 0.189 | 5.301 |
| | Num of JD's Image | 0.509 | 0.251 | 0.140 | 2.025 | 0.044 | 0.191 | 5.245 |
| | Star rating of JD | 16.922 | 14.384 | 0.036 | 1.176 | 0.240 | 0.964 | 1.038 |
| | Num of XHS's Comments | 0.853 | 0.141 | 0.188 | 6.054 | 0.000 | 0.946 | 1.057 |
| a. Dependent Variable: Sales volume of products | | | | | | | | |

From the T-test results, it can be seen that in the regression model incorporating the number of comments on Xiaohongshu, the number of comments on Xiaohongshu has a significant impact on sales (P<0.05), and the regression coefficient is positive, indicating that the number of comments has a significant positive impact on sales. The number of JD comments and JD image comments has a significant impact on sales (P<0.05), while star rating still has no significant impact on sales (p>0.05). The maximum value of the variance inflation factor (VIF) for each variable is 5.3<10, indicating that there is no collinearity problem between the independent variables.

After data organization and analysis, the 4 hypotheses proposed in the paper were validated. The results of hypothesis testing are listed in the table.

**Table 11** Hypothesis test results

| Serial Number | Research Hypotheses | Conclusions |
|---|---|---|
| H1a | The more comments in the e-commerce platform reviews, the greater the impact on product sales, and it is a positive relationship | valid |
| H1b | The more image comments in the e-commerce platform reviews, the greater the impact on product sales, and it is a positive relationship | valid |
| H1c | The more star ratings in e-commerce platform reviews, the greater the impact on product sales, and it is a positive relationship | invalid |
| H2a | The higher the number of comments on social media platforms, the greater the impact on product sales, and it is a positive relationship | valid |

Summary: When analyzing only a single e-commerce platform (JD), the more total comments and image reviews, the greater the positive impact on product sales, and the largest impact is on the total comments of the e-commerce platform (JD). When integrated into third-party social media platforms (xiaohongshu), an increase in the number of third-party platform comments will have a more significant positive impact on product sales.

## Conclusion

1. The comprehensive impact of various dimensions of online WoM on product sales from a single e-commerce platform.

The research results show that the number of comments and image reviews increase, product sales will increase, and there is a significant positive correlation between the JD e-commerce platform. This indicates that consumers show more interest in products with more comments and image reviews. The impact of star ratings on product sales is relatively small because high-star-rating products have already achieved consumers' satisfaction and trust.

2. Integrating the influence of social media platforms' online WoM on product sales.

Research has found a significant positive relationship between the number of comments on social media platforms and product sales. This indicates that more comments on social media can positively impact product sales. The widespread dissemination and user interaction on social media platforms make it easier for consumers to access the real user experience and evaluations of other purchased consumers, and this contributes to generating trust in products and further promoting purchase decisions by consumers.

3. The most important online WoM factor affects product sales.

Research has found that the number of comments is the most important influencing factor. There is a significant positive relationship between the increase in the number of comments and product sales, which further confirms that consumers are more inclined to consider products with more comments in their purchasing decisions. The number of comments represents the degree to which more consumers participate and pay attention, and also means that more consumers have purchased and evaluated the product.

## Discussions

1. About sample selection This study only selects 14 skincare products and 20578 valid samples are collected as sample data for regression analysis. While the product types on e-commerce platforms are diverse, analyzing more product types is our future research direction. Which corresponds to (Jia & Chen, 2021) How Does Word of Mouth from Different Components Systems Influence Product Sales differently The results showed that the review component and the Q&A component were significantly different in terms of quantity and completeness of content. The review component will be more complete and larger. And the Q&A section had little content and relatively small volume in comparison. Additionally, the OLS results indicated that topic consistency had a negative impact on product sales. While both maturity characteristics have a positive impact on product sales. And the completeness of the content of the Q&A element has a greater impact on sales than the review element

2. Relevant sample sources The e-commerce platform selected for this study is JD. Although JD is one of China's leading e-commerce platforms, its coverage cannot represent all e-commerce platforms. Different e-commerce platforms have unique user groups, product types, and characteristics. The selected social media platform is Xiaohongshu. Although it is a very popular social media platform, different social media platforms have different user groups, content characteristics, and communication methods. Therefore, the relationship between the number of product comments and sales needs to be further tested and verified on other e-commerce platforms and social media platforms which corresponds to (Huang & Zhe, 2022). Spanning 36 years, the evolution and trend of word-of-mouth marketing research–based on bibliometrix analysis. Word of mouth is an important factor that influences customers' purchasing decisions. Behavior and is an important basis for promoting products and improving business activities. The term viral marketing is a new type of marketing tool, which has a special communication mechanism and characteristics and is the main focus of business activity research. From extracting information from the scientific web This study used bibliometrix software to perform network econometric analysis on 259. Literature on word-of-mouth marketing over the past 36 years. Research on word-of-mouth marketing is divided into three phases, emphasizing the development of research topics and future development trends.

3. Accuracy of measurement The number of measurement variables used in this article is relatively less, which only represents part of the impact of WoM variables on product sales. We will extend online WoM variables to comprehensively evaluate the impact of WoM variables on product sales in our future study which corresponds to (Sattelberger, 2015). Optimising media marketing strategies in a multi-platform world: an inter-relational approach to pre-release social media communication and online searching This study reveals strong relationships both within and between platforms. This finding points to strong path dependency and an unexpectedly high level of interchangeability between different platforms with different users. It suggests that more streamlined procedures for monitoring social media could be developed. This may reduce effort and costs. Increasing access to samples This causes the number of likes and comments to lead to disproportionately low negative evaluations for movies. From these discoveries, A multi-platform marketing strategy should focus on fan pages and trailers as much as possible. From the findings in this article, Marketing strategies for art and film directors should be widely distributed. For blockbuster movies The online search process invariably precedes online user communication. It's important to provide information about a film before it's released to increase the likelihood that it will be indexed by online search engines. The methods of this article can be applied to other research areas

## Suggestions

From the research results, we can conclude that online WoM has a significant impact on product sales. It is recommended to adopt WoM marketing strategies, such as providing high-quality products and customer service to increase consumers' trust and satisfaction and promote consumers to give good online WoM. At the same time, brand exposure and awareness can also be increased through channels such as social media platforms. In the management of online WoM, we provide suggestions on these important factors:

1. Suggestions for the platform

1) E-commerce platforms: 1) Reduce attention to online star ratings, avoid blindly pursuing store star ratings, and focus more on other dimensions of online WoM.2) Encourage users to participate in online comments by setting up reward mechanisms; It can also stimulate consumers' purchasing desire and enthusiasm; After online shopping, guidance can be provided to encourage users to share their purchasing experience and product usage experience; The platform can encourage consumers to share their comments on social media, expand the influence of comments, and attract more users to participate in comments.3) Improve the reward mechanism for image reviews and stimulate consumers' enthusiasm for image reviews.

2) Social media platforms: 1) Improve the quality of promotional content. 2) Emphasize the significance of user sharing. 3) Create a sharing theme activity. 4) Provide incentive measures. 5) Follow and recommend high-quality sharing. 6) Provide skincare discussion areas.

2. Suggestions for consumers: Because skincare products are experiential products, it is difficult to understand skincare products before use. Therefore, it is recommended that consumers should have a comprehensive and accurate understanding of their own skin type and needs. Before purchasing a product, it is important to pay attention to the product online WoM from the e-commerce platform, such as the number of comments, image comments, etc. Consumers also read third-party platforms (such as social media platforms) online WoM to learn if this product is compatible with yourself.

3. Suggestions for enterprises: 1) Value and proactively respond to user feedback. 2) Focus on social media and online comments. 3) Win-win cooperation with the third media platform. 4) Purposive WoM marketing. 5) Strict monitoring and management of online comments. 6) Cultivate brand loyalty. 7) Highlight product features.

Overall, e-commerce platform sellers can actively seek cooperation with third-party social media platforms to enhance the visibility of positive WoM. By collaborating to maintain the reputation of their sales platform and third-party social media platforms, e-commerce platform sellers are expected to enhance consumers' perception and experience of their products, thereby promoting the growth of product sales. In today's fiercely competitive e-commerce environment, WoM management on e-commerce platforms and third-party social media platforms is the key to successful sales. Only by carefully planning and implementing WoM strategies, and actively collaborating with third-party social media, can e-commerce platform sellers achieve sales goals and increase market share.

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# Brand Building and Brand Communication Strategies for Banana Powder to Increase Competitiveness of Thakrapee Community Enterprise on Safe Agriculture, Suphan Buri Province

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## Abstract

The purposes of this research were to: 1. analyze the strategy of brand banana powder product, 2. prescribe brand building and brand communication for banana powder of Thakrapee community enterprise on safe agriculture, 3. communicate brand name of banana powder product of Thakrapee community enterprise on safe agriculture. The population and samples for the study were the entrepreneurs who produce/sell the banana powder, experts, academics and people having ulcer problems/Gastroesophageal Reflux Disease-GERD. It is a mixed study combining a qualitative with quantitative researches. The first one used a structural interview with content analysis but the latter used a questionnaire and the data were analyzed using descriptive statistics, namely percentage, mean, and standard deviation.

The findings of the study were as follows: on building brand banana powder, Win Garden analyzed customer groups, the competitors and brand banana. He was able to specify brand identity, brand positioning and brand value to link the identity, positioning and brand personality in order to lead to "Good Product, Clean and Safe Directly from the Garden to Customers". There was a decode of each word by using a colored letter and imagination for the design of brand communication through both online and offline appropriate for the target groups for the customers to know, desire and trial buy. When there is consumption, the customers receive the product value, a flow of words of mouth and brand royalty occurred to the product in the end.

**Keywords:** Brand Building, Brand Communication, Competitiveness

## Introduction

One of the important strategies to develop the country following the 20th year national strategy to achieve the vision "National Security, Prosperity, Sustainability, Developed by Sufficiency Economy" with the national goal "Secured Nation, Happy People, Continued Economic Development, Justice Society, Sustained National Resource Base" is to develop the level of competitiveness, economic development (Office of the National Economic and Social Development Council, 2017). The way to develop the country based on the National Economic and Social Development No.12 (2017-21021) Strategy 3 has been prescribed to build economic strength and sustainable competitiveness on building strength and sustainability to agriculture development, building and transferring body of knowledge, upgrading production of agricultural products and level of production ability on industry cycle, promote and accelerate agricultural ideas, and develop supportive factors on management of agricultural sectors and promote new agriculturalists. (Office of the National Economic and Social Development Council, 2016). Suphan Buri province is one of the provinces in the Central part of Thailand that realizes such significance, and therefore stipulated in the provincial development plan fiscal year 2018-2022 with the development aim to be "Sustainable Agriculture, strong economy, Good Life Quality and Happy Society" with important issues of development at the beginning, namely increasing capacity of agricultural product production to meet the standard for competitiveness and sustainable development. This can be seen from increasing marketing competiveness as a part for driving community economy, important base of the country.

Thakrapee community enterprise on safe agriculture is the target group in moving the work of the producers and sellers of community enterprises on safe agriculture which is a network of Young Smart Farmer, one of new groups of agriculturalists in Suphan Buri province. Their agricultural products are white bark bananas and *Mali Ong* in a close proportion (40 *rai*) is organically planted, without chemical substances, with 10% of the products is sold fresh and 90% processed into banana powder, dried bananas, and banana rolls. Banana powder in particular is produced and sold under the brand "Win Garden" having the people with problem on ulcer/pain and GERD as the target groups. From an interview it was found that the community enterprise had some problems not knowing that there was products on safe banana powder from Thakrapee for sale, and that some of the target group were not aware of the benefits of the banana powder. This leaded to a major research question on how to do brand building and brand communication for the target group to know and understand the value of band understand the value of brand which may bring about behaviors purchasing the banana powder of Thakrapee safe agriculture. The result of the research would lead to an increase of an income for members of the community enterprise at Thakrapee safe agriculture and would build strength within the network and spread to other community enterprises in Suphan Buri province, resulting in driving basic economy and elevate the income of agriculturalists and community enterprises in Suphan Buri province in the future.

## Objective

1.To analyze the strategy of brand banana powder product.

2.To prescribe brand building and brand communication for banana powder of Thakrapee community enterprise on safe agriculture.

3.To communicate brand name of banana powder product of  Thakrapee community enterprise on safe agriculture.

## Literature Review

The researcher has reviewed the related literature and studies on brand building and communicating brand as detailed in the followings.

Duane E. Knapp (2000) states that brand building should take into consideration five aspects, namely: 1) Differentiation, making a dominant brand that is different from competitors for the consumers' perception, 2) Relevance, linking the product brand with the consumers using   characters directly linked with the consumers, 3) Esteem, building the product brand accepted by the consumers, 4) Awareness, making an awareness and value of the brand for the consumers' perception, and 5) Mind's eye, making an impression with  the consumers.

Aaker (1996) states that building brand and communicating brand have three steps: Step 1 Analyzing brand strategy by 1) Consumer analysis, an investigation of favor and inspiration of consumers towards the product and there is no brand responds to that need, 2) Competitor analysis, an investigation of image and identity of competitor's brand, his weak and strong points,3) Self-analysis, an analysis of current image of the brand, what the brand accumulated, organization's weak points and strong points. Step 2 Building a brand identity systematically, namely: 1) building main identity and extended identity of the product which can be done in many ways by linking the brand with the benefit originated from the brand's function and benefit on emotion and feeling or linking the brand which is a person with a person's characteristics or linking the brand which is a symbol that can be seen (Aaker, 1991), 2) presentation of Value Proposition, 3) creating reliability to the product brand by linking with the organization, and 4) creating brand-customer relationship for the customer to recognize the brand  and have good attitude toward the brand which will help sell the product by linking the customer with the brand. The brand will be involved with the customer's daily life. Step 3 Creating brand identity implementation system, namely: 1) identify brand position by bringing part of the product identity and brand value to identify or make brand position by linking with purchasing or using the product in order to make the customer realize that the product position has advantage to the competitor, 2) brand communication refers to making perception among the target customers which has important steps, that is making them have brand awareness and brand recognition as well as the prescribed brand value, and transferring to the target customers' perception for their understanding, acceptation of good image and differences from the competitor's brand in their mind, 3)  Tracking by follow-up and evaluation of the brand is by mainly evaluating the brand position and other factors of the brand for future improvement of the brand, including finding other appropriate functional benefits for the customers in order to create deep and permanent relationship with the brand.

Naruemon Kimphakorn and Aek Bunjuea (2012) have stated that branding system has five important steps, namely: 1) Target Market Identification. This is identify customers' needs and thinking in various aspects towards the brand so that the brand maker can create product value and position to win the target customers' hearts, 2) Branding Design, identifying vision in making a clear brand, identifying the brand wishing to relay, conversing position of the brand

to the commitment for the target customers, including brand designing to build identity in line with its value and winning position of the brand, 3) Branding Communication. This is to plan, design and relay the brand itself to the target group to create an image consistent to the winning position of the brand in the heart of the target group, 4) Brand Measure and Evaluation. In order to reach success/failure of the established brand, the data received is important for improvement of brand building, and 5) Brand Growth. This is to plan to extend the brand by management of brand factors, adjusting the winning position and keeping the brand up to date all the time.

On building and communicating the brand, an instrument for marketing communication is very important. Siriwan Seriratana et al. (2019) states that integrated marketing communication-IMC is a coordinating strategy via appropriate selected instrument for giving information and organization image or products which bring about using various instruments to make consumers to have positive behaviors required by the marketers. Shimp (2010) explains that important characteristics of marketing communications is to affect behaviors, beginning from letting the customers to have expectation, use every form of evaluated communication whether they have potential to reach the target groups without sticking to a particular media such as organizing special activity, packaging, website, shop decoration, and giving services. Every kind of media has to present the data in the same direction and support one another to strengthen the brand. Therefore, choosing an instrument for marketing communication is important that characteristics of the product or service, appropriateness of situation, rhythm, opportunity, time, place, budget availability, behaviors and the target customers' needs and wants, economic environment, society, politics or relevant other aspects which may have impact have to be taken into consideration (Hatch & Schultz, 2001).

## Research Methodology

1. Investigate secondary data from books, documents, journals, and reports

2. Analyze the strategy of brand banana powder product Win Garden done so far, and analyze the competitors and consumers.

3. Make use of the results of an analysis as a guideline in prescribing the strategy for brand building and brand communication of banana powder Win Garden as suggested by entrepreneurs who produce/sell banana powder experts, and academics.

4. Develop instruments/media in building brand and communicate brand banana powder Win Garden.

5. Communicate brand banana powder Win Garden.

6. Evaluate effectiveness in brand communication of banana powder Win Garden.

7. Analyze the results of the study, make a study conclusion, and make a study report.

In this study the researcher used a mix method consisting of quantitative and qualitative researches as detailed below.

### Population and Samples

The population and samples in this study were divided into four groups.

1.The informants in group conversation being five members of the members of the community enterprise of Thakrapee safe agriculture, Suphan Buri province who are related to operation of banana powder Win Garden.

2.The informants who gave important information were 15 members of the entrepreneurs who produced/sold banana powder, experts, and academics purposively chosen for the study.

3.The consumers having ulcer problem or GERD that Thailand has ulcer problem 66% (Phrommee, 2020) helped prescribing the size of the samples purposively selected of 400 people based on Taro Yamane's Table (Yamane, 1973) using a questionnaire for collecting data from those having ulcer problems or GERD in Suphan Buri, Bangkok and surrounding areas.

4.The consumers of banana powder Win Garden based derived from interview on community enterprises  approximately 400 people using Taro Yamane's Table (1973) (N/1+Ne2; variance 0.05) to get 200 samples purposively selected using the data base of the customers of banana powder Win Garden.

**Research Instrument**
**Qualitative Research**
1.Focus group

The focus group was made with community enterprise of Thakrapee on safe agriculture, Suphan Buri province in order to analyze the marketing state and the previous brand strategy of community enterprise Thakrapee safe agriculture by means of focus group for exchanging the information in order to complete the study.

2.In-depth Interview

An in-depth interview conducted with the entrepreneurs who sold the banana powder products investigated the marketing, building brand identity, prescribing special characteristics of the products, value of the brand for experts, academics to study view point in brand building and communicating brand of banana powder Win Garden using structured interview.

**Quantitative Research**
1.Questionnaire

The questionnaire collecting data from the people having ulcer problem/ wound and those with GERD is a check list questionnaire on perception and behaviors of the people who purchased banana powder  as a guideline for brand building and communicating the brand of banana powder Win Garden.

2.Questionnaire

The questionnaire collecting data from the customers who have purchased the banana powder Win Garden in order to monitor and follow effectiveness of communicating brand banana powder Win Garden is a 5-level rating scale questionnaire on perception of communication of the banana powder Win Garden.

**Data Analysis**
Qualitative Research

1. The focus group made with community enterprise of Thakrapee safe agriculture, Suphan Buri province was to analyze the content for interpretation, and drawing main ideas for classification and making conclusion from the group conversation.

2. In-depth Interviews were conducted with the entrepreneurs who sold the  banana powder products, experts, academics, testing reliability of the data by choosing the data with reliable informants rather than reliable data, and using content analysis for interpretation, and drawing main ideas for data presentation in summary of various points.

Quantitative Research

The data collected by a check list questionnaire were checked and analyzed using package software and descriptive statistics to test perception and behaviors of purchasing the banana powder products Win Garden. The statistics used was percentage. The questionnaire evaluating the perception of communicating banana powder products Win Garden was a rating scale analyzed using statistics, namely, mean and standard deviation.

## Conclusion

**Objective 1 Analysis of Brand Strategy of Banana Powder showed the results on three sides, namely:**

1. An analysis of the strategy of brand banana powder Win Garden found that Brand Value of instant banana powder for drinking was safe and was a selective choice that had benefit for taking care of people having ulcer problem and GERD, including ones who were allergic to Gluten but able to consume the banana powder by brand communication but without clarity and continuation. The perception of the brand was within a limited circle. However, the community enterprise places its dominance on brand positioning by having "direct delivery from the garden to the consumers with good, clean and safe products" indicated in the product label, without other form of communication for the brand personality that may convince the consumers to think of the brand because it was not clearly specified.

2. An analysis of 400 consumers by investigating their perception and behaviors of purchasing the product of banana powder of the consumers having ulcer problems/GERD found that the majority of the respondents were female aged between 31-40 years old, holding a bachelor's degree, being private employees with an income of 20,000-40,000 baht per month. The result of the analysis on their perception of the banana powder product found that the respondents perceived the benefits of the banana powder on relieving ulcer symptom. The information that interested them in the banana powder product was the quality/benefit of the product, media/the channel that made them know the product was Facebook. The analysis of the behavior purchasing the banana powder product found that the brand name did not affect decision making to purchase the product, place of purchasing from Page, the store's Facebook, and online platform. The purchasing reason was based on the quality/benefits of the product and prices. The satisfaction after consuming the banana powder product found that the majority had satisfaction, wanted to repeat purchase and wanted to recommend other people.

3. An analysis of competitors by selecting five of those who are community enterprises producing/selling the banana powder products for comparison by collecting their data from documents, searching for the data through electronic media and from interviews. Based on the product, it was found that every brand had the same benefits of the banana powder, had four types of brand favor with different herbal favors added and with emphasis on safe raw materials (Win Garden has two favors, original and coco favor with emphasis on cleanliness and safety), and all the five brands are competitors with product standard (Win Garden is in the process). On price aspect, every brand has more or less the same prices; on selling channel, two brands are sold offline and five brands are sold online through online platform and Facebook Page (Win Garden has both channels but more on offline than online). The key message used for communicating the five brands was telling the benefits of the products, raw materials, production process, product standard, method of consuming, and review from customers (Win Garden has the same content except not mentioning the product standard).

**Objective 2 Prescribe the strategy of building brand and communicating brand of banana powder of Thakrapee community enterprise on safe agriculture.**

Based on an analysis of consumer group, analysis of competitors and analysis of brand banana powder Win Garden, Brand Identity, Brand Positioning and Brand Value could be prescribed in order to have Brand Design as detailed below.

Brand Identity: "Functional Identity" could create value including using safe raw materials from the community enterprise to produce banana powder with value and benefits to make Key Message for communicating sets of knowledge to various target groups showing benefits from the bananas".

Brand Positioning "As the product has the target group being Niche Market in the form of those who love health, take care of health, love the product from nature by considering the benefits and certification, reliability by using the dominant characters of the raw materials being safe bananas of the community enterprise to prescribe Brand Positioning".

Brand Value "Building Brand Value by considering from the Functional Identity that shows benefits to the body, being safe and not harmful to the body, creating confidence to the target groups who love health, take care of health, love products from nature, wish to see choices to solve health problem from the nature by communicating and linking with both Positioning and Personality for the consumers to know the value added, creating wants and needs and trying to purchase. On consuming, the consumers receive the value of the product, and create a word of mouth and Brand Royalty to the product in the end".

Based on the synthesis of Brand Identity, Brand Positioning and Brand Value, it could lead to Brand Design through Brand Canvas as a guideline for brand building and brand communication of the banana powder as follows.

1. The Story of Brand

1) The name is "Win Garden" based on the fact that Thakrapee community enterprise on safe agriculture wishes to name the brand which is interesting, easy to read, write and remember and that the word Win means 'victory' which is a good name, including the word banana garden. Therefore the word 'Garden' is used at the end.

2) The position statement of the brand wanted to be seen by groups of customers compared to the competitor is "being the product produced from safe raw materials for those having problems on digestive system" with the Key Message for communication.

3) The promise "directly delivered from the garden to the consumer with good, clean and safe product" is an important statement showing the commitment to deliver the products to the target group which Win Garden has emphasized in line with the product position in the customers' heart, particularly the benefits received from consuming the banana powder and building reliability of the product using natural quality raw materials.

4) The personality of the brand banana powder Win Garden was able to communicate with "the determined agriculturalists in using technology to produce good and safe product from the garden to the consumer" which shows the image of Thakrapee community enterprise on safe agriculture in the perspective of Young Smart Farmer by using new technology to develop the product for value added and giving importance to the consumers wanting good and safe product derived from the nature.

5) The overall image of the personas, the target group of the brand banana powder Win Garden is "Health lovers, taking care of health, love the product derived from nature", giving importance to self-health, and being interested in the product that helps solving daily-life problems and that comes from the nature and has production process and safe processing method as well as benefits.

6) An interesting presentation of the storyboard based on Brand Positioning, Personality, and the target group mentioned above, including the production process, processing, and delivery of the product to the consumers would be able communicate the story to draw the consumers' interest in the products in the form of "safe natural raw materials, having benefits, through production process and having good product and benefits delivered to the consumers in solving problems in the digestive system".

2. The Brand Symbols

1) The Logo of banana powder Win Garden emphasizes simple communication, attractive for recognition, using the word "Win" with a green tree above in order to refer to growth of agricultural produces.

2) The color palette of the brand banana powder Win Garden uses brown and green as a basis, with the green color to refer to nature, growth and being healthy while the brown color referring to simplicity, community and stability.

3) The typography of the brand banana powder Win Garden will use graphic line being handwriting which is clear and easy to read, using few words and easy to memorize.

4) The imagery for communicating brand banana powder Win Garden with the mood and tone which emphasize being natural and safe with the character of banana leaves, green trees, growth and good health.

3. The Strategy

1) Awareness, building awareness of the brand banana powder Win Garden uses various methods including building awareness online, product exhibition booths, and online communication like Facebook, Page and E-marketplace (Shopee) to tell story of the product in the form of "natural and safe raw materials, having benefits, through producing process, having good and useful product delivered to the customer to solve problems on digestive system".

2) Sale, channel and method of building dominance of brand banana powder Win Garden during sale is in the form of packaging development with product brand communicating "the product produced from safe raw materials for the people having problems on digestive system" and the commitment on "direct delivery from the garden to the customer with good, clean and safe product". Vinyl banners are used to publicize the product and leaflets to present the benefits of the banana powder as well as communicating the product brand through the banner in Facebook and Page.

3) Delivery during sending the brand banana powder Win Garden uses the method of designing the packages with the product brand, using leaflets accompanying the package delivered to the customer, and attaching the tag to the product to communicate being "natural, safe and beneficial raw materials through the producing process to have the good and beneficial product delivered to the customer to solve problems on digestive system".

4) Management of post-delivery or post-sale is the strategy of product brand after delivery/after sale of brand banana powder Win Garden using Facebook Manager and Line Application in communicating, flowing up the product and updating the information for the customer continuously.

| Story | | | Symbols | | Strategy | |
|---|---|---|---|---|---|---|
| Name | Win garden | Persona | Typography | *Win Garden* | Awareness | Facebook Fan Page<br><br>E-Marketplace<br>(Shopee) |
| Positioning Statement | Product produced from safe raw materials for people having | Health lovers, take care of health, love product from | Color Palette | | Sale | Packages, Vinyl<br><br>Leaflets, |
| Promise | Direct delivery from garden to customer | | Logo | Win Garden | Delivery | Product Packages |
| Personality | Determined agriculturalists in using technology in producing good and safe product from the garden to customers | Raw materials from nature, safe and beneficial through producing process to have good product for people having problems on digestive system | Imagery | | Post -Delivery | Product Packages<br><br>Facebook Massager |

**Figure 1:** Brand Canvas of Brand Banana Powder Win Garden

Objective 3 To communicate brand banana powder of Thakrapee community enterprise on safe agriculture.

1) On selecting the communication instruments for brand banana powder Win Garden, it should be those being able to specifically reach the target customer groups, be efficient in communicating in a wide range, able to assess clearly, up to date, inexpensive when using each time, and able to show the feedback of the target group immediately. The instruments could be classified into two types, namely: online and offline.

2) The content for communication of the brand and the story of the product of banana powder Win Garden should be about the benefits of the product derived from natural raw materials, the community enterprise which are the places of production and the producing process beginning from planting banana trees, how to take care of them, and the process of producing the banana powder Win Garden that shows the identity of the product by using the findings to design and produce the product banana powder Win Garden in different forms, namely:

(1) Infographic is the graphic that shows set of knowledge with the details of benefits of the product.

(2) Review shows the content and story of the product of banana powder for making a drink branded Win Garden, telling of the benefits of banana powder, convenience in consuming and being the product derived from nature 100%.

(3) VDO Clip shows the content and story telling about the establishment of Thakrapee community enterprise on safe agriculture and how the brand Win Garden originated, including how to begin planting banana trees, how to take care of them, being safe, raw bananas, the method of processing the raw bananas to be banana powder for a drink branded Win Garden, having the target group who were allergic to Gluten, people who have ulcer problem and GERD, and lovers of health with Key Message in the story, stating "Direct from the garden to customers with good, clean and safe product".

(4) Communication channel is for disseminating the banana powder brand Win Garden through online media or online social media, through people media, activity media and

through printed matters such as, brochures, leaflets. The result of which would lead to prescribing the channel of communicating the brand of product banana powder Win Garden as follows.

(4.1) Facebook Page is used for building the brand, form of the various contents developed and presented through Facebook of Win Garden, namely: package of knowledge on the benefits of banana powder, reviewing the product and VDO clips.

(4.2) E-marketplace of Win Garden is placed for sale on platform Shopee in two channels to increase the channel to reach the customers, namely: Win Garden and Banana Win.

(4.3) Online media using leaflets, banners, brochures to increase perception for the consumers to recognize Win Garden and the benefits of the banana powder in order to be supplementary media in the product exhibition fair.

(4.4) Evaluation of brand communication through communication channels of Win Garden by using questionnaires surveying perception of communication and purchasing behaviors of the product made from banana powder Win Garden from the group of 200 customers is the way to monitor and follow efficiency of band communication. It was found that the majority of consumers were female aged between 31-40, graduated with a bachelor's degree, being government officials/state enterprise employees, having an income between 20,000- 40,000 baht per month. The customer groups perceived the benefits of the banana powder, background of Win Garden, Brand Win Garden, information of the product and figure of the product from high level to highest. Moreover, it was found from the survey of the purchasing behaviors that the majority of the customers were satisfied, confident in the product Win Garden and wanted to repeat purchase the product, and were ready to recommend the product to friend/ known persons. For the evaluation of the Facebook channel of Win Garden, it was found that there was an increase of entering 1600 %, entering the post increased 190.1%, and participation in Facebook Page increased 372%. On inquiring the community enterprises of Thakrapee safe agriculture, it was found that there were a lot of inquires entering the Inbox, and there were orders of the product through the Page, being mostly 199% new customers which never did before. Pertaining to offline, most of them were customers of origin. AS the COVID-19 just started, there were seldom showcases in the product exhibition fair.

## Discussion

The results of the study on Brand Building and Brand Communication Strategies for Banana Powder to Increase Competitiveness of Thakrapee Community Enterprise on Safe Agriculture, Suphan Buri Province could be discussed as follows.

On prescribing the strategy for brand building of banana powder to Increase competitiveness of Thakrapee community enterprise on safe agriculture, Suphan Buri province, it is a process beginning from making an analysis on three aspects, namely: an analysis of the target group, an analysis of the competitors, and an analysis of the brand banana powder Win Garden in order to lead to a synthesis that brings about Brand Identity, Brand Positioning, and Brand Value that link to Brand Design with its own identity and be able to attract interest from the target group to perceive, recognize which will lead to their confidence and decision to purchase the product in the end. The brand banana powder Win Garden has a linkage in analytical issues and be able to create value of the brand as being "good, clean and safe product directly delivered from the agriculture to the customer's hand". The process of building brand banana powder Win Garden has the same way as the paper "Green Idea" a study by Nattawut Sgnar-garm (2011) who found that Brand DNA

of "Green Idea" is thinking of the better environment and use that DNA as a center for prescribing the standpoint, personality and brand identity judged by the customers' perspective at that time by considering the quality of use, taking care of the environment, a different point from other brands which choose to present only a particular topic which is in line with a study of Nichawadee Tahneeheng (2019) who built a brand of a basketry product from Pandanus Tectorius under the idea of being friend with the environment, without chemical additives as a standpoint of brand building and communication which is in line with the idea of brand building of Aaker (1996) and Naruemon Kimphaporn and Aek Bunjuea (2012) that state that in the process of building a brand, there must have a study in the perspective of consumers, an analysis of competitors, and analysis of self-brand which leads to brand designing both in brand identity, brand position, brand personality, and brand value wanted to establish in the heart of the target group which will lead to the strategy of brand communication in business in the future.

Brand communication of banana powder of Thakrapee community enterprise gives importance to the product itself because what to communicate with the consumers through the product is the first thing to build the brand it-self and other factors to strength confidence to the consumers. This is consistent with the idea of Aaker (1996) who explains the structure of brand identity of the product in two types, namely, core Identity and extended Identity. The core identity shows the standpoint of the product both in meaning and success of the product while Win Garden shows it standpoint of being safe product directly sent from agriculturalists to the consumers. The extended identity is a factor that helps the brand to be more perfect which the entrepreneurs may change other market factors but keep the core identity. Important principles in using a strategy in communication are communicating the content clearly and true. Every communication must strengthen the brand and most importantly communication must be made continuously in order to create confidence in the product brand which is consistent with the idea of brand building go Duane E. Knapp (2000) and James E. H. , Z. D. Gray and A. Eosenbloom (2011) on significance of building favors of product brands and reliability in product brand towards decision making to purchase products of the consumers, favors of product brand and reliability in the brand are most important in predicting tendency of intension to purchase. It is also consistent with Romero, J. and M. J. Yague (2016) on perception of the quality of the brand, awareness of the brand, linkage of the brand, royalty of the brand and other assets of the brand have influences toward behaviors in decision making of the consumers to purchase the product.

On selecting an instrument for communicating the brand banana powder Win Garden, it should be the instrument that could reach the specific target group, being efficient in communication in a wide range, able to assess clearly, up-dating, inexpensive to use each time, and able to show the result of the feedback of the target group immediately. The instruments could be classified into two types, namely, online and offline which is consistent with a study of Nattika Kaetprakorb et al. (2011) who state that creating online media has to take into consideration of designing the media to have efficient communication, and with a study of Radeewattana Chantaphoti and Bugnah Chaisuwan (2015) who found that online social media had a lot of roles in building product brands, and could be used as important instruments in reaching the target group exactly and quickly.

The content for communication of the brand banana powder Win Garden should be about the benefits of the product derived from natural raw materials, the community enterprise which are the places of production and the producing process beginning from planting banana

trees, how to take care of them, and the process of producing the banana powder Win Garden that shows the identity of the product brand by making the content of the product banana powder Win Garden in the form of infographic, review, and VDO clips which is consistent with the idea of Aaker (1991) who states that presenting the value proposition of the product is to present that the product brand can provide functional benefits on emotional benefits, self-express benefits for the consumers which is in the same direction of a study by Cecilia (2014) which shows that the product brand of the company and the quality of the product have important influences on the customers' royalty toward the Newspaper XYZ in Surabaya City and is in line with a study of Weeranant Khamnuenwut and Anchana Klinthian (2019) which states that the strategy of communication and marketing on presenting the content that the information of the product produced in the production site or in different communities should be right and clear. Building reliability and confidence for the consumers in choosing to purchase the product both by quality and satisfaction is necessary and should in include presenting the content that reflects cultural identity, way of life, natural esthetics and dominant environment abundance.

The channel of communication of brand banana powder Win Garden should be disseminated through online or online social media, personnel media, activities and printed matter such as folders, leaflets, brochures by specifying the channel of communicating brand banana powder Win Garden such as Facebook Page, E-marketplace, online media by using folders, leaflets and brochures which is consistent with a study of Nichawadee Tahneeheng (2019) which found that there should be variety of media such as VDO clips, showcase at sale and demonstration of production process, building content through Facebook, creating Page, sale by personnel, and consignment sale at the store. This is consistent with a study of Nantarat Attayakorn and Wilaiporn Jirawattanset (2120) who found that using social media such as Facebook Page and online ad as a drive of all communication of the brand and as marketing instrument would stimulate the customers, both original and new to memorize and repeat purchase of the product continuously.

## Acknowledgment

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# Factors of Internal Auditors' Characteristics
# in the Digital Age in Thailand

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## Abstract

A study on the factors of internal auditors' characteristics in the digital age in Thailand is a survey research using a quantitative descriptive method, and a questionnaire as an instrument for data collection. The samples were administrators of the companies registered with the Stock Exchange of Thailand (SET), the Market for Alternative Investment-MAI and groups of internal auditors. The statistics for data analysis were descriptive statistics consisting of percentage, mean and standard deviation including confirmatory factor analysis or CFA, system equation model-SEM. The model fit was assessed and it was found that the indexes of congruence of the model were: Chi-Square = 611.016, CMIN/df. = 1.089, CFI = 0.995, GFI = 0.903, IFI = 0.995, NFI = 0.941, AGFI = 0.836, RMSEA = 0.019 และ RMR = 0.021.

The results of the analysis of the factors of internal auditors' characteristics in the digital age in Thailand were statistically significant at level 0.01, namely : 1) those registered with SET having the most influences were characteristics of the internal auditors, followed by professionalism, work performance, digital skills, leadership and communication, and ability in handling changing environment respectively; 2) those registered with the Market for Alternative Investment-MAI having the most influences consisted of work performance, followed by professionalism, characteristics of internal auditors, digital skills, leadership and communication, and ability in handling changing environment respectively; 3) those within the groups of internal auditors themselves having the most influences, namely: characteristics of the internal auditors, followed by professionalism, work performance, digital skills, leadership and communication, and ability in handling changing environment respectively.

**Keywords:** Factors of Internal Auditors, Internal Auditors' Characteristics, Digital Age in Thailand

## Introduction

Currently, we are in the digital age which comes to play important roles in changing business rapidly which can be observed from the changed behaviors of customers in purchasing, financial transaction, using public transportation services and others, creating challenges among internal auditors a great deal. The business process and other activities in the past have been adjusted to be performed much more online, making information transferring and linking occur quickly. Such abrupt changes without notice may change our ways of life and the ways the internal auditors work. This could happen permanently and become a New Normal under which we have to adjust ourselves to new environment and find ways to confront with the changes (Bangkok Thurakit, 2020). The information in the Big Data has to be brought into analyzed and used in the internal auditing by finding the relationship of the information, as well as using the Data Analytics method in the internal auditing system when everything is driven by the term "digital". The same is true when getting access to customers, including using other media like iPad, Tablet to help facilitate the customers within the rapid changes in digital transformation and the society driven by the Big Data. It is therefore necessary for the internal auditors to adjust themselves to keep up with the new world of auditing which is aimed at developing new information technology and innovation that directly affect auditing work. The internal auditors must always develop themselves by learning new skills, both thinking skill, technical skill and digital skill in order to cope with the changes, and also increase the standard of internal auditing in a creative manner, creating both efficiency and effectiveness to the organization. Therefore, the internal auditors must adjust themselves to be well-rounded, having both thinking skill, using equipment including social skill in order to be more professional and reliable. It is a kind of value-added to the organization which is an important factor of the internal auditor in the new digital age, a new model for driving the country's economy to adjust its structure toward the economy driving by value-based economy where an integrated internal auditing is required. It is necessary that the internal auditing be developed to cope with this changing world situation in order to fulfill the organization's objectives by evaluating and improving the effectiveness of risk management, controlling, and monitoring by means of the internal auditors analyzing, suggesting and giving advice pertaining to the internal auditing system (Chomprang Wongrasameeduean, 2021).

At present, internal auditing has been developed in terms of roles and forms with the aim at changing the outsiders' negative attitude by finding false to promoting the work to be successful or adding up value to the internal auditing organization to listen to the facts occurring, coordinate or give consultation for the work to achieve the management's objectives. The internal auditors' roles, therefore, change according to a new model of economic drive of Thailand into an innovation-driven economy, making the internal auditors have wider roles and functions to play which will affect the organization's success. This is where their important roles come from in the new era, and this why the internal auditors become an important mechanism in a business sector that enables us to move forward steadily in the world economic context with a clear recovery tendency but with more risks occurring as well. Under the world with high risks, we will also confront with changes on leaping technological progress and disease epidemic which will alter our way of life, ways of working, relationship of people in the society, and also will bring both an opportunity and new challenges. The internal auditing, therefore, is an important tool to make the organization perform properly and transparent because it is a mechanism that helps increase ability to control, report and follow up the operation. The internal auditors take parts with administrators at different levels in order to find appropriate and efficient ways and method of job performing under the increasing

competition. Also, the internal auditing has important roles in assisting the organization to have transparent management, good monitoring and have important roles in making value-added to the organization, as well as developing the organization to have sustainable strength. This is the reason why the researchers are interested to investigate the factors of internal auditors' characteristics in the digital age in Thailand.

# Objective

To investigate the factors of the internal auditors' characteristics in the digital age, analyze and compare the required factors that should be developed for the internal auditors.

# Literature Review

### Related Concepts on Internal Auditing
Internal auditing as defined by the Association of Internal Auditing of Thailand (2004) refers to giving assurance and consultation with justice and independence in order to add values and improve of an organization. The internal auditing helps the organization achieve its goal by an evaluation and improvement of effectiveness of the process, risk management, control, and with systematic and orderly management which is consistent with the Comptroller General's Department (2003). Also Silapaporn Srichanpetch (2011) has defined internal auditing in the same manner, and Kanjana Wimonchaijit (2015) has concluded it is an activity giving assurance and consultation independently and justly established to create added values and improve an organization operation. The internal auditing could be classified into types, namely:

1.Assurance services refer to checking various evidence with justice in order to be evaluated independently in the process of risk management, control and good management of the organization by performing the work with care based on the profession standard like the professionals.

2.Consulting services refer to suggestion activities and services related to the organization, types and work frame are in line with joint agreement of the organization with the aim to add values and improve work performance of the organization.

### Related Concepts on Using Technology in Internal Auditing
The era 4.0 is full of changes, sustainable driving an organization forward in the world of VUCA is volatile, uncertain, complex and ambiguous. Wirathai Santipraphop (2017) states that the internal auditor gives importance in three aspects, namely:

### Dimension 1 Productivity
The internal auditors increase their roles in examining performance audit using 3E principle, namely Economy, Efficiency and Effectiveness in an evaluation of using resources in different projects or processes of the organization if they are worthwhile and meet its set objective which will eventually lead to increasing the efficiency and image of the organization. However, this kind of internal auditing will be different from in the past, the auditors have to realize thoroughly understand the goal and the how different sides of work in the organization are performed. The auditors could increase their efficiency in their work by using technology such as Data analytics/Artificial intelligence. In the future this technology will be an important tool in the internal auditing in the digital age. Certain organizations may have Real Time Data

Base. This development will enable the internal auditors to have the source of data to find errors or signs of risks.

**Dimension 2 Immunity**

The best immunity of the organization is corporate or organization culture that takes into consideration of risks or risk culture. To make everyone in the organization have If the risk culture can not be made successfully, if everyone in the organization is not aware that the internal auditors are their trusted partners who know the risks and keep warning of dangers and also their consultants who can help risk management.

**Dimension 3 Inclusivity**

To promote the organization realize in being good corporate citizen in order to have inclusivity where benefits spread all over will decrease social problems, particularly inequality or will not aggravate or add up the existing problems. The organization administrator has to establish good corporate citizen where the internal auditors can assure the committee and administrators that a good governance and sustainability policy can be brought into real practice in the organization.

## Research Methodology

**Population and Samples**

The population for the study were administrators of the companies registered at the Stock Exchange of Thailand (SET) consisting of eight groups with a total number of 580 companies (as announced at the SET on 3 September 2021) and the administrator of the eight groups registered at MAI with a total number of 197 companies (as announced at the SET on 3 September 2021) including the internal auditors. The samples, based on Taro Yamane (1970) with reliability at 95%, statistical error 5% consisting of 600 samples divided by the researchers into three groups, namely:

Group 1 all of the eight groups of administrators of the companies registered at the Stock Exchange of Thailand (SET) with a total number of 580 companies 150 samples.

Group 2 all of the eight groups of administrators of the companies registered at MAI with a total number of 179 companies 150 samples.

Group 3 the internal auditors collected by purposively sampled with a total number of 200 samples.

**Research Instrument**

The questionnaire is an instrument for collecting quantitative data since its contents are related the characteristics of the internal auditors on professionalism, operation, ability in confronting with the necessary changing environment, leadership and communication, and digital skills. The questionnaire is designed into types, namely: 1) questionnaire for administrators, and 2) questionnaire for the internal auditors. Both types are different from each other only in Part 1, general information of the respondent. However, the questionnaire used in this study is divided into three parts, namely: questionnaire on, questionnaire on opinions towards the factors of internal auditors' characteristics in the digital age in Thailand, and the opened questionnaire for respondents express their ideas if there are any other factors of the internal auditors' characteristics apart from those in Part 2. Afterwards, the whole data collected would be used for an analysis according to the objectives of study.

**Statistics for Data**

The confirmatory Factor Analysis: CFA was used to examine the constructive validity of the factors on each side, that is professionalism, operation, ability in confronting with the necessary changing environment, leadership and communication, and digital skills in order to check whether they have been examined the theoretical validity, and content validity by experts and are true according to the empirical data using Structural Equation Model: SEM by AMOS program, Standardized Regression Coefficient, Standard Error, t-Value, Critical Ratio (C.R.) and Average Variance Extracted: AVE followed by an Evaluation of the Data Model Fit. The statistics used in examining appropriateness of the empirical data and theoretical validity were: 1) Chi-square Probability Level: CMIN-p, 2）Relative Chi-square: CMIN/df, 3）Goodness of Fit Index: GFI, and 4) Root Mean Square Error of Approximation: RMSEA.

## Research Finding

Based on the analysis the researchers have found the results as detailed as follows.

**1. The result of an analysis of a confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand on characteristics of internal auditors.**



**Figure 1:** Variance Model A Variance Model indicating a confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand

The Variance Model indicating a confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand could be concluded that the model was valid and in line the empirical data at a good level with the CFI, GFI, AGFI, RMSEA, RMR, NFI and the IFI passing the set criteria (0.90). This showed that the model validity in measuring the internal auditors' characteristics in the digital age in Thailand was valid. Besides the weight of coefficient between 0.67-0.83 and Variance Extracted between 0.06-0.08 were between the satisfactory criteria, $R^2$ for each item between 45.0-69.0%, AVE 0.592 more than 0.50, and CR 0f 0.935 more than 0.60 indicating that the validity and reliability of the variance used in the analysis. And the result found that the correlation between observable variance was

between 0.516 – 0.592, more than 0.50 and CR equal 0.935 more than 0.60, indicating that the validity and reliability of the variance used in the analysis. And the result found that the correlation between observable variance was between 0.516 – 0.782 was positive and not more than 0.80 and had no problem on being independent between the variances.

**2. The result of an analysis of a confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand on professionalism.**



**Figure 2:** A confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand on professionalism.

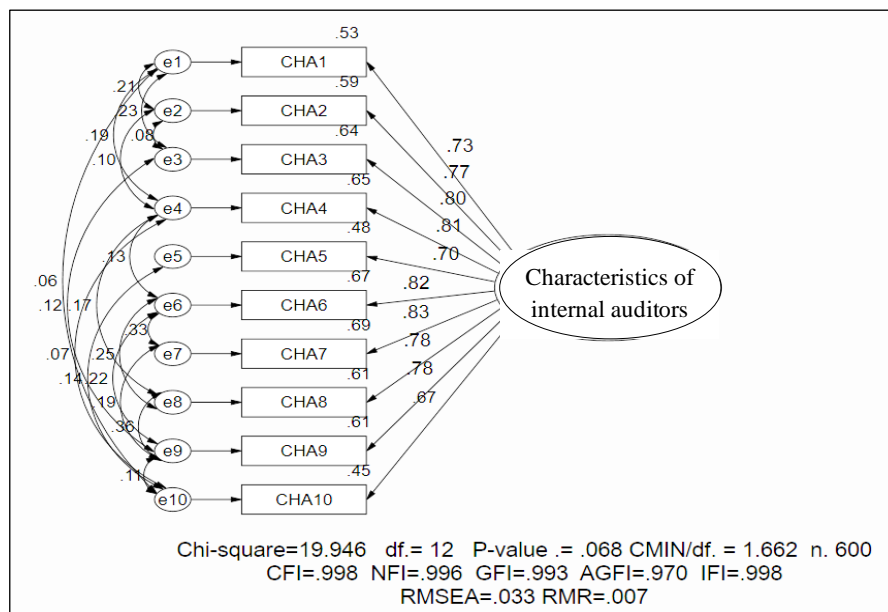The confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand on professionalism could be concluded that the Model was valid and the measuring model was line with the empirical data at a good level with the CFI, GFI, AGFI, RMSEA, RMR, NFI and the IFI passing the set criteria (0.90). This indicated the validity that the model validity in measuring the internal auditors' characteristics in the digital age in Thailand was valid. Besides the weight of coefficient between 0.62 - 0.80 0.62 - 0.80, the variance Extracted between 0.08 - 0.11, in the satisfactory criteria, R2 of each item at 36.0-65.0%, AVE) equal 0.576 more than 0.50, and CR equal 0.890 more than 0.60 which indicated the validity and reliability of the variances used in the analysis. Besides, the correlation between observable variance was between 0.388 - 0.894 was positive and not more than 0.90 and had no problem on being independent between the variances.

**3. The result of an analysis of a confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand on performance.**
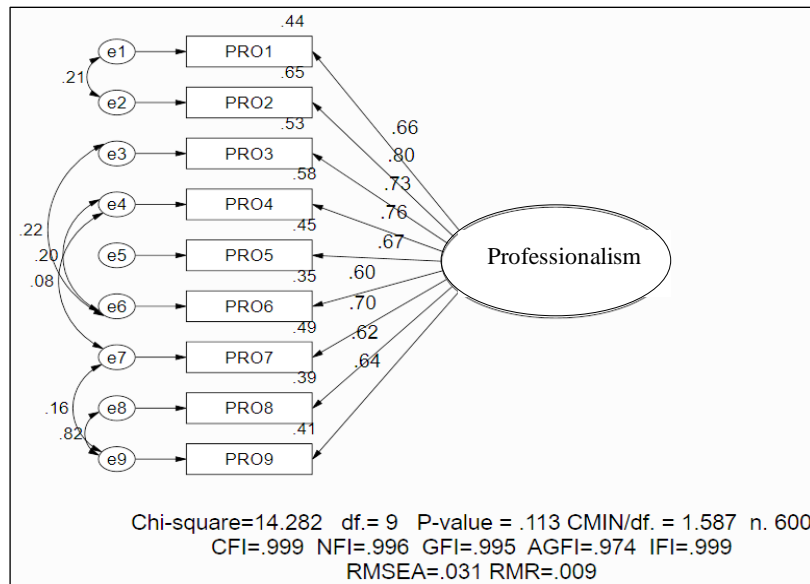


**Figure 3:** A confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand on performance.

The confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand on performance could be concluded that the Model was valid and the measuring model was line with the empirical data at a good level with the CFI, GFI, AGFI, RMSEA, RMR, NFI and the IFI passing the set criteria (0.90). This indicated the validity that the model validity in measuring the internal auditors' characteristics in the digital age in Thailand was valid. Besides the weight of coefficient between 0.62 - 0.80 0.62 - 0.80, the variance Extracted between 0.08 - 0.11, in the satisfactory criteria, R2 of each item at 36.0-65.0%, AVE) equal 0.576 more than 0.50, and CR equal 0.890 more than 0.60 which indicated the validity and reliability of the variances used in the analysis. Besides, the correlation between observable variance was between 0.388 - 0.894 was positive and not more than 0.90 and had no problem on being independent between the variances.

**4.** T**he result of an analysis of a confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand on** ability **to confront with the changing environment.**
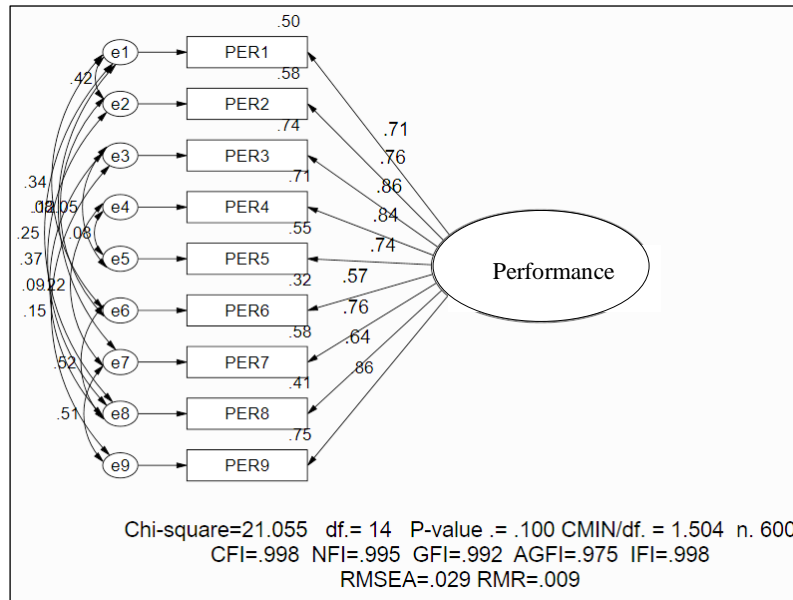


**Figure 4:** A confirmatory model of the factors of the internal auditors' characteristicsin the digital age in Thailand on ability to confront with the changing environment

The confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand on ability to confront with changing environment could be concluded that the Model was valid and the measuring model was in line with the empirical data at a good level with the CFI, GFI, AGFI, RMSEA, RMR, NFI and the IFI passing the set criteria (0.90). This indicated the validity that the model in measuring the internal auditors' characteristics in the digital age in Thailand was valid. Besides the weight of coefficient between 0.62 - 0.80 0.62 - 0.80, the variance Extracted between 0.08 - 0.11, in the satisfactory criteria, R2 of each item at 36.0-65.0%, AVE) equal 0.576 more than 0.50, and CR equal 0.890 more than 0.60 which indicated the validity and reliability of the variances used in the analysis. Besides, the correlation between observable variance was between 0.388 - 0.894 was positive and not more than 0.90 and had no problem on being independent between the variances.

**5. The result of an analysis of a confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand on leadership and communication.**
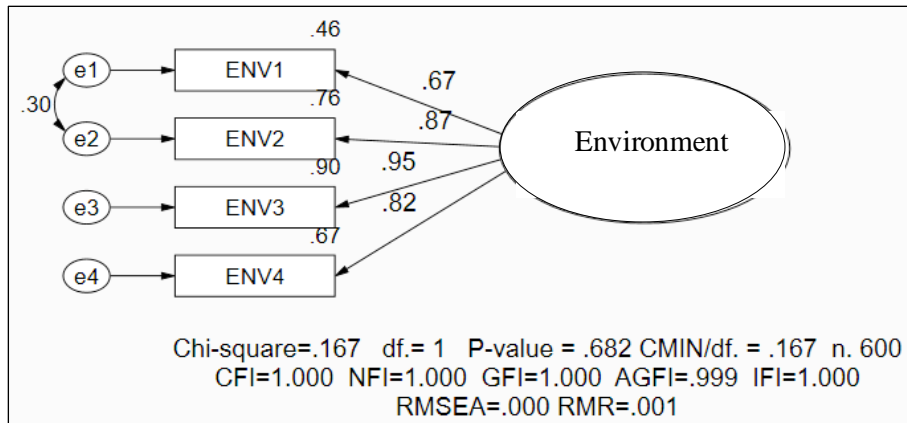


**Figure 5:** A confirmatory model of the factors of the internal auditor's' characteristics in the digital age in Thailand on leadership and communication

The confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand on leadership and communication could be concluded that the Model was valid and the measuring model was line with the empirical data at a good level with the CFI, GFI, AGFI, RMSEA, RMR, NFI and the IFI passing the set criteria (0.90). This indicated the validity that the model validity in measuring the internal auditors' characteristics in the digital age in Thailand was valid. Besides the weight of coefficient between 0.62 - 0.80 0.62 - 0.80, the variance Extracted between 0.08 - 0.11, in the satisfactory criteria, R2 of each item at 36.0-65.0%, AVE equal 0.576 more than 0.50, and CR equal 0.890 more than 0.60 which indicated the validity and reliability of the variances used in the analysis. Besides, the correlation between observable variance was between 0.68 - 0.95 and the Variance Extract between 0.06 - 0.08 which was satisfactory. The correlation of R2 for each item was at 53.0-85.0%, AVE equal 0.647 more than 0.50 and CR equal 0.916 more than 0.60, indicating that validity and reliability of the variance used in the analysis. Besides, the correlation between the observable variance was between 0.554 - 0.817 was positive and not more than 0.80 and without problem on being independent between the variances.

**6. The confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand on digital skills.**



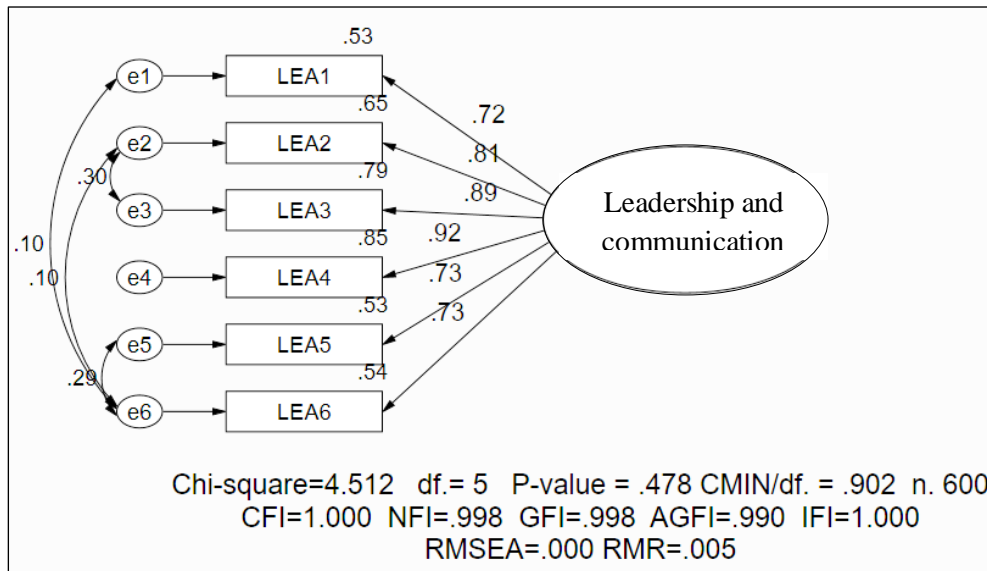**Figure 6:** A confirmatory model of the factors of the internal auditor's' characteristics in the digital age in Thailand on digital skills

The confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand on digital skills could be concluded that the Model was valid and in line with the empirical data at a good level with the CFI, GFI, adjusted AGFI, RMSEA, RMR, NFI and the IFI passing the set criteria (0.90). This indicated that the model in measuring the internal auditors' characteristics in the digital age in Thailand was valid. But the weight of coefficient was between 0.79 - 0.93 and the Variance Extracted was between 0.03 - 0.05 which was satisfactory. The correlation $R^2$ of each item was between 62.0-87.0 %. The AVE equal 0.691 more than 0.50 and CR equal 0.930 more than 0.60, indicating the validity and reliability of the variance used in the analysis. Furthermore, the correlation between the observable variance was between 0.654 - 0.798 which was positive, not more than 0.80, and without problems in being independent between the variances.

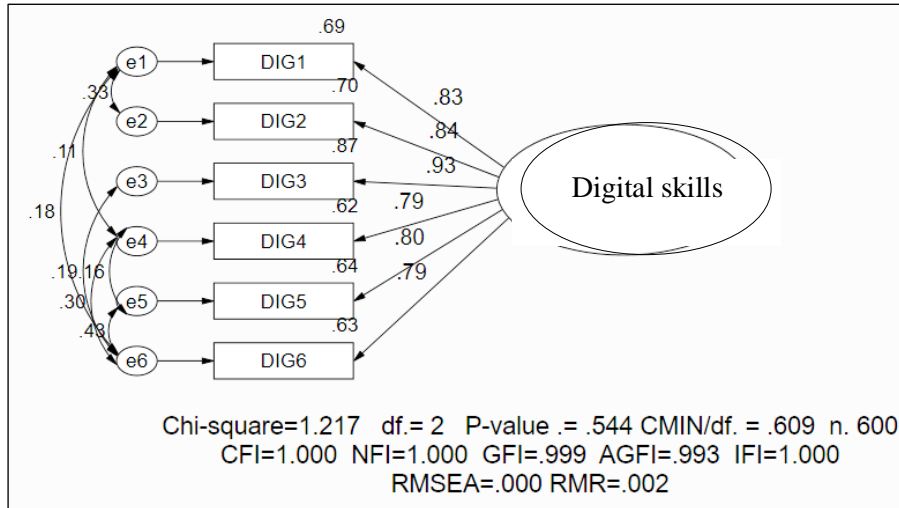**7. The confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand within the groups of administrators of companies registered in Stock Exchange of Thailand (SET).**



**Figure 7:** A confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand within the groups of administrators of companies registered in Stock Exchange of Thailand (SET)

The confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand within the groups of administrators of companies registered in the Stock Exchange of Thailand (SET) could be concluded that it was congruent with the empirical data at a good level with the Chi-Square equal 611.016 with df equal 561.0 and P-value equal 0.071 $(> 0.05)$, and CMIN/df equal $1.089$ $(< 2.0)$. The (CFI) equal $0.995$ $(> 0.90)$, (GFI) equal $0.903$ $(> 0.80)$, AGFI equal $0.836$ $(> 0.80)$, RMSEA equal $0.019$ $(< 0.05)$, RMR equal $0.021$ $(< 0.05)$, NFI equal $0.941$ $(> 0.90)$, and the IFI equal $0.995$ $(> 0.90)$.

This indicated that these indexes passed the set criteria for measuring the validity of the model in analyzing the characteristics of the companies' administrators registered in the SET in the digital age. It was found that the result of the analysis of the confirmatory model of the factors of their characteristics of those registered at SET in the digital age in Thailand was that the correlation $R^2$ between variance was within $27.0\%$ - $83.0\%$ with the highest characteristics of the internal auditors having $R^2 = 0.97$ and the lowest characteristics on the ability to confront with the changing environment ($R^2 = 0.67$, indicating that the relation of variances in the model was different at the statistical level .01, making the result of the analysis was highly statistical reliable.

**8. The confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand within groups of companies' administrators registered in the MAI Stock Exchange.**
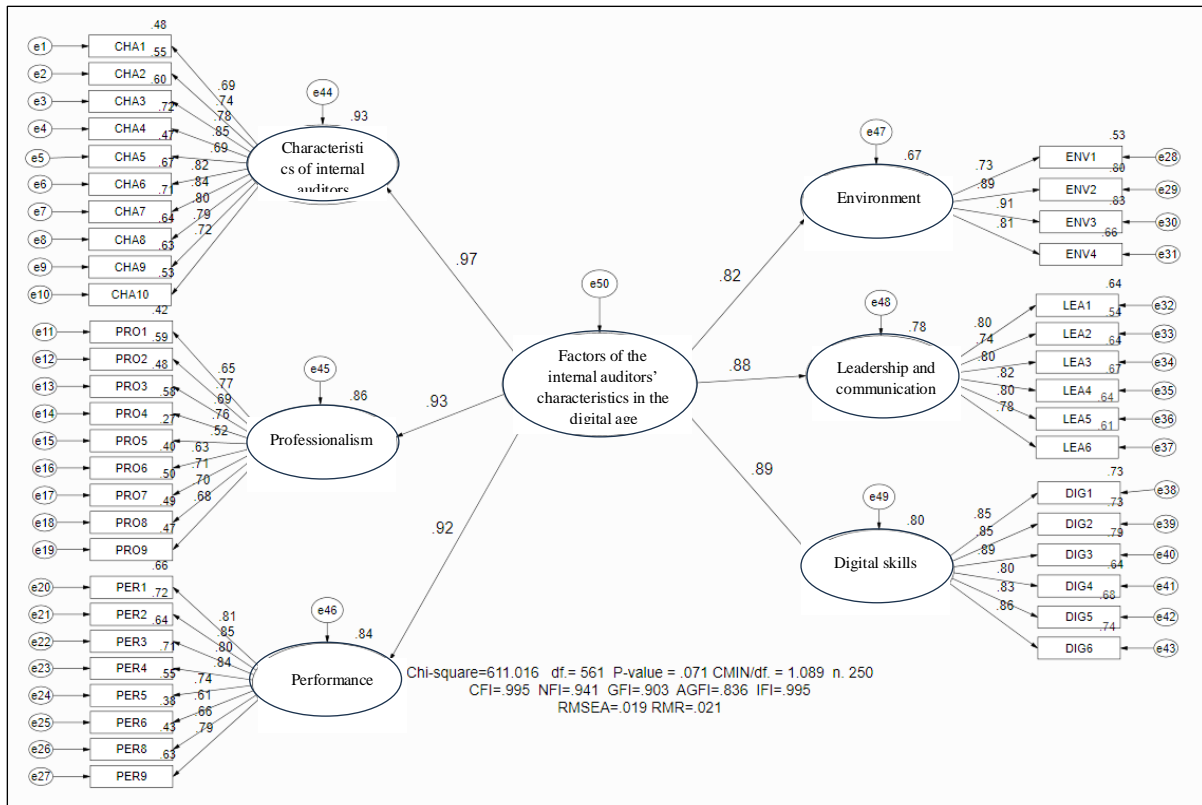


**Figure 8** A confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand within the groups of administrators of companies' administrators registered in the MAI Stock Exchange

The confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand within the groups of companies' administrators registered in MAI Stock Exchange could be concluded that it was congruent with the set criteria with Chi-Square equal 577.069 with df equal 575.0 and P-value equal 0.468 (> 0.05) including indexes of congruence with CFI = 1.000 (> 0.90), GFI = 0.860 (> 0.80), AGFI = 0.870 (> 0.80), RMSEA = 0.005 (< 0.05), RMR = 0.027 (< 0.05), NFI = 0.924 (> 0.90), IFI = 1.000 (> 0.90), indicating that the model was right in measuring the internal auditors' characteristics in the digital age. Besides, the $R^2$ was during 33.0 - 89.0 % with the factors having the most influences on performance ($R^2$ = 0.94), professionalism ($R^2$ = 0.92), internal auditors' characteristics ($R^2$ = 0.92), digital skills ($R^2$ = 0.88), leadership and communication₃ ($R^2$ = 0.87), and ability to confront changing environment ($R^2$ = 0.85) with t-test with coefficient between 0.58 - 0.92 and t-test for the tolerance was interesting at the statistical level .01, making the relation of the variances in the model highly reliable.

**9. The confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand within groups of companies' administrators registered in the MAI Stock Exchange.**



**Figure 9:** A confirmatory model of the factors of the internal auditors' characteristicsin the digital age in Thailand within the groups of the companies' administrators registered in the MAI Stock Exchange

The confirmatory model of the factors of the internal auditors' characteristics in the digital age in Thailand within the groups of companie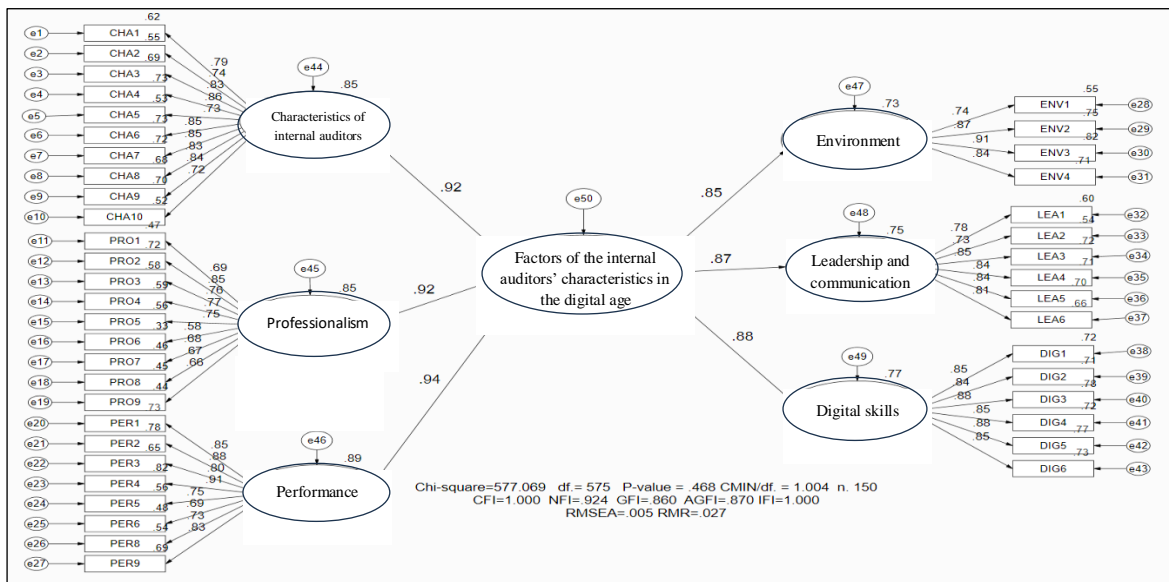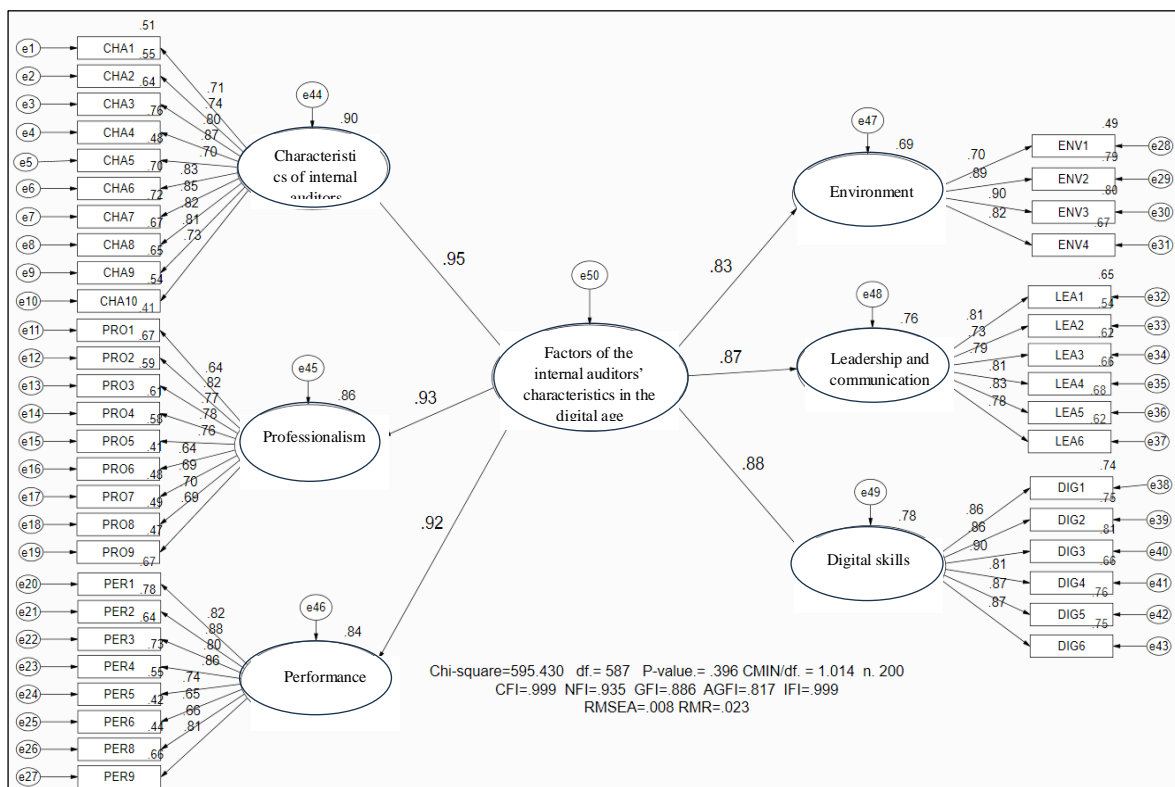s' administers registered in the MAI Stock Exchange on congruence and validity of the model used in the analysis could be concluded that the results of analysis of the model showing that it was in congruence with the empirical data at a good level with Chi-Square equal 595.530, with df equal 587.0 and P-value equal 0.396 (> 0.05, meaning the model had validity toward the data. Besides, CMIN/df was within 1.014 (< 2.0) and CFI equal 0.999, GFI equal 0.886, AGFI equal 0.817, all of which were higher than the set value (CFI, GFI, AGFI > 0.80). This indicated the appropriateness of the model and data consistency but the RMSEA was 0.008 and RMR equal 0.023, both less than 0.05, indicating satisfaction in measuring the model consistency with NFI equal 0.935 and IFI equal 0.999, both of which were higher than the set value (NFI, IFI > 0.90). This indicated the appropriateness and data consistency of the model as a whole. The result of the analysis found that the model had the confirmatory indexes consistent with the empirical data with validity and appropriate in measuring the data in many dimensions of the factors on the internal auditors' characteristics in the digital age in Thailand within the groups of companies' administrators registered at the MAI Stock Exchange. As a whole, the internal auditors' characteristics in the digital age in Thailand within the groups of companies' administrators registered at the MAI Stock Exchange were important for work management and could have influences on the success of the organization in the state of changes in the digital age. The characteristics like the internal auditors' characteristics, professionalism, work performance, digital skills, leadership and communication, and ability to confront with the changing environment had relation with success of the organization in the state of digital with statistical significance.

## Discussion

1. An investigation of the factors of the internal auditors' characteristics in the digital age in Thailand on ability to confront with the changing environment found that the qualification that the internal auditors should have most was self-adjustment and learn about changes quickly and the working environment was important factors for success of the organization a great deal which was in line with a study of Ramita Insai and Worawit Laohameti (2019). It was found that the factors that affected work performance of the internal auditors on the state of environment were the administrative policy and support, readiness of working system and information, understanding and acceptation of the auditing receiver, relationship between the internal auditing office and other offices. This was in congruence with Aekachai Achaphipat (2016) who stated that in developing of the internal auditing, the internal auditor should prepare readiness on various sides including self-adjustment for changes, be well-rounded on information and keep up with the world, try to understand factors/continued and rapid environment changes from both insides and outside in order to be able audit at the right point and be an efficient supporting office

2. An investigation of the factors of the internal auditors' characteristics in the digital age in Thailand on professionalism found that the qualification that the internal auditors should have most was the internal auditors being independent, justice in giving opinion toward auditing report or restriction in auditing in order to sufficiently and appropriately report to the auditing committee. This is consistent with Angelicah Wanjiru Kaabue (2020) who found that the expertise of internal auditors and support of executives It affects the performance of the Kenya Civil Service Commission. In addition, the study also found that internal control and the head of internal audit has no influence on the performance of the Kenya Civil Service

Commission. In line with Saddam A (2020), the impact of internal auditing on the financial performance of commercial banks was studied. The research results found that Independence of the internal audit department According to international standards, internal auditing has a significant impact on the financial performance of commercial banks. In line with Fikre, Gedefa (2019) stated that the independence of the internal audit function It has a positive relationship with financial performance. It was also found that Increased independence of the internal audit function will lead to increased financial performance. The study further concluded that internal auditors should be independent of both personnel and the organization's operations. minor elements Internal auditors should have accounting knowledge. (Financial reporting standards, financial statement analysis, accounting systems, management accounting) to be useful in internal auditing work.

3. An investigation of the factors of the internal auditors' characteristics in the digital age in Thailand on work performance found that the internal auditors should have most was they should well respond to the need of the auditing receiver and expectation of users of the auditing report, Delegation of authorization and duties had positive relation with the quality of the internal auditing report which was consistent with Inshik Seol, Joseph Sarkis and Frank Lefley (2011) who explained the necessary skills for the internal auditors, namely: 1) Skill and knowledge like technical skills, analytical skills/design, admiring skills, 2) behavioral skills, personal skills, human relationship skills, organizational skills, professional ability of the internal auditors, and from an investigation of professional ability of the internal auditors in the government sectors in Balgaria opportunity and challenges.

4. An investigation of the factors of the internal auditors' characteristics in the digital age in Thailand on the characters of the internal auditors found that the qualification that the internal auditors should have most was they should perform their work under the risk of the organization specified in the handout of risk management so that the organization would be able to meet the set objectives which was in line with Inshik Seol (2005) who found that decision making structure and decision making analysis to choose the internal auditors consisted of 1) skills and knowledge, namely: technical skills, analytical skills, admiration skills, and 2) behavioral skills, namely: personal skills, human relationship skills, and organizational skills.

5. An investigation of the factors of the internal auditors' characteristics in the digital age in Thailand on digital skills found that that the qualification that the internal auditors should have most was they shiuld have searching skills, evaluating, sharing, and creating contents as well as systematic process (Digital Literacy) because Thailand is entering digital society which was in line with James A. Bailey (2010) who found the result of a survey of important general ability of the internal auditors in an organization included knowledge of IT, work frame, instrument and techniques which raked number 5 in term of importance.

## Suggestions

### Suggestions for the study

1.The findings should be taken into consideration as a guideline for administrators in developing the characteristics of the internal auditors to suit the digital age which will lead to development of the necessary factors for the internal auditors' the internal auditing process.

2.To confront with the changing environment affecting the internal auditors, internal auditing, characteristics of internal auditors in  the digital age which influence the internal auditing efficiency.

3.The findings could be used by the internal auditors and interested persons who wish to investigate the characteristic factors of the internal auditors in the digital age in Thailand.

4. The findings could be used for the administrators to support the internal auditors and to help make decision choosing the internal auditor.

### Suggestions for future study

1.Agencies or interested persons could make use of the internal auditors' characteristics mentioned to further study and compare differences of different businesses or industries whether the differences affect the internal auditors' characteristics or not.

2.Additional studies should be made on characteristics of internal auditors on other sides during the time and the new situations arising for development of the personnel on internal auditing.

3.Additional studies should be made on the impact of the age of digital skills towards the efficiency of other government sectors such as Excise Department, Customs Department, Revenue Department, State Enterprises or other business organizations in order to compare the findings.

4.An additional studies should be made on the method of collecting data using other methods such as in-depth interview according to kind of business of the companies having been ordered by the Securities and Exchange Commission (SEC) to have special inspections, and backward comparison of work performance, for instance, in order to learn the view point and in-depth data for more research efficiency and effectiveness.

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# The development of a model for improving student thriving at private universities in HUNAN, CHINA

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## Abstract

This research explored the influential pathways to student thriving at private universities in Hunan, China by employing a partial least squares structural equation modeling (PLS-SEM) approach, and the strategic model from the research results are expected to help improve student thriving in these institutions. The conceptual framework was proposed based on the Thriving Model and it examined how factors of university support and students' campus experiences are associated with students' thriving. Through an online survey 707 valid questionnaire responses were obtained from students at four representative private universities in Hunan, China. Findings suggested that factors related to university supports (institutional integrity, commitment to student welfare, institutional readiness, and perceived teacher support) and students' campus experiences (psychological sense of community and campus involvement) are positively associated with student thriving. We also found that students' campus experiences play the mediating role in the relationship between university supports and student thriving. The SEM model from the results for improving student thriving at private universities in Hunan, China can provide implications and recommendations for teachers and university administrators at private universities in Hunan, China, as well as private higher education policy makers and researchers in this field, to create interventions or conduct further research to enhance student thriving, either practically or theoretically.

**Keywords:** institutional integrity; institutional readiness; commitment to student welfare; perceived teacher support; psychological sense of community; campus involvement; student thriving

## Introduction

Private universities in China have expanded rapidly in the past few decades and have become an integral part of Chinese higher education (Dwivedi, 2022). Meanwhile, private universities in Hunan Province are ranked at the top in the 2023 national ranking of private universities (Zhao, 2023). However, there has been a decline in the social status of these institutions due to the poor quality of their graduates. Various reasons contribute to this, including the administrations of private institutions being more concerned with enrollment rather than students' overall development (Altbach, 2016; Liu, 2020), neglecting students' rich campus experiences (Liu, 2020), failing to match the promises made during the admissions process (Liu et al., 2021), and lacking adequate and competent full-time faculty or complete campus infrastructure (Levy, 2009).

Consequently, the impact of these universities on student development contradicts the mission of higher education, which should encompass holistic education, establishing necessary environmental supports, enriching students' college experiences, enhancing personal

achievements, and preparing them for future civic engagement (Kolb, 2014). To promote the sustainable development of private universities in Hunan, China, and to improve the quality of their graduates, this study proposes a research conceptual framework based on the Thriving Model. This model measures student success more comprehensively in three areas: interpersonal, psychological, and academic (Schreiner, 2016). Previous research has also confirmed that certain social and psychological elements contribute to student thriving in this model, such as institutional integrity, spirituality, campus involvement, student-faculty interaction, psychological sense of community, and major certainty, etc. (Schreiner, 2016).

Since academic research has seldom focused on student thriving in the context of private higher education in China, especially in Hunan province, this research aims to explore the pathways to students' thriving in private universities in Hunan, China, by adopting a PLS-SEM approach. This approach will investigate social and psychological elements apart from student thriving, including institutional integrity, commitment to student welfare, institutional readiness, perceived teacher support, campus involvement, and psychological sense of community. The strategic model for improving student thriving, derived from the research results, would be valuable in raising the awareness of institutional administrators, faculty members, and educational policymakers in the context of private universities in Hunan. It will encourage them to create relevant interventions and supports for student thriving. Moreover, it will broaden the thriving model and enrich the thriving literature for future research. The following questions guide this study: What are the current university supports, campus experiences, and student thriving at private universities in Hunan, China? And what are the pathways to thriving, considering the university supports and campus experiences at private universities in Hunan, China?

## Objective

To explored the influential pathways to student thriving at private universities in Hunan, China

## Literature Review

### Student Thriving Model

The Student Thriving Model, developed by Schreiner in 2010b, is based on Keyes' flourishing theory from 2002. It combines the psychological retention model of Eaton and Bean (1995) with Braxton and Hirschy's persistence model (2004). Representing a holistic approach, this model evaluates students' campus experiences and achievements intellectually, socially, emotionally, and psychologically (Ash and Schreiner, 2016). Schreiner (2010b) developed the Thriving Quotient to measure student thriving, assessing three aspects through five sub-constructs: engaged learning, academic determination, positive perspective, diverse citizenship, and social connectedness, all of which are adopted in this study.

Schreiner and others have identified several contributors to student thriving, such as institutional integrity, sense of community, student-faculty interaction, campus involvement, and spirituality, etc. Many of these have been found to vary in different contexts (Schreiner et al., 2013). For instance, pathways to thriving may differ across distinct student demographics and populations, including different racial groups, transfer students (McIntosh and Nelson, 2012), community college students (Romero, 2016; Dy, 2017), students from faith-based campuses (Derrico et al., 2015), and graduate students (Horne, 2017). Students' college experiences can be enhanced through external interventions or environmental improvements,

thereby enriching their university life, contributing to their thriving and future achievements (Robbins et al., 2004). While the study of thriving in the context of private higher education in China is limited, this research adopts the thriving model to study the pathways to student thriving in the private institutional context of Hunan, China.

**Institutional Integrity, Commitment to Student Welfare and Institutional Readiness**

University supports, such as institutional integrity and commitment to student welfare, are key elements influencing student social integration in the model by Braxton and Hirschy (2004). Institutional integrity is defined as 'the degree of congruence between the espoused mission and goals of a college or university and the actions of administrators, faculty, and staff' (Braxton et al., 2014, p. 88). Braxton et al. (2014) describe institutional commitment to student welfare as 'the institution's abiding concern for the growth and development of its students… and its clear communication of the high value it places on students' (p. 22). Another element of university support, institutional readiness, refers to the adequacy of the university's infrastructure and the soundness of its various regulations.

Miller (2019) and Schreiner (2018) have indicated that support and concern from universities contribute positively to factors that promote thriving. When students perceive support from their institutions, they engage more in campus life, leading to positive psychological experiences (Braxton and Hirschy, 2004). How students view their institution has been shown to be indicative of their sense of belonging on campus (Strayhorn, 2018) and their persistence in difficult tasks (Ash and Schreiner, 2016). For example, institutional readiness, as an aspect of the higher education climate, has been validated as impacting the lives and learning experiences of university students (Rankin and Reason, 2008) and is a significant contributor to thriving (Ash and Schreiner, 2016). Positive educational experiences are enhanced through the improvement of the institutional climate and environment, which in turn improves social integration (Li et al., 2016) and a sense of belonging (Wells and Horn, 2015). Studies on student thriving have indicated that these university supports are not only key contributors to positive psychological experiences but also have an indirect association with thriving, mediated by campus experiences (Conn, 2019). Considering the important roles of students' perceptions of these supports provided by universities, this study seeks to examine how these institutional factors impact students' thriving as well as their campus experiences in the context of private universities in Hunan, China."

**Perceived Teacher Support**

According to Ryan and Patrick (2001), perceived teacher support can be viewed as the extent to which students trust in their teachers' values and their association with them, primarily embodying four aspects: emotional, instrumental, appraisal, and informational support. Metheny et al. (2008) define perceived teacher support as the degree to which students believe their teachers are accessible resources when they need assistance. To measure perceived teacher support, Metheny et al. (2008) developed four sub-variables: invested, positive regard, expectation, and accessibility. As an educational context for students, its strong connection with students' education on campus has been widely confirmed. This includes enhancing academic motivation (Quin et al., 2018), influencing the learning process (Ricard and Pelletier, 2016), creating a supportive learning environment (Ruzek et al., 2016), assisting with academic adjustment (Wentzel et al., 2010), boosting higher degree aspirations (Kim and Sax, 2009), helping build confidence and make friends on campus (Dietrich et al., 2015), fostering a sense of community (Hausmann et al., 2009), and increasing the opportunities for success (Kuh and Hu, 2001).

**Psychological Sense of Community**

Psychological sense of community is described as 'a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together' (McMillan and Chavis, 1986, p. 9). Schreiner (2010b) built a measurement by recognizing four perspectives in psychological sense of community: membership, relationship, ownership, and partnership. Psychological sense of community contributes significantly to student educational success and their personal development. This includes aspects such as student social connectedness and academic achievements (Schreiner, 2016; Vetter et al., 2019a), student satisfaction (Prezza et al., 2001), perceptions of the institution (Sonn, 2002), and psychological health (Ellaway et al., 2001). Research has indicated that the effects of association with psychological sense of community differ considering different student groups (Ash and Schreiner, 2016).

**Campus Involvement**

Astin (1984) proposed the involvement theory, which emphasizes the importance of campus involvement, asserting that students experience more academic gains and personal growth when they are engaged in campus activities. Campus involvement can be understood as the amount of mental and physical energy that students invest in curricular and co-curricular activities. It is associated with nearly all desired college student outcomes, such as excellent academic performance (Wolf-Wendel et al., 2009), increased graduation and retention rates (Astin, 2005), and student thriving (Schreiner, 2016). Involvement in campus activities has also been linked to student satisfaction with faculty interactions (Nelson and Vetter, 2012). Student thriving is directly influenced by the quality of student involvement and indirectly by the quantity of involvement (Vetter, 2018). While all students benefit from campus involvement, the benefits vary among different groups (Schreiner, 2014). These studies emphasize that students' college experiences contribute to their growth and social integration. They suggest that students are satisfied with their college careers if they are engaged in academic activities, build good relationships with peers and faculty, and are actively involved in other campus activities, rather than focusing too much energy on just one area.

Based on the review of the related literature, the current study proposed the following hypotheses and Figure 1 shows the conceptual framework of this research:

H1: University supports like institutional integrity, commitment to student welfare and institutional readiness are positively related to student thriving at private universities in Hunan, China.

H1a: Institutional integrity is positively related to student thriving at private universities in Hunan, China.

H1b: Commitment to student welfare is positively related to student thriving at private universities in Hunan, China.

H1c: Institutional readiness is positively related to student thriving at private universities in Hunan, China.

H2: Perceived teacher support is positively related to student thriving at private universities in Hunan, China.

H3: Psychological sense of community is positively related to student thriving at private universities in Hunan, China.

H4: Campus involvement is positively related to student thriving at private universities in Hunan, China.

H5: Institutional integrity are positively related to psychological sense of community and campus involvement at private universities in Hunan, China.

H5a: Institutional integrity is positively related to psychological sense of community at private universities in Hunan, China.

H5b: Institutional integrity is positively related to campus involvement at private universities in Hunan, China.

H6: Commitment to student welfare is positively related to psychological sense of community and campus involvement at private universities in Hunan, China.

H6a: Commitment to student welfare is positively related to psychological sense of community at private universities in Hunan, China.

H6b: Commitment to student welfare is positively related to campus involvement at private universities in Hunan, China.

H7: Institutional readiness is positively related to psychological sense of community and campus involvement at private universities in Hunan, China.

H7a: Institutional readiness is positively related to psychological sense of community in private universities at private universities in Hunan, China.

H7b: Institutional readiness is positively related to campus involvement in private universities in China.

H8: Perceived teacher support is positively related to psychological sense of community and campus involvement in private universities in China.

H8a: Perceived teacher support is positively related to psychological sense of community in private universities in China.

H8b: Perceived teacher support is positively related to campus involvement in private universities.
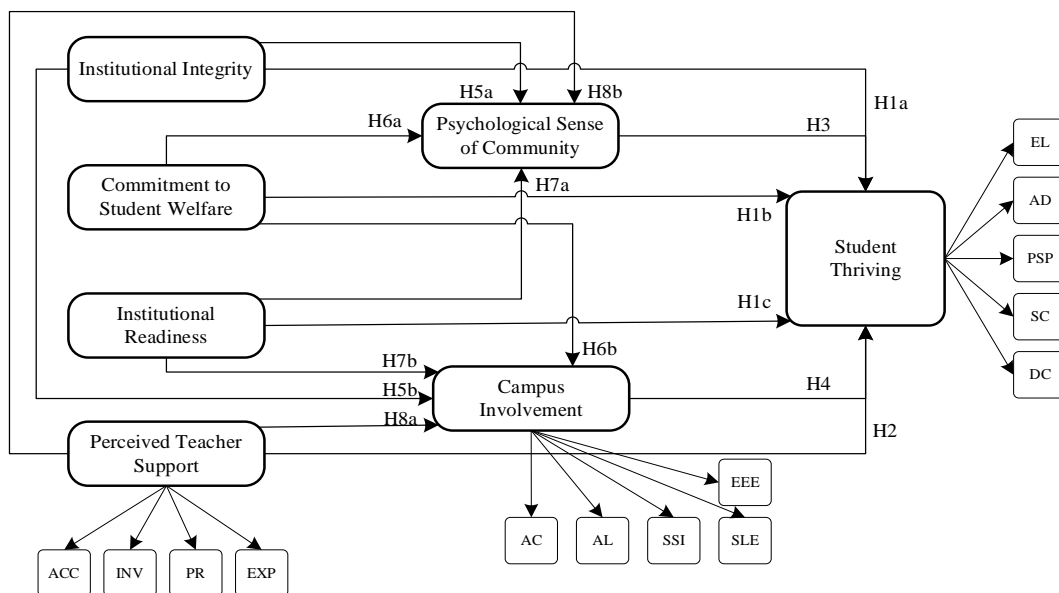


Notes: ACC, Accessible; INV, Invested; PR, Positive Regard; EXP, Expectation; AC, Academic Challenge; AL, Active Learning; SSI, Student-Stuff Interaction; SLE, Enriching Educational Experiences; EL, Engaged Learning; AD, Academic Determination; PSP, Positive Perspective; SC, Social Connectedness; DC, Diverse Citizenship.

**Figure 1:** Research Conceptual Framework

## Research Methodology

### Participants and Procedure

The data in this research were collected through online questionnaire survey due to the advantage of the method compared with other ones, such as ensuring data integrity through the investigation process (Shiau and Luo, 2012).The research targeted students for bachelor's degree from 4 private universities in Hunan, China. After the approval from the university administration, the survey link along with research purposes were sent out to the concerned students mainly through students' social networking groups, such as Wechat and QQ groups. Students voluntarily participated in the survey from Sep.1,2023 to September 15, 2023. After clearing the unqualified questionnaires through the software of SPSS, all together 707 valid ones were obtained, and the sample number is sufficient enough in line with the regular accepted standards of sample size (Krejcie and Morgan, 1970).

Two sections were employed in this online survey, with section one getting the participants' demographic information, to assure controlling variables properly, which includes university, sex, age, grade, thus allowing researchers to focus on the subject and "rule out alternative plausible hypotheses" (Mayhew et al., 2016b, p612). And section two involves detailed questions to measure the constructs in the research model. A seven-point Likert scale was adopted to measure the items, and the values of each item range from "1 = Strongly disagree" to "7 = Strongly agree". The questionnaire in Chinese version was sent to students as it was conducted in China, and sufficient time was left out for them to complete the questionnaire.

The researchers adopted the partial least squares-structural equation modeling (PLS-SEM) to analyze the proposed theoretical model through Smart PLS V.3.3.9 software(Ringle et al., 2015). Different from the other methods, PLS-SEM is considered as the least restrictive method, because it focuses on the explained variance of the criterion variable(Hair, 2014; Briz-Ponce et al., 2017). Therefore, PLS-SEM is an appropriate tool to explore pathways to student thriving in this study.

## Research Findings

### Descriptive Analysis

Descriptive analysis of the participants' demographics. This survey obtained 707 valid responses of students from 4 representative private universities which belong to: the top quartile, the second quartile, the third quartile and the last quartile respectively in the ranking of private universities in China in 2022 (Zhao, 2022). Among them 26% responses were from Hunan University of International Economics, 50% were from Swan College of Central South University of Forestry and Changsha Medical University equally, and the left 24% were from Hunan University of Information Technology. 336 responses were from females and 371 ones from males, and 26.2% were from freshman group and 25.9 % were sophomore, 24.9% were junior and 23.1% were senior. 71.6% of students surveyed were aged between 19-21 years old, while the rest 17.4% participants surveyed were under 18 or below and 11% were 22 years old or above. Table 2 presents the demographic characteristics of the participants surveyed.

Descriptive analysis of the surveyed constructs. The results of the current university supports (institutional integrity, institution readiness, commitment to student welfare, and perceived teacher support), individual campus experiences (sense of psychological community and campus involvement) and student thriving at private universities in Hunan, China is shown

in Figure 2. As a seven-point Likert scale was adopted to measure the items, with the values of each item ranging from "1 = Strongly disagree" to "7 = Strongly agree", so correspondingly, the Criteria of Scale in evaluating the mean of the constructs in this study range from "1-1.5=Very Low" to "6.51-7= Very High", with "3.51-4.5=Moderate", with "1.51-2.5=Low, 2.51-3.5= Somewhat low" and "4.51-5.5= Somewhat high, 5.51-6.5= High".

There are seven constructs in this survey, and the results showed that the total mean of constructs is 5.39 (SD=1.184). More specifically, all of the 7 constructs have positive results, as they got the means higher than 4.51, and lower than 7. Student thriving(M=5.58, SD=1.15), perceived teacher support(M=5.59,SD=1.064) and campus involvement(M=5.59, SD=1.12) have the high results, with the means in 5.51-6.5; and institutional integrity(M=4.99, SD=1.38), institutional readiness(M=5.37,SD=1.176), commitment to student welfare (M=5.21,SD=1.22) and psychological sense of community(M=5.4, SD=1.18) have the somewhat positive result, with the means from 4.51-5.50. However, none of the constructs had a very high mean between 6.51-7.00.

The research was conducted by employing a partial least squares structural equation modeling (PLS-SEM) approach. The outer model in this research was assessed through the following aspects: the internal consistency and the reliability of each item, convergent validity and discriminant validity of the constructs.

The internal consistency and reliability of the measurement were achieved by corresponding loading of the questions, the values of Cronbach's alpha and composite reliability of the constructs. The recommended standard value for factor loadings is higher than 0.6 (Hair, 2014), the suggested value for Cronbach's alpha is greater than 0.8 (Nunnally, 1994) and composite reliability (CR) value for each construct should be higher than 0.7(Chin, 1998). According to Mehmood and Najmi (2017), convergent validity is the degree to which the variable measurements function as if they are assessing the underlying theoretical construct because they share the same extent of variance. Apart from assessing the values for factor loadings and the composite reliability, the index of the average variance extracted (AVE) above 0.5 is also a necessary standard for achieving convergent validity (Fornell and Larcker, 1981). Table 3 demonstrated the values of the assessment: factor loadings, Cronbach's alpha, composite reliability, and average AVE. We can see that values of factor loadings fall between 0.697 and 0.957, which are higher than the threshold value of 0.6; the Cronbach's alpha values are between 0.826 and 0.959, and all are beyond the suggested threshold value of 0.8. Besides, the CR values range between 0.885 and 0.969, exceeding the threshold value of 0.7, and the AVE values are shown between 0.569 and 0.896, being higher than the suggested threshold value of 0.5.

The discriminant validity of each construct was detected to assess the outer model of this research. Discriminant validity means the degree of discrimination between two variables tested empirically (Fornell and Larcker, 1981; Hair et al., 2017). To measure it two mainly-adopted methods were utilized: Fornell-Larcker criterion and Heterotrait-Monotrait ratio (HTMT). The assessing standard for Fornell-Larcker criterion is that the square root of AVE of every construct is more significant than its bi-variate association with other constructs, while the threshold value for HTMT should be lower than 0.90 (Gold et al., 2001).Therefore, the validity of discriminant in this research is acceptable because the values of Fornell-Larcker criterion and the HTMT values between the constructs have all met the suggested standards respectively. Thus, the discriminant validity of this study is also achieved.

The common method variance (CMV) may arise from the gathering of cognitive information of student' respondents through self-report scales, and to reduce the influence of it, we took preventive measures in our investigation. Apart from anonymous survey, the

intention for the questions of each construct were hidden deliberately in the questionnaires. And the variable results have a satisfying construct validity, indicating that the results are not greatly impacted by CMV (see Table 5). Additionally, the severity of CMV of the study was tested by adopting Harman's One-Factor Test (Podsakoff and Organ, 1986). Exploratory factor analysis for the 54 questions in this study indicated that the explanatory variance for the first factor was 42.16%, which is less than the criterion of no more than 50% and it was a non-integrated factor, indicating that there is no serious impact of CMV in this research.

**Structural Model Assessment**

We adopted the bootstrapping procedure of 5000 re-samples and the blindfolding procedure of omission distance 12 within Smart-PLS to assess the inner model, and values of the standard beta ($\beta$), t-value, coefficient of determination ($R^2$) and Q-square ($Q^2$) were obtained through the computing process. The results are shown in Table 6 and Figure 2 and all the hypotheses are supported. The mediating effects also tested and are presented in Table 7.

As for the direct effects on student thriving, the results show that university supports like institutional integrity, commitment to student welfare and institutional readiness are positively related to student thriving at private universities in Hunan, China, supporting the first hypothesis of the study (H1). Among them, institutional integrity ($\beta = 0.685$, t = 33.133, p < 0.001) is positively related to student thriving, which is consistent with H1a. Besides, commitment to student welfare ($\beta = 0.321$, t = 6.186, p < 0.001) and institutional readiness ($\beta = 0.148$, t = 3.887, p < 0.001) are positively related to student thriving, supporting H1b and H1c. Additionally, we can see from the results that perceived teacher support ($\beta = 0.262$, t = 4.616, p < 0.001), psychological sense of community ($\beta = 0.308$, t = 5.51, p < 0.001) and campus involvement ($\beta = 0.436$, t = 7.717, p < 0.001) are all positively related to student thriving, thus H2, H3 and H4 are supported.

In line with the H5, institutional integrity is positively related to psychological sense of community ($\beta = 0.367$, t = 7.409, p < 0.001) and campus involvement ($\beta = 0.676$, t = 31.145, p < 0.001) at private universities in Hunan, China. Therefore, H5a and H5b are acceptable. Meanwhile, commitment to student welfare is positively related to psychological sense of community ($\beta = 0.791$, t = 50.14, p < 0.001) and campus involvement ($\beta = 0.738$, t = 38.842, p < 0.001) at private universities in Hunan, China, supporting H6a and H6b. The results also show that institutional readiness is positively related to psychological sense of community ($\beta = 0.378$, t = 7.871, p < 0.001) and campus involvement ($\beta = 0.379$, t = 38.643, p < 0.001) at private universities in Hunan, China. Thus, we can see that H7a and H7b are supported. Lastly, the results present that perceived teacher support is positively related to psychological sense of community ($\beta = 0.224$, t = 5.603, p < 0.001) and campus involvement ($\beta = 0.893$, t = 96.464, p < 0.001) in private universities in China.

Path analysis was conducted in this study to obtain approximate p-values so as to assess the significance of the mediating effects among these constructs, which were modeled in the research framework. All of them underwent mediation effect testing and the results showed that psychological sense of community and campus involvement can provide positive mediation effects between the independent variables: institutional integrity, commitment to student welfare and perceived teacher support, and the dependent variable: student thriving (as shown in Table 7).

**Table 6** Path coefficients

| Hypothesis | Relationship | Original Sample | Standard Deviation | T Statistics | P Values | Decision |
|---|---|---|---|---|---|---|
| H1a | INI →STT | .685 | .21 | 33.133 | *** | Supported |
| H1b | CSW→STT | .321 | .52 | 6.186 | *** | Supported |
| H1c | INR→STT | .148 | .38 | 3.887 | *** | Supported |
| H2 | PTS→STT | .262 | .57 | 4.616 | *** | Supported |
| H3 | PSC→STT | .38 | .56 | 5.51 | *** | Supported |
| H4 | CAI→STT | .436 | .56 | 7.717 | *** | Supported |
| H5a | INI→PSC | .367 | .5 | 7.49 | *** | Supported |
| H5b | INI→CAI | .676 | .22 | 31.145 | *** | Supported |
| H6a | CSW→PSC | .791 | .16 | 5.14 | *** | Supported |
| H6b | CSW→CAI | .738 | .19 | 38.842 | *** | Supported |
| H7a | INR→PSC | .378 | .48 | 7.871 | *** | Supported |
| H7b | INR→CAI | .739 | .19 | 38.643 | *** | Supported |
| H8a | PTS→PSC | .224 | .4 | 5.63 | *** | Supported |
| H8b | PTS→CAI | .893 | .9 | 96.464 | *** | Supported |

*Notes.* STT, Student Thriving; PSC, Psychological Sense of Community; PTS, Perceived Teacher Support; INI, Institutional Integrity; CSW, Commitment to Student Welfare; CAI, Campus Involvement; INR, Institutional Readiness; ***P < .1.

**Table 7** Mediation effects testing/Specific indirect effects

| Relationship | Original Sample | Standard Deviation | T Statistics | P Values |
|---|---|---|---|---|
| INI→PSC→STT | .546 | .23 | 23.539 | *** |
| INI→CAI→STT | .527 | .23 | 22.572 | *** |
| CSW→PSC→STT | .537 | .24 | 22.14 | *** |
| CSW→CAI→STT | .575 | .22 | 25.992 | *** |
| INR→PSC→STT | .559 | .24 | 23.362 | *** |
| INR→CAI→STT | .576 | .23 | 25.345 | *** |
| PTS→PSC→STT | .58 | .29 | 17.489 | *** |
| PTS→CAI→STT | .696 | .19 | 35.941 | *** |

*Notes.* STT, Student Thriving; PSC, Psychological Sense of Community; PTS, Perceived Teacher Support; INI, Institutional Integrity; CSW, Commitment to Student Welfare; CAI, Campus Involvement; INR, Institutional Readiness; ***P < .1.

As we can see the ($R^2$) results from Figure 2, institutional integrity, commitment to student welfare, institutional readiness and perceived teacher support explain 77.2% of the variance in psychological sense of community. Besides, institutional integrity, commitment to student welfare, institutional readiness and perceived teacher support explains 81.4% of the variance in campus involvement. Furthermore, institutional integrity, commitment to student welfare, institutional readiness, perceived teacher support, psychological sense of community and campus involvement together explain 66.1% of the variance in student thriving. According to the values of ($R^2$) suggested by Chin (1998), the ($R^2$) values obtained in this study are acceptable. The values of $Q^2$ are all greater than the standard of zero, including student thriving ($Q^2$= 0.314), psychological sense of community ($Q^2$ =0.606), campus involvement ($Q^2$ = 0.489), accessible($Q^2$ = 0.727), expectation ($Q^2$ = 0.0.758), positive regard ($Q^2$=0.743) and invested ($Q^2$ = 0.683), which establishes that the proposed model has sufficient predictive power(Claes Fornell, 1994). To evaluate the quality of the proposed model, the Goodness of Fit (GoF) was also computed(Tenenhaus et al., 2005). The GoF is calculated as:

$$\text{GoF} = \sqrt{\overline{AVE} \times \overline{R^2}} = \sqrt{0.733 \times 0.795} = 0.681$$

The result shows that the GoF of the model is 0.681, above the threshold criterion of 0.36 for a large effect size(Wetzels et al., 2009). This indicates that the Goodness of Fit is acceptable.
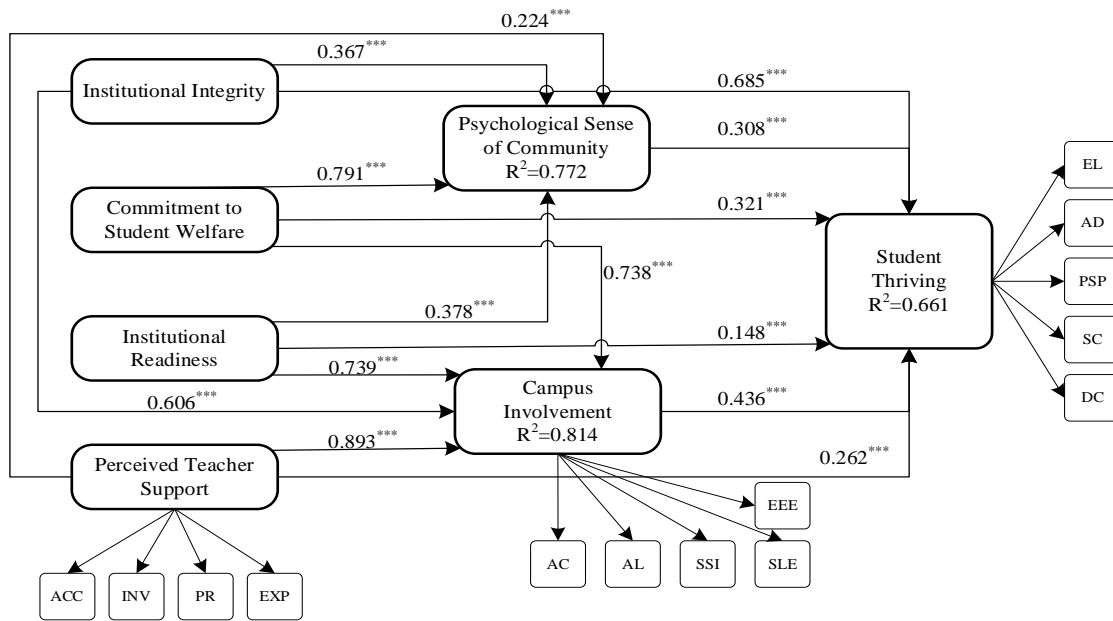
**Figure 2:** Results of Structural Model

Notes: ACC, Accessible; INV, Invested; PR, Positive Regard; EXP, Expectation; AC, Academic Challenge; AL, Active Learning; SSI, Student-Stuff Interaction; EEE, Enriching Educational Experiences; SLE, Supportive Learning Environment; EL, Engaged Learning; AD, Academic Determination; PSP, Positive Perspective; SC, Social Connectedness; DC, Diverse Citizenship; *** $P < 0.001$ ; ** $P < 0.01$.

## Discussion

The findings of this survey are consistent with previous studies by scholars, and the results have also validated the proposed hypotheses of the research.

First of all, based on the survey(n=707), the total mean of constructs surveyed is 5.39 (SD=1.184), which falls in the somewhat high category, but not in the high or very high section. Specifically, the current student thriving obtained an overall mean score of 5.582 (SD=1.15), perceived teacher support (M=5.59,SD=1.064),campus involvement (M=5.59, SD=1.12),institutional integrity (M=4.99, SD=1.38), institutional readiness (M=5.37,SD=1.176), commitment to student welfare (M=5.21,SD=1.22) and psychological sense of community (M=5.4, SD=1.18). However, of all the constructs surveyed, none of them had a very high mean between 6.51-7.00. Due to kinds of reasons, the administrations of private institutions are likely to be more concerned with enrollment rather than students' overall development (Altbach, 2016; Liu, 2020), ignoring students' rich campus experience (Liu, 2020), even not matching the promises made during the admissions process(Liu et al., 2021), lacking adequate and competent full-time faculty or complete campus infrastructure (Levy, 2009). It can be seen from the survey results that student thriving, university support and student campus experience could be improved,).

As for the effects of university supports and campus experiences on student thriving at private universities in Hunan, China, the results showed that institutional integrity ($\beta = 0.685$, $t = 33.133$, $p < 0.001$), commitment to student welfare ($\beta = 0.321$, $t = 6.186$, $p < 0.001$) and institutional readiness ($\beta = 0.148$, $t = 3.887$, $p < 0.001$) are positively related to student thriving at private universities in Hunan, China, supporting the first hypothesis of the study (H1). Previous research has indicated that fulfilling institutional promises is important to all students and has a positive effect on student persistence (Ash and Schreiner, 2016), as well as acting as a predicator of thriving (Schreiner, 2016). When students perceive the integrity of the institution, they are more likely to be integrated into the university, achieving expected development (Braxton and Hirschy, 2004). Besides, commitment to student welfare is expressed in institutional policies and practices that convey "an abiding concern for the growth and development of its students… and clearly communicate the high value it places on students"(Braxton and Hirschy, 2004, p22). Such policies and practices that promote student growth and development, as well as the caring attitude of faculty, staff and administrators toward students, make students feel valued, promote student integration at the university, which in turn may significantly affect their academic persistence and development(Braxton and Hirschy, 2004). Institutional readiness has also long been validated that it has impact on the lives and learning experiences of university students(Rankin and Reason, 2008). These fundamental conditions provide by universities can ensure positive environments for student learning, as well as for interpersonal relations between university students(Wells and Horn, 2015), and is crucial to ensure their socialization (Rankin and Reason, 2008). Additionally, we can see from the results that university support like perceived teacher support ($\beta = 0.262$, $t = 4.616$, $p < 0.001$), as well as campus experiences like psychological sense of community ($\beta = 0.308$, $t = 5.51$, $p < 0.001$) and campus involvement ($\beta = 0.436$, $t = 7.717$, $p < 0.001$) are all positively related to student thriving, thus H2, H3 and H4 are supported. Previous research has indicated that psychological sense of community is a vital component of student persistence for different student groups (Hausmann et al., 2009) and is the most significant contributor to student thriving (Schreiner, 2014). Previous research has explained the value of it, as it can ease students' transitions and improve retention rates and overall student success(Strayhorn, 2018). Research has also reported that psychological sense of community was important for individuals as influences the relationships with others and with the institution (Jason et al., 2015). Campus involvement of college students is a large predictor of student thriving (Schreiner, 2016), and some studies points to direct pathways exist between campus involvement and thriving(Seppelt, 2016). It is associated with almost all desired college student achievements, such as excellent academic performance, increased graduation and retention rates, etc (Astin, 2005; Wolf-Wendel et al., 2009). High-quality student involvement has a direct impact on overall student thriving (Vetter et al., 2019b).

And as for the effects of university supports on campus experiences at private universities in Hunan, China, research results confirmed that institutional integrity is positively related to psychological sense of community ($\beta = 0.367$, $t = 7.409$, $p < 0.001$) and campus involvement ($\beta = 0.676$, $t = 31.145$, $p < 0.001$), commitment to student welfare is positively related to psychological sense of community ($\beta = 0.791$, $t = 50.14$, $p < 0.001$) and campus involvement ($\beta = 0.738$, $t = 38.842$, $p < 0.001$) and institutional readiness is positively related to psychological sense of community ($\beta = 0.378$, $t = 7.871$, $p < 0.001$) and campus involvement ($\beta = 0.379$, $t = 38.643$, $p < 0.001$).Therefore, H5, H6 and H7 are acceptable. Institutional integrity can have an impact on psychological sense of community(Schreiner et al., 2020). Meanwhile, when students perceive the integrity of the institution, they are more likely to be integrated into the university and get involved in campus activities. Thus

universities can fulfill their mission by setting policies and meeting student expectations fairly so that students experience more academic gains and personal growth when they are engaged in campus activities (Braxton and Hirschy, 2004). Also, commitment to student welfare can promote student integration at the university and influence students' sense of belonging and their persistence(Braxton and Hirschy, 2004). It is expressed in institutional policies and practices that convey "an abiding concern for the growth and development of its students… and clearly communicate the high value it places on students"(Braxton and Hirschy, 2004, p22). Such policies and practices that promote student growth and development, as well as the caring attitude of faculty, staff and administrators toward students, make students feel valued (Braxton and Mundy, 2001), which may significantly affect their psychological sense of community. Besides, as an institutional climate under the context of higher education, institutional readiness has long been validated that it has impact on the campus lives and psychological experiences of university students(Rankin and Reason, 2008). It is crucial to ensuring the socialization of students and thus enhancing their sense of belonging on campus(Rankin and Reason, 2008). Some positive educational experiences are enhanced through the improvement of institutional readiness of the organization, such as well-being(McEvoy and Welker, 2000), social integration(Li et al., 2016) and a sense of belonging(Wells and Horn, 2015).

Furthermore, the results present that perceived teacher support is positively related to psychological sense of community ($\beta = 0.224$, $t = 5.603$, $p < 0.001$) and campus involvement ($\beta = 0.893$, $t = 96.464$, $p < 0.001$) in private universities in China, supporting H8. Teachers' support, which functions as an educational context for students, its strong connection with students' education on campus has been widely confirmed(Mayhew et al., 2016a). McIntosh and Nelson (2012) claimed that factors of teachers explained 36.1% of the variance in psychological sense of community for students in his investigation. Similarly, in another survey of 2,889 students from several different higher institutions by Schreiner et al. (2013), teacher's factors explained 22% of the variance in psychological sense of community. Teachers' support is also related to a range of behavioral experiences they have on campus, such as academic involvement(Quin et al., 2018), learning process(Ricard and Pelletier, 2016), academic adjustment and making friends on campus (Wentzel et al., 2010; Dietrich et al., 2015).

Lastly, from the results we found that institutional integrity has positive effect on student thriving through the mediate roles of psychological sense of community ($\beta = 0.546$, $t = 23.539$, $p < 0.001$) and campus involvement ($\beta = 0.0527$, $t = 22.572$, $p < 0.001$) respectively. And the results show that commitment to student welfare influences student thriving through the mediating effects of psychological sense of community ($\beta = 0.537$, $t = 22.014$, $p < 0.001$) and campus involvement ($\beta = 0.575$, $t = 25.992$, $p < 0.001$) respectively. Meanwhile, psychological sense of community ($\beta = 0.559$, $t = 22.362$, $p < 0.001$) and campus involvement ($\beta = 0.576$ $t = 25.345$, $p < 0.001$) positively play mediating roles of the relationship of between institutional readiness and student thriving respectively. It is also found that perceived teacher support has positive impact on student thriving through the mediating roles of psychological sense of community ($\beta = 0.508$, $t = 17.489$ $p < 0.001$) and campus involvement ($\beta = 0.696$, $t = 35.941$, $p < 0.001$) respectively. Previous research has confirmed that if students can enjoy rich educational experiences on campus, then those from well-conditioned organizations can achieve more positive educational development (McEvoy and Welker, 2000; Li et al., 2016). For example, a survey of 2,889 students from several different higher institutions by Schreiner et al. (2013), teacher's factors explained 22% of the variance in psychological sense of community, which explained 32% of the variance in thriving, and thus it is indicated that effect

of teachers factors to thriving is both direct, and indirect through psychological sense of community.

In summary, the strategic model for improving student thriving at private universities in Hunan, China, which is derived from the research results, is expected to help improve student thriving in these institutions. From the levels of university support and student campus experience, it can provide implications and recommendations for teachers and university administrators at private universities in Hunan, China, as well as private higher education policy makers and researchers in this field, to create interventions or conduct further research to enhance student thriving, either practically or theoretically.

## Conclusion

This research was conducted based on the Thriving Model by adopting a PLS-SEM approach, and the findings validated the impact of university supports and campus experiences on thriving at private universities in China. The results would make some contributions to the research of student thriving, and the strategic model from university support and campus experiences for improving student thriving also brings practical implications in the relevant field. The results appeal the educators, policy makers or even researchers to put more emphasis on students' college experiences, especially for those under the similar contexts of private universities in China. After assessing students' experiences and considering their unique needs, some positive institutional intervenes and supports should be created and built, assisting them to experience meaningful college life and achieve grand personal development, thus improving their overall thriving on campus.

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1. The article including the title and the content should pinpoint the issue the writer wishes to present and it should be organized in an appropriate order so that it is clearly and easily understood by the reader. The issue or issues must be analyzed and summarized using academic principles. The writer may use the knowledge based on the conceptual framework and theories from various sources for a synthesis and clearly express his academic viewpoints for the benefits of the reader.

2. In case of a research article, the method and findings should be presented systematically with the following components (the topic and components may vary).

    2.1 Introduction: significance and background of the study together with overall view of the article.

    2.2 Objective

    2.2 Literature Review

    2.3 Research Methodology: steps of doing the research, samples for the study, data collection, research instrument and statistics.

    2.4 Research Finding

    2.5 Discussion and Conclusion

    2.6 References

## References

In submitting an article for consideration, you need to write citations of other documents or the sources of information used at the end of the article. By providing references only in English and categorized in APA style, the submitter should check the correctness and completeness of the citation in accordance with the criteria specified by the journal. Any articles on topics that have a citation format that has not yet been complied with the journal will not be forwarded to a qualified reader for reviewing in the next step. The submitter must adhere to the following main guidelines.

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3. In case the editorial board do not receive the article for further step, they will keep the author informed of the rejection with some seasons and brief suggestions through the e-mail.

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