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FEATURE EXTRACTION OF ENGLISH TOURIST GUIDEBOOKS IN HOKURIKU REGION IN JAPAN USING DATA MINING

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ABSTRACT

Abstract—Ishikawa Prefecture is located in the Hokuriku region in Japan. One of the main targets of the tourism industry in Ishikawa is to increase the number of tourists from foreign countries. In order to achieve this goal, it is necessary to provide foreign tourists with "language service." In this study, in order to understand the state of language service provided to foreign tourists, what linguistic characteristics can be found in English guidebooks at Komatsu Airport and Toyama Airport, which are local airports in Japan, are investigated and compared with guidebooks available at international airports in Japan and the U.S. In short, frequency characteristics of character- and word-appearance are investigated using a program written in C++. These characteristics are approximated by an exponential function. Furthermore, the percentage of Japanese junior high school required vocabulary and American basic vocabulary is calculated to obtain the difficulty-level as well as the *K*-characteristic of each material. As a result, it is clearly shown that English guidebooks available at airports in the Hokuriku region have a similar tendency to literary writings in the characteristics of character-appearance. Besides, the values of the *K*-characteristic for the guidebooks are high, and the difficulty level is low in terms of the American basic vocabulary.

Keywords: data mining, metrical linguistics, statistical analysis, tourism, tourist guidebook

Introduction

Ishikawa Prefecture, located in the Hokuriku region in Japan, has a population of about 1.1 million, and its capital is Kanazawa city. Ishikawa is blessed with natural beauty and traditional cultures, which attract a lot of tourists. These days, one of the main targets of the tourism industry in Ishikawa is to increase the number of tourists from foreign countries. In order to achieve this goal, it is necessary to provide foreign tourists with a "language service," which motivates foreigners to go sightseeing more easily. This "language service" means to serve benefits and convenience to foreign

tourists by enhancing signs, pamphlets and homepages in several languages. It will become a key word for the increase of foreign tourists (Ban & Oyabu, 2019).

While some foreigners who visit Kyoto often extend their trip to Kanazawa which is located about two hours away by limited express train, other tourists also come to use regular flights from Seoul and Shanghai or charter flights from Taiwan to Komatsu Airport, located one hour or less away from Kanazawa city by car. Moreover, there are regular flights from Dalian to Toyama Airport which is located in the vicinity of Kanazawa, and it is likely that tourists who visit Toyama will also visit Ishikawa Prefecture.

In this study, in order to understand the state of "language service" provided to foreign tourists, English guidebooks at Komatsu Airport and Toyama Airport, which are local airports in Japan, are examined, and compared with guidebooks available at Narita, Kansai, Chubu, and San Francisco international airports. As a result, it is clearly shown that English guidebooks at local airports in Japan have some interesting characteristics regarding character- and word-appearance.

Method of analysis and materials

The materials analyzed here are English guidebooks available at Komatsu, Toyama, Narita, Kansai and Chubu. Moreover, San Francisco International Airport is taken as an example of an overseas international airport because San Francisco is a popular tourist destination in the United States. The following guidebooks are selected with paying attention to unify the topics as much as possible.

Material 1: *HOKURIKU JAPAN, Fukui, Ishikawa & Toyama, RESORT OF WONDERS AND FASCINATION, Hot spring route blessed with four seasons*, Mar. 2000, Komatsu Airport

Material 2: *TOYAMA – Japan*, Oct. 2007, and *TOYAMA City Guide*, Nov. 2006, Toyama Airport

Material 3: *Tourist Guide, Around Narita International Airport*, May 2008, Narita International Airport

Material 4: *Have a nice day in KANSAI, Visitor's guide*, vol. 5, Feb. 2008, Kansai International Airport

Material 5: *Aichi, Gifu, Mie, Shizuoka, Fukui, Nagoya, ACCESS MAP*, June 2007, Chubu Centrair International Airport

Material 6: *San Francisco guide®, where to go & what to do*, Aug. 2010, San Francisco International Airport (SFO)

Due to the circulation, the publication of Material 1 is older than other materials.

In addition, English textbooks for Japanese junior high school students (*NEW HORIZON English Course 1*, *2* and *3* (2010, Tokyo Shoseki Co., Ltd.) (hereinafter referred to as "JHS 1, 2 and 3")) and those for Japanese high school students (*UNICORN ENGLISH COURSE I, II* and *READING* (2010, Bun-eido Publishing Co.,

Ltd.) (“HS 1, 2 and 3”)) are also analyzed.

The computer program for this analysis is composed of C++. Besides the characteristics of character- and word-appearance for each piece of material, various information such as the “number of sentences,” the “number of paragraphs,” the “mean length,” the “number of words per sentence,” etc. can be extracted by this program (Ban, Kimura, & Oyabu, 2016)

Results

1.1. Characteristics of character-appearance

Zipf’s law being referred to, frequencies of character- and word-appearance are examined. First, the frequently used characters in each material and their frequency are derived. The frequencies of the 50 most frequently used characters including blanks, capitals, small letters, and punctuations are plotted on a descending scale. The vertical shaft shows the degree of the frequency and the horizontal shaft shows the order of character-appearance. The vertical shaft is scaled with a logarithm. Figure 1 shows the results for Material 1.

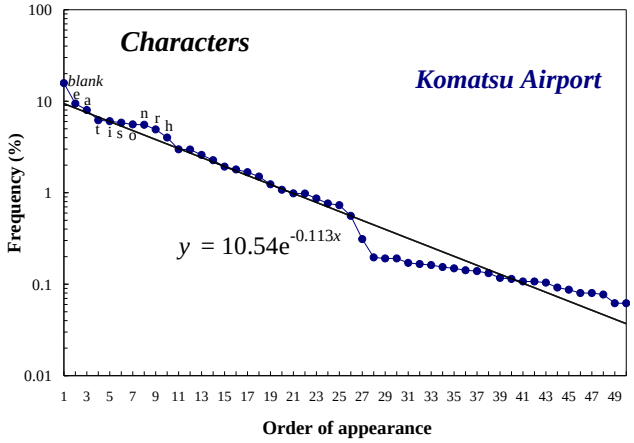

Figure 1 – Frequency characteristics of character-appearance in Material 1.

Between the 26th and 27th places, there is an inflection point caused by the difference in declines, and a relatively larger decline is observed at the 27th place and thereafter. This characteristic curve is approximated by the following exponential function:

$$y = c * \exp(-bx) \qquad (1)$$

From this function, coefficients c and b can be derived (Ban & Oyabu, 2013). In the case of Material 1, as shown in Figure 1, values, $c = 10.54$ and $b = 0.113$ are obtained.

The distribution of coefficients c and b extracted from each material is shown in Figure 2.

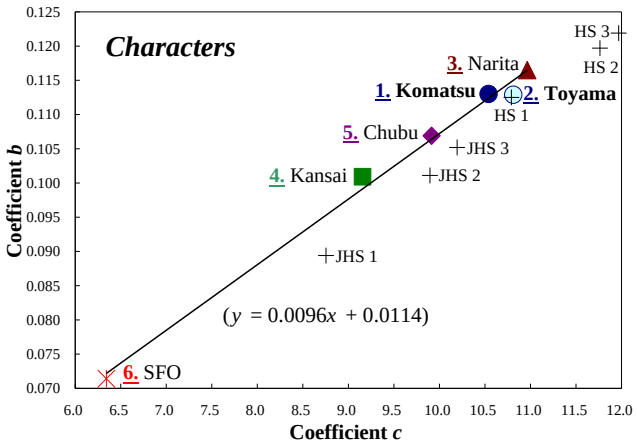

Figure 2 – Dispersions of coefficients *c* and *b* for character-appearance.

There is a linear relationship between *c* and *b* for all materials. While the values of coefficients *c* and *b* for Material 6 are lowest, those for HS 3, HS 2 and Material 3 are high. With regard to the English textbooks, values of *c* and *b* are larger for higher grades. The values for all the six tourist guidebooks are approximated by [$y = 0.0096x + 0.0114$]. The values of coefficients *c* and *b* for Materials 1 and 2 are high: the values of *c* are 10.540 and 10.811, and those of *b* are 0.1130 and 0.1129. Previously, various English writings were analyzed and it was reported that, as for the 50 most frequently used characters, there is a positive correlation between the coefficients *c* and *b*, and that the more journalistic the material is, the lower the values of *c* and *b* are, and that the more literary the material is, the higher the values of *c* and *b* are (Ban, Kimura & Oyabu, 2015). Thus, while the material at San Francisco International Airport is rather journalistic, the tourist guidebooks available at local airports in Japan have a similar tendency to English literary writings.

1.2. Characteristics of word-appearance

Next, frequently used words in each material and their frequency are derived. Table 1 shows the top 20 words most frequently used in each material. The article THE is the most frequently used word in every material except JHS 1. While OF is the second most frequently used word in the five guidebooks in Japan, AND is the second most frequently used word for Material 6. In the cases of Materials 1 and 2, as well as JHS 1 and JHS 2, the frequency of CAN is high, which ranks at 15 and 12 respectively. On the other hand, in the cases of Materials 3, 4 and 5, the frequencies of JAPAN and JAPANESE are high. Besides, nouns related to tourism, such as FESTIVAL in Material 1, VISITORS, TEMPLES, STREET and TRANSIT can be seen at the 8th to 20th in guidebooks.

Table 1 – High-frequency words for each material.

	1. Komatsu	2. Toyama	3. Narita	4. Kansai	5. Chubu	6. SFO	JHS 1 (*Horizon 1*)	JHS 2 (*Horizon 2*)	JHS 3 (*Horizon 3*)	HS 1 (*Unicorn 1*)	HS 2 (*Unicorn 2*)	HS 3 (*Unicorn R*)
1	the	the	the	the	the	the	I	the	the	the	the	the
2	of	of	of	of	of	and	the	a	a	and	to	and
3	in	and	and	and	and	of	you	I	to	in	and	to
4	and	a	a	in	a	a	is	to	and	of	a	of
5	a	in	to	a	in	to	a	you	you	to	of	a
6	is	to	is	to	is	at	it's	and	in	a	I	in
7	this	is	in	is	this	in	to	in	I	I	in	is
8	to	Toyama	this	for	to	street	we	it	is	was	was	I
9	as	with	as	as	with	is	I'm	is	of	he	for	it
10	are	as	for	with	as	for	do	of	was	they	that	as
11	for	for	are	you	are	on	in	but	it	that	it	that
12	with	can	Japanese	are	for	from	my	we	but	are	we	we
13	from	from	many	on	on	with	have	can	for	it	my	for
14	on	are	that	at	was	San	this	he	are	for	as	on
15	can	at	on	Japan	Japan	or	yes	was	she	is	is	are
16	by	by	visitors	by	an	public	are	have	people	his	on	was
17	festival	on	from	its	city	transit	at	for	this	on	but	with
18	it	it	Narita	can	famous	Francisco	your	are	very	my	had	she
19	has	you	pride	from	from	by	can	on	have	one	she	but
20	which	this	an	temple	hot	map	like	about	my	people	they	have

Just as in the case of characters, the frequencies of the 50 most frequently used words in each material are plotted. Each characteristic curve is approximated by the same exponential function. The distribution of *c* and *b* is shown in Figure 3.

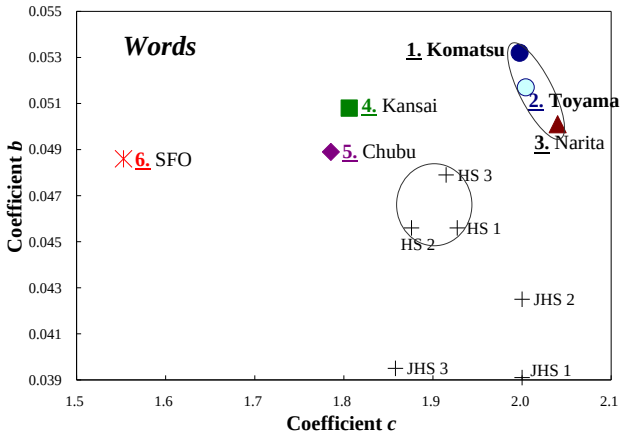

Figure 3 – Dispersions of coefficients *c* and *b* for word-appearance.

As for the coefficient *c*, the values for Materials 1 and 2 are high: they are 1.9973 (Material 1) and 2.0042 (Material 2), compared with the value for Material 6 (1.5527). Moreover, the value of coefficient *c* gradually increases in the order of Material 1, Material 2 and Material 3. This order corresponds with the coefficients *c* for character-appearance, and the intervals of the values in both cases are very similar as well. On the hand, as for the coefficient *b*, the value for Material 1 is the highest and that for Material 2 is the second highest of all. All the six guidebooks have higher values than all the six textbooks. Besides, the values of coefficients *c* and *b* for word-appearance for Materials 1, 2 and 3, and those for three textbooks for high school

students are similar respectively, and they might be regarded as two clusters.

As a method of featuring words used in writing, a statistician named Udny Yule suggested an index called the "*K*-characteristic" in 1944 (Yule, 1944). This can express the richness of vocabulary in writings by measuring the probability of any randomly selected pair of words being identical. It was used to identify the author of *The Imitation of Christ*. This *K*-characteristic is defined as follows:

$$K = 10^4 \left(S_2 / S_1^2 - 1 / S_1 \right) \qquad (2)$$

where if there are f_i words used x_i times in a writing, $S_1 = \Sigma\, x_i\, f_i$, $S_2 = \Sigma\, x_i^2 f_i$.

The *K*-characteristic for each material is examined. The results are shown in Figure 4. According to the figure, the values for the five guidebooks in Japan are high: they range form 97.682 (Material 3) to 124.897 (Material 5), compared with the value for Material 6 (64.349), which is the lowest of all the 12 materials. The values for Materials 1 and 2 are high: they are 118.882 (Material 1) and 107.047 (Material 2), which are 54.533 and 42.678 higher than that for Material 6. As for textbooks, the values for JHS and those for HS are 70.358 to 78.935 and 79.643 to 85.488, which are similar respectively, and the former are lower than the latter.

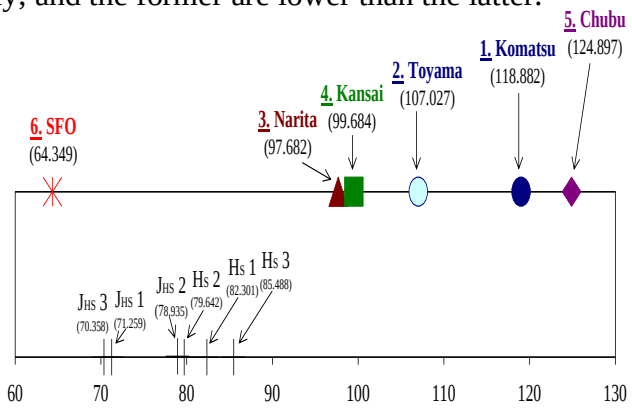

Figure 4 – *K*-characteristic for each material.

The results showing higher *K*-characteristics for Materials 1 and 2 than for Material 6 coincide with the aforementioned tendency regarding coefficients *c* and *b* for character- and word-appearance. In addition, higher *K*-characteristic values for textbooks for HS than those for JHS coincide with the tendency regarding coefficients *c* and *b* for character-appearance and coefficient *b* for word-appearance. This correlation between *K*-characteristic and the coefficients for character- and word-appearance needs to be studied in the future.

1.3. Degree of difficulty

In order to show how difficult the materials are for readers, the degree of difficulty for each material through the variety of words and their frequency is derived (Ban, Oguri, & Kimura, 2015; Ban, Kimura & Oyabu, 2016). That is, two parameters to measure difficulty are used; one is for word-type or word-sort (D_{ws}), and the other

is for the frequency or the number of words (D_{wn}). The equation for each parameter is as follows:

$$D_{ws} = (1 - n_{rs} / n_s) \quad (3)$$

$$D_{wn} = \{ 1 - (1 / n_t * \Sigma n(i))\} \quad (4)$$

where n_t means the total number of words, n_s means the total number of word-sort, n_{rs} means the required English vocabulary in Japanese junior high schools or American basic vocabulary by *The American Heritage Picture Dictionary* (American Heritage Dictionaries, Houghton Mifflin, 2003), and $n(i)$ means the respective number of each required or basic word. Thus, it can be calculated how many required or basic words are not contained in each piece of material in terms of word-sort and frequency.

Thus, the values of both D_{ws} and D_{wn} are calculated to show how difficult the materials are for readers, and to show at which level of English the materials are, compared with other materials. Then, to make the judgments of difficulty easier for the general public, one difficulty parameter is derived from D_{ws} and D_{wn} using the following principal component analysis:

$$z = a_1 * D_{ws} + a_2 * D_{wn} \quad (5)$$

where a_1 and a_2 are the weights used to combine D_{ws} and D_{wn}. Using the variance-covariance matrix, the 1st principal component z is extracted: [z = 0.7071*D_{ws} + 0.7071*D_{wn}] for both required and basic vocabulary, from which the principal component scores are calculated. Figure 5 shows the principal component scores obtained from this, expressed in one dimension each.

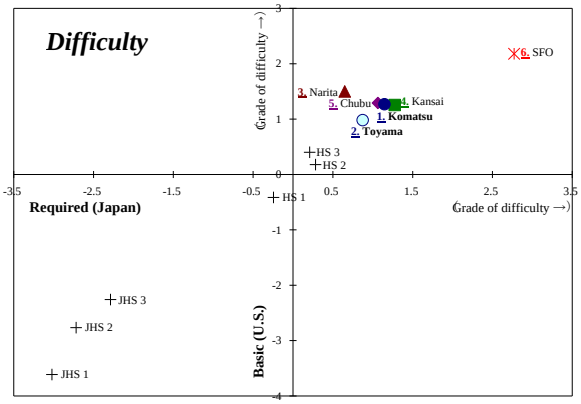

Figure 5 – Principal component scores of difficulty.

According to Figure 5, all the 6 guidebooks are more difficult than English textbooks, and Material 6 is by far the most difficult of all. In the case of the required vocabulary, Material 4 is the most difficult, and Material 1 is the second most difficult of the five guidebooks in Japan. The difficulty of Material 1 is similar to that of Material 4. The difficulty level decreases in the order of Materials 4, 1, 5, 2 and 3. On the other hand, in the case of the basic vocabulary, Material 3 is the most difficult,

and Material 2 is the easiest of the five guidebook materials in Japan. Material 5 is the second most difficult after Material 3, and its difficulty is almost equal to Materials 1 and 4.

Thus, although Material 1 is difficult in the case of the Japanese required vocabulary, English guidebooks available at local airports in Hokuriku region are easy in terms of the American basic vocabulary. Therefore, the materials seem to be easier for Americans to read.

1.4. Other characteristics

Other metrical characteristics of each material are compared. The results of the "mean word length," the "number of words per sentence," etc. are shown together in Table 2. Although the "frequency of prepositions," the "frequency of relatives," etc. are counted, some of the words counted might be used as other parts of speech because the meaning of each word is not checked.

Table 2 – Metrical data for each material.

	1. Komatsu	2. Toyama	3. Narita	4. Kansai	5. Chubu	6. SFO	JHS 1 (*Horizon 1*)	JHS 2 (*Horizon 2*)	JHS 3 (*Horizon 3*)	HS 1 (*Unicorn 1*)	HS 2 (*Unicorn 2*)	HS3 (*Unicorn R*)
Total num. of characters	40,245	25,583	19,372	28,936	10,034	86,046	6,824	14,362	13,387	44,279	67,662	88,289
Total num. of character-type	75	74	71	77	69	79	69	69	71	73	75	76
Total num. of words	6,867	4,309	3,248	4,874	1,699	14,332	1,339	2,876	2,594	8,083	12,264	15,857
Total num. of word-type	1,925	1,423	1,169	1,671	787	3,657	497	799	764	2,059	2,657	3,594
Total num. of sentences	385	252	179	287	101	968	251	394	317	633	890	1,005
Total num. of paragraphs	147	120	54	132	43	199	233	227	177	163	261	260
Mean word length	5.861	5.937	5.964	5.937	5.906	6.004	5.096	4.994	5.161	5.478	5.517	5.568
Words/sentence	17.836	17.099	18.145	16.983	16.822	14.806	5.335	7.299	8.183	12.769	13.780	15.778
Sentences/paragraph	2.619	2.100	3.315	2.174	2.349	4.864	1.077	1.736	1.791	3.883	3.410	3.865
Commas/sentence	0.797	0.861	0.810	0.746	0.950	1.130	0.263	0.223	0.331	0.694	0.801	0.977
Repetition of a word	3.567	3.028	2.778	2.917	2.159	3.919	2.694	3.599	3.395	3.926	4.616	4.412
Freq. of prepositions (%)	15.367	14.202	15.306	15.292	13.954	11.647	9.110	11.788	12.188	14.769	14.810	15.052
Freq. of relatives (%)	1.033	1.414	1.540	0.842	0.472	0.475	1.792	1.392	1.927	1.745	2.421	2.383
Freq. of auxiliaries (%)	0.728	0.974	0.833	0.699	0.530	0.266	0.897	1.530	1.119	0.802	1.215	1.217
Freq. of pers. pronouns (%)	1.545	2.157	1.324	2.610	1.649	1.040	17.476	15.511	10.684	9.324	8.707	8.393

3.4.1. Mean word length

As for the "mean word length," it is 5.861 letters for Material 1, which is the shortest of all the six guidebook materials. In the case of Material 2, it is 5.937 letters, which being equal to Material 4, is the third longest of all. The mean word length of Material 6 (6.004 letters) is longer than any other material. It seems that this is because Material 6 contains many long-length terms such as COLLECTION (10 times), ENTERTAINMANT (13), FISHERMAN'S (45), NEIGHBORHOOD(S) (15), RESTAURANT(S) (32) and WATERFRONT (9).

3.4.2. Number of words per sentence

The "number of words per sentence" for Material 1 is 17.836 words and that for Material 2 is 17.099 words. They are the second and the third longest of all the materials. All the five guidebooks in Japan have more number of words per sentence

than Material 6 (14.806 words). Thus, it can be said that English tourist guidebooks at Japanese airports are characterized by a large number of words per sentence. Material 3 (18.145 words) has the highest number of all. From this point of view, as well as the result of the difficulty derived through the variety of words and their frequency in terms of the basic vocabulary, Material 3 seems to be rather difficult to read.

3.4.3. Frequency of relatives

The "frequency of relatives" for Material 2 is 1.414%, which is the second highest, and the one for Material 1 is 1.033%, which is the fourth highest of all the guidebooks. The frequency for Material 2 is as high as that for Material 3 (1.540%). The one for Material 5, whose percentage is only 0.472%, is the lowest of all. Therefore, it can be assumed that the English guidebooks at Toyama and Narita Airports tend to contain more complex sentences, the material seems to be difficult to read from this point of view, as well as in terms of the variety of words and their frequency.

3.4.4. Frequency of auxiliaries

There are two kinds of auxiliaries in a broad sense. One expresses the tense and voice, such as *BE* which makes up the progressive form and the passive form, the perfect tense *HAVE*, and *DO* in interrogative sentences or negative sentences. The other is a modal auxiliary, such as *WILL* or *CAN* which expresses the mood or attitude of the speaker (Ban, Kimura & Oyabu, 2017). In this study, only modal auxiliaries are targeted. As a result, while the "frequency of auxiliaries" for Material 2 (0.974%) is the highest and Material 1 (0.728%) is the third highest of all the guidebook materials, Material 6 contains 0.266% auxiliaries, which is the lowest of all. Therefore, it might be said that while the writers of English guidebooks available at Japanese airports tend to communicate their subtle thoughts and feelings by using auxiliary verbs, the style of Material 6 can be called more assertive.

1.5. Word-length distribution

In addition, word-length distribution for each material is examined. The results are shown in Figure 6. The vertical shaft shows the degree of frequency with the word length as a variable. As for all the guidebook materials, the frequency of 3-letter words is the highest. The frequency of 3-letter words ranges from 17.334% (Material 3) to 21.307% (Material 5). The frequency of 5-letter words such as ENJOY, WATER and WHICH for Materials 1 and 2 is higher than in other 10 materials. While in the case of Material 1, the frequency decreases after 4-letter words, in the case of Material 2, although the frequency decreases until 7-letter words, the frequency of 8-letter words such as FESTIVAL, GOKAYAMA and VISITORS is 0.604% higher than that of 7-letter words.

Besides, although Materials 1 and 2 have almost equal frequencies to other guidebooks regarding 8-letter words, the degree of decrease for them gets a little higher than other materials after 9-letter words.

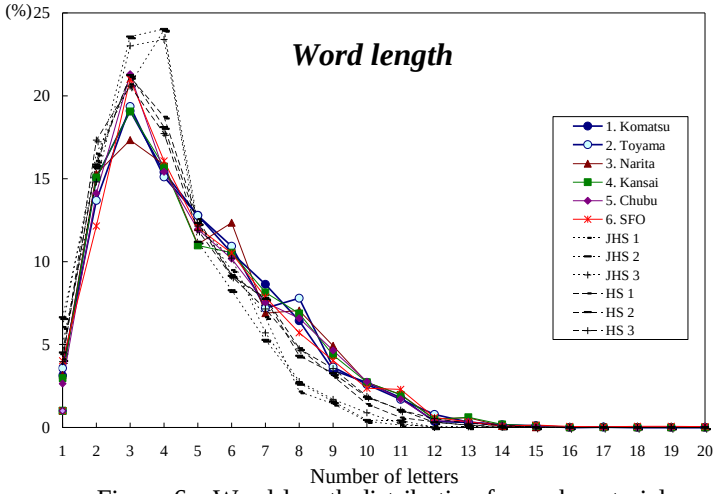

Figure 6 – Word-length distribution for each material.

1.6. Cluster analysis of the materials

After the aforementioned results being standardized, cluster analysis of the materials is conducted using Ward's method. The following 22 items are considered: the values of coefficient *c* for character-appearance, coefficient *b* for character-appearance, coefficient *c* for word-appearance, coefficient *b* for word-appearance, and *K*-characteristic, the principal component scores of difficulty using the required vocabulary, and scores of difficulty using the basic vocabulary, and the total numbers of characters, character-type, words, word-type, sentences, and paragraphs, the mean word length, the numbers of words per sentence, sentences per paragraph, commas per sentence, and repetition of a word, and the frequencies of prepositions, relatives, auxiliaries, and personal pronouns. Figure 7 shows the results.

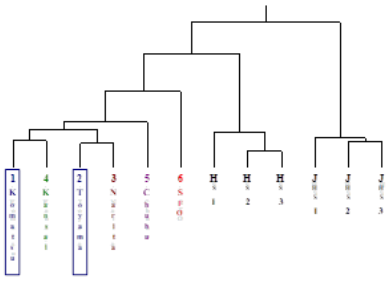

Figure 7 – Dendrogram for cluster analysis.

From this figure, strong correlations can be observed between Materials 1 and 4 (Kansai), and between Materials 2 and 3 (Narita). Therefore, it can be said that the literary style as a whole of the English guidebook available at Komatsu Airport is similar to the style for Kansai International Airport, and the guidebook at Toyama is similar to that for Narita.

As for the Hokuriku region, the number of limited express trains which depart and arrive at the Osaka district in Kansai is larger than that for the Kanto and Chubu areas. Then, the Hokuriku region seems to have received more influence of the Kansai area. Moreover, the characteristics of spoken language in the Hokuriku region seem to be comparatively similar to those in the Kansai area. Thus, the English guidebook available at Komatsu Airport may also be influenced by the Kansai area.

Although Toyama is also in the same Hokuriku region, it is located in the east of Komatsu, and the distance to Kansai is longer and that to Kanto is shorter compared to Komatsu. Therefore, it is possible that the relationship with the guidebook at Narita Airport is stronger.

Conclusion

Some characteristics of character- and word-appearance for English tourist guidebooks at local airports in Hokuriku region in Japan were investigated, compared with those for guidebooks available at Narita, Kansai, Chubu, and San Francisco international airports. In this analysis, an approximate equation of an exponential function was used to extract the characteristics of each material using coefficients *c* and *b* of the equation. Moreover, the percentage of Japanese junior high school required vocabulary and American basic vocabulary was calculated to obtain the difficulty-level as well as the *K*-characteristic. As a result, it was clearly shown that English guidebooks available at local airports in Hokuriku have a similar tendency to literary writings in the characteristics of character-appearance. Besides, the values of the *K*-characteristic for the guidebooks are high, and the difficulty level is low in terms of the American basic vocabulary.

In the future, to examine new guidebooks published after the opening of the Hokuriku Shinkansen and compare with the results educed in this study is being planned.

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EFFECTIVE DRUG MAKING NEEDS BETTER LOCAL TEAM WISDOM: AN EMPIRICAL STUDY OG THE HERBAL CITY PHARMACEUTICAL OF SARABURI THAILAND

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ABSTRACT

While the mechanism of local team wisdom, which mainly refers to the ability of team members to make the right use of their information and knowledge mainly through their actions, ethical judgments, and decisions. Though, the main aim of this research paper is to evaluate the impact of team wisdom mechanisms on the innovation performance of pharmaceutical firms in Thailand. Based on the mechanisms and framework of firm wisdom and group wisdom, this research study also examines the mediating impact of team virtue and team intention on the relationship between local team wisdom and innovation performance. This research paper also aims to identify the innovation process of the pharmaceutical firm's team wisdom as a mechanism for how team individual's best to use the flow of their information through ethical virtues and emotions. By examining different pharmaceutical firms in Thailand this research study empirically indicate that the role of team wisdom mechanism is significant in improving the innovation performance of the sector. The findings of this research study also concluded that the impact of team virtue and team intention is so positive in improving the relationship between local team wisdom and innovation performance. There are several managerial and practical implications of this research.

Keywords: Team wisdom mechanism, team virtue, team intention, innovation performance, teamwork

Introduction

As firms are usually acquainted with dynamic business environment, they have shifted to the approach of 'teams' for coping with these challenges. Resultantly, they are able to achieve and maintain the desired goals. These teams make effective use of the relevant information and use their wisdom, intelligence, prudence, ethics and intuitive abilities to forge Innovation in their firms to boost their Innovation performance (Akgün, Keskin, & Kırçovalı, 2019). In order to achieve the economic and health benefits, many pharmaceutical firms are now investing in clinical research.

Table 1.1: Benefits from Clinical Research in Thailand

Benefits (economic and health terms)	Baht (billions)
Amount spent on Clinical trials	10.4
Contribution to GDP of Thailand	8.8
Projected benefits in health	10.5

Thailand is known as the 'medical hub' of Asia, as it stands second in the drug sector in South Asia. Much economic and health benefits have been achieved from research in the Pharma sector as this leads to innovation and overall progress in the country, as shown in table 1.1. However, we see that return from clinical research and innovation is gradually decreasing owing to the reason that effective steps need to be taken to improve the R& D so that IP of Pharma companies could be improved. For this purpose, it is important to establish teams that could have skills and capabilities to collaborate efficiently for increasing the IP.

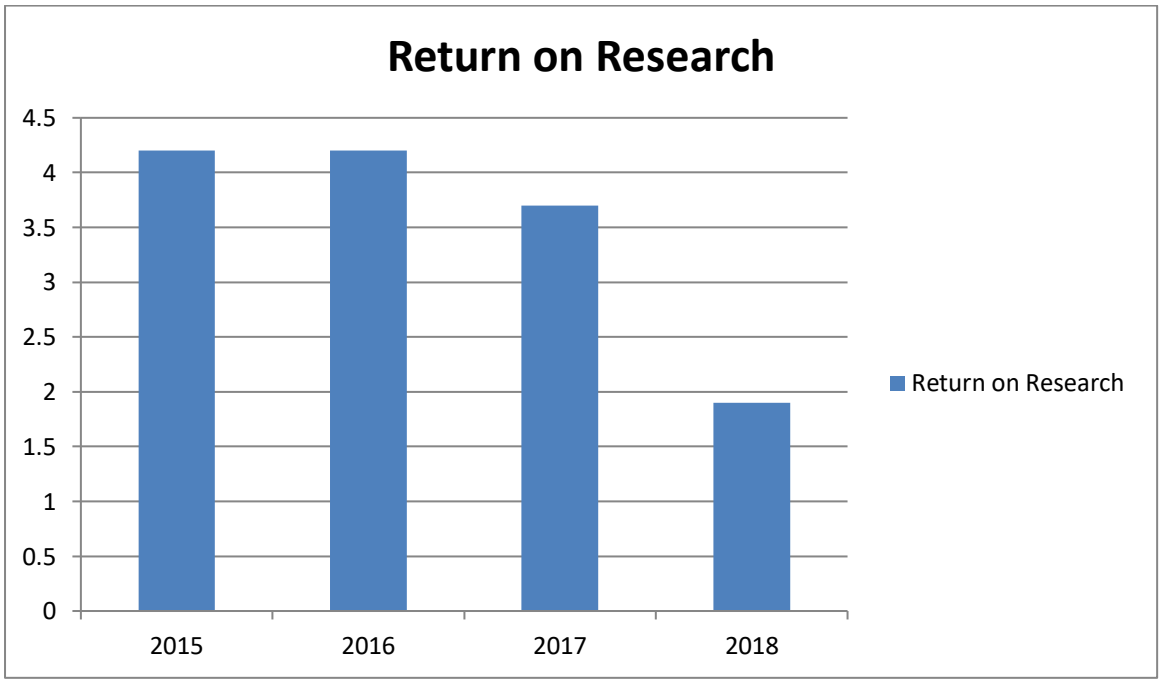

Figure 1.1: Return from Clinical Research (Deloite)

Many studies have focused on team wisdom, however the relationship between various wisdom practices is still fragmented (Akgün, 2020; Akgün et al., 2019). Also, a narrowing this concept for pharmaceutical firms from the perspective of Thailand is required, as they vary from culture to culture (Dayan & Elbanna, 2011). This study will address these research gaps. This paper's prime objective is to see how team wisdom can add value to innovative performance of the pharmaceutical firms in Thailand. Specifically, this study has the following research objectives:

- To determine the impact of TWM on IP
- To determine the mediating path of TP in the association of TWM and IP

- To determine the mediating path of TI in the association of TWM and IP
- To determine the mediating path of TV in the association of TWM and IP

Theoretically, this study has added contribution to the body of knowledge by investigating the role of Team prudence, intuitive and virtue as the potential mechanism in the role of TWM in achieving innovation performance. Practically, the results of this study will provide benefits to managers who can build teams and use their wisdom, prudence, virtue and intuition for superior IP.

Literature Review

2.1 Theoretical background

The study uses the "process philosophy theory' to establish how team wisdom can be utilized strategically to build mechanisms which can produce desired results (Styhre, 2002).

2.2 Impact of Team Wisdom Mechanics (TWM)

TWM is a process according to which the members of a specific team use the knowledge for making decisions. In other words, TWM is a set of practices that determine how information is to be used and spread among the team (Andler, 2012; Landemore, 2012). TWM has the potential to transform the disarranged information to so that wisdom-related mechanisms can turn an organized one so that it can be used more effectively for making decisions (Ghobadi & Mathiassen, 2017; Wang, Sun, Shen, & Zhang, 2018). TWM can help find solutions to any conflicts among members, harvesting innovation (Song, Dyer, & Thieme, 2006)and promises the performance of projects and firms (Gardner, Gino, & Staats, 2012; Huckman, Staats, & Upton, 2009; Lalonde, Bourgault, & Findeli, 2012; Paulus, Dzindolet, & Kohn, 2012). This shows that TWM is positively linked to IP. Hence the hypothesis:
H1: TWM has significant association with IP

2.3 Mediation of Team Prudence (TP)

TP is the collective information possessed by the team members for any specific problem. This helps the teams to make decisions freely and can take actions timely (Eikeland, 2006; Nonaka & Toyama, 2007). TWM can increase the sharing of tacit knowledge among the team (Olaisen & Revang, 2018; Ryan & O'connor, 2009) and can integrate relevant knowledge collected through other internal and external domains (Šmite, Moe, Šāblis, & Wohlin, 2017), thus leading to improved levels of innovation (Hussain, Konar, & Ali, 2016). TWM have been proved to positively relate to TP (Akgün, 2020; Hogan, Raza, & Driskell, 1988; Hogan & Shelton, 1998; Neuman, Wagner, & Christiansen, 1999). Studies by (Dalal & Pauleen, 2019; Ralph, 2018) have shown that TP is clearly linked to the innovation success of the firms (Akgün, 2020). Hence, TP can be tested as a mediating variable and the study gives the hypothesis:
H2: TP significantly mediates the association of TWM and IP

2.4 Mediation of Team Intuition (TI)

TI is one of the factors of 'Joint epistemic actions' that are based on the basic concept of wisdom in psychology and focuses on the actions taken regarding this

wisdom (Proust, 2014). In these actions, the members of team can express their real beliefs about problems using practical information from internal and external sources. Resultantly, they produce flexible and innovative opinions which can be changed according to the nature of situation being faced, promoting IP. Wisdom enables teams to simplify the issues and solve them more effectively (Akgün, 2020; Olaisen & Revang, 2018; Ordóñez de Pablos & Lytras, 2018). This shows that TWM promotes TI which has positive relations with performance. So, TI can serve as potential mediator in this relationship and the study has hypothesized:
H3: TI significantly mediates the association of TWM and IP

2.5 Mediation of Team Virtue (TV)

TV is a major part of the wisdom philosophy conceived by Aristotle (Bredillet, Tywoniak, & Dwivedula, 2015; Rooney & McKenna, 2008; Rowley, 2006). TV can be defined as the tendency of the team to behave on ethical grounds (Akgün et al., 2019; Weaver, 2006). Studies have shown that TWM is positively related to TV (Akgün, 2020), because it increases the morality of members by developing their understanding of ethics in their interactions with each other. This allows the members to think over if their decisions affect other members and how they must work together by applying the knowledge for success of the team and firm (Nielsen, Edmondson, & Sundstrom, 2006; Zhang & Guo, 2019), hence cultivating innovation (Awan & Akram, 2012; Silver, 2010). This shows that TV can lead to improved IP and its mediating impact can be checked in this relationship. So, the study has hypothesized:
H4: TV significantly mediates the association of TWM and IP

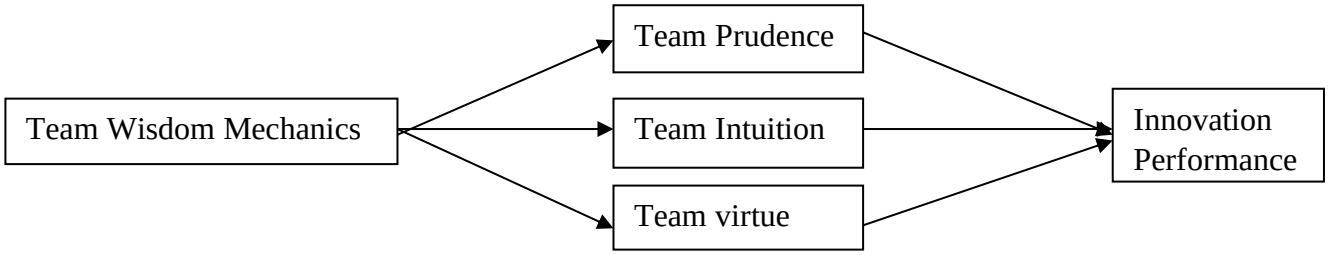

Figure 1.2: Conceptual Framework

Methodology

3.1 Data source

Data for this research was collected from pharmaceutical firms of Thailand. That is rapidly growing market and face many challenges such as competition and innovation. Target for this research were large scale pharmaceutical firms of Thailand. Taking into use of convenient sampling technique 540 managers from pharmaceutical firms were drafted in sample. This survey was mainly directed towards senior managers, top managers, supervisors and team leaders for more authentic organizational information. At the start, some team members were consulted to understand the practical implication and possible issues faced by firms. Then, self-administrative questionnaire was developed according to the research variables. It was developed very carefully to avoid any error. Questionnaires were delivered by research

team in the firms that also explained the research basic information. Thailand pharmaceutical association imparted contact details of these firms. Five hundred survey copies were disseminated. When the data collection phase was completed, gathered responses were screened 190 incomplete questionnaires were rejected and rest were retained for analysis. Further it was seen that 280 were male (51.8%), and 260 were female (48.2%). Most respondents were 31–40 years old (31.1%), and respondents (42.3%) had post-graduation qualification. Most of the respondents had approximately 5 years of work experience (44.8%).

3.2 Instruments

To examine the proposed hypotheses, multi-item scales that were either adopted from the prior literature or revised were utilized. 5-pointLikertscalerangingfrom "strongly disagree" (1) to "strongly agree" (5).

Virtue team of the firm is validated in this study four items were adapted from Akgün and Lynn (2002) to measure Team virtue. A sample item is "Team members are concerned about the role of ethics and virtue in our team.". Results showed Cronbach's Alpha is 0.92 reported on 5 response scale. Team prudence incorporated Sanne et al. (2010) scale and measured team's prudence with four items including Team members have rich factual knowledge about their areas in our team" respondents rated team's discipline and carefulness on 5 Likert scale showing reliability of α=0.820. Items for Innovation performance measurements were adapted from Miller and Friesen (1982). Utilizing 5 items modified measure the level of Innovation Performance. Innovation performance reflects the new products, process and technologies used in firms. Results showed α =0.83 for innovation performance. Three items were drawn from Dayan and Elbanna (2011) and changed to explore Team intuition that how intuition impact team members decision making . An item is "Team members put more emphasis on feelings than data when making decisions". Informants recorded their responses on 5-Likert scale. Cronbach's Alpha is 0.92.

Team wisdom mechanism was evaluated by three dimensions Team networking, Team diversity and team experience. This construct make use of scale confirmed by Peterson, Smith, Martorana, and Owens (2003), total 11 items were applied after making changes, one sample question is "to what extent did your team members have social networks with other project team members?" results indicated α=0.96 as composite reliability.

3.3 Analysis

For data analysis of key research constraints statistical software AMOS and SPSS were used in this study as to draw graphical models and for quick valuation for different analysis and results. Initially scales were tested by running an exploratory factor analysis and was further checked using CFA. Overall, the measurement models' assessment results satisfied the reliability requirements.

Data Analysis

4.1 Demographics

The frequency distribution of respondents is estimated on SPSS in order to identify the participation of respondents based on their demographic characteristics. The dataset based on 540 responses among which the contribution of male respondents is 55.1 percent and contribution of female respondents is 44.9 percent. as far as

frequency distribution in terms of age is concerned, the most of the respondents fall in age range of 31-35 years. In terms of education, the share of graduate respondents are 47.1 percent, where share of under graduate is just 14.0 percent, which indicates that most of the respondents are highly educated.

4.2 Descriptive Statistics

Table I indicates the descriptive statistics or summary of data. The table indicates the central tendency, minimum, maximum values, and normality is data. The findings of analysis indicates that all items are recorded on five point likert scale. The mean values of measures indicate that most of the respondents were slightly agree with survey questions. Moreover, the values of skewness are also in acceptable range of normality.

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
InnPer	399	1.00	5.00	3.472	1.215	-.389	.122
TeaIntu	399	1.00	5.00	3.365	1.128	-.497	.122
TeaVirt	399	1.00	5.00	3.288	1.212	-.520	.122
TeaPrud	399	1.00	5.00	3.437	1.245	-.516	.122
TeaWisMech	399	1.00	5.00	3.426	1.112	-.563	.122
Valid(N) (listwise)	399						

4.3 Factor Loading and Convergent Validity

Table 2 indicates the empirical findings of composite factor analysis, composite reliability and average value extracted from variance (Hassan, Hameed, Basheer, & Ali, 2020; Iqbal & Hameed, 2020). Column 1 denotes the all survey items (questions) of team wisdom performance are highly loaded on innovation performance construct, which indicates that items of team wisdom mechanism is highly correlated with innovation performance. Likewise the column two indicates the correlation of items of innovation performance with construct of team virtue, thus it indicates that items of innovation performance are highly loaded on factors of team virtue. The composite reliability denotes that most of the measures have valid construct as the values of CR for each measures is higher than 0.7. Average Variance Extracted (AVE) of each measure indicates discriminant validity. Discriminant validity referred to the degree to which measures of different dimensions are distinct from each other. The values of AVE also confirm discriminant validity in model.

Table 2: Factor Loading and Convergent Validity

	1	2	3	4	5	CR	AVE
IP1		.854				0.919	0.845
IP2		.858					
IP3		.871					
IP4		.872					
IP5		.856					
TI1					.824	0.926	0.807

TI2				.763		
TI3				.778		
TV1		.828			0.931	0.834
TV2		.831				
TV3		.834				
TV4		.821				
TP1			.816		0.913	0.838
TP2			.831			
TP3			.821			
TP4			.832			
TWM1	.747				0.931	0.743
TWM2	.788					
TWM3	.753					
TWM4	.791					
TWM5	.772					
TWM6	.766					
TWM7	.777					
TWM8	.784					
TWM9	.781					
TWM10	.794					
TWM11	.751					

4.4 Discriminant Validity

Table 3 indicates the matrix of composite factor analysis, which is estimated to explore discriminant validity in data. In matrix the values of diagonal are higher than off diagonal values which indicates that the issue of cross loading are not found in measures and discriminant validity is confirm. Discriminant validity indicate that measures are not related with other factors with which it ought not to relate.

Table 3: Discriminant Validity

	TP	IP	TI	TV	TWM
TP	0.968				
IP	0.638	0.970			
TI	0.600	0.588	0.898		
TV	0.621	0.604	0.593	0.968	
TWM	0.690	0.656	0.727	0.701	0.861

4.5 Confirmatory Factors Analysis and KMO

Table 4 indicates the findings of composite factor analysis and KMO (Kaiser-Meyer-Olkin Test). The model fitness test such as CMIN/DF, GFI, IFI, CFI, RMSEA indicates the strength and health of model. The values of model fitness tests confirm that model is fit for analysis as the values lies in acceptable range. Where, the KMO test checks the relevancy of data for Factor Analysis and to confirm the adequacy of sample data. The satisfactory range to authorize that sample is adequate for factor analysis is 0.6 to 1.0, and for this model it is suffice to confirm that sample is adequate for factor analysis.

Table 4: Confirmatory Factors Analysis and KMO

CFA Indicators	CMIN/ DF	GFI	IFI	CFI	RMSEA	KMO
Threshold Value	≤ 3	≥ 0.80	≥ 0.90	≥ 0.90	≤ 0.08	0.6 – 1.0
Observed Value	2.970	0.874	0.972	0.970	0.072	0.932

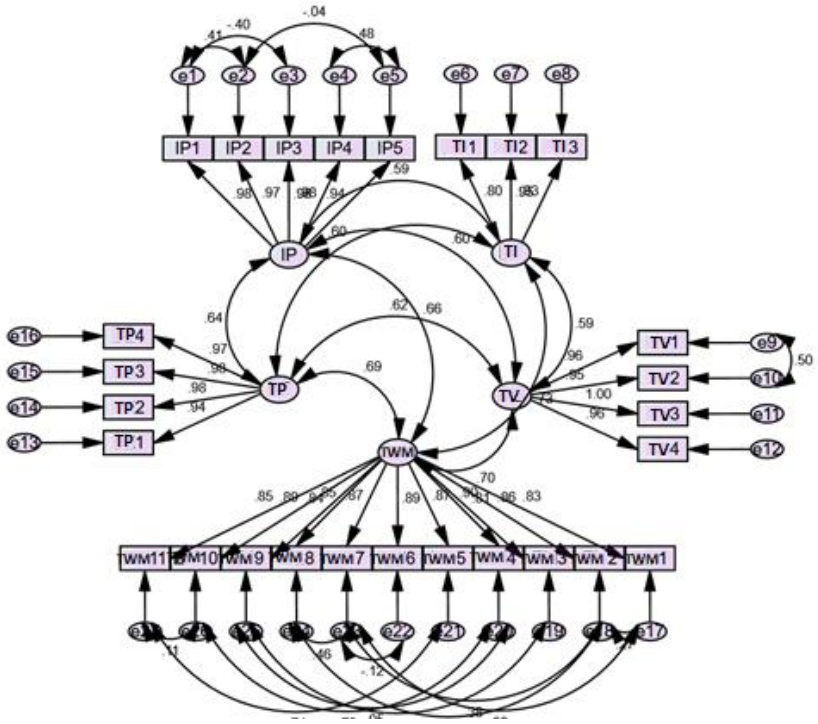

Figure 1: CFA

4.6 Structural Equation Modeling

Table 5 indiactes the regression coefficients of latent construct estimated through structural equation model. The results indiactes that team wisdom mechanisim has significant impact on the team prudence, team virtue, and team intution. The coefficients indicate that one unit incraese in team wisdom mechanisim will cause 66.0, 69.0, and 68.4 percent incraese in team prudence, team virtue, and team intution, respectively. Thus team wisdom mechansim has signifixant direct imapct on mediating varaibles. Inaddition, all the medaiting varibles has signifixcant positive imapct on innovation performance. The coeffcients of mediating varaibles indicate that one unit incraese in team prudence, team virtue, and team intution will cause 28.2, 20.8, and 13.2 percent incraese in innovation performance, respectively. Moreover, the direct imapct of team wisdom mechanisim on innovation perforamnce is positive and significant.

Table 5: Structural Equation Modeling

Path			Estimate	S.E.	P	Decision
TeaPrud	<---	TeaWisMech	.666	.044	.000	Accepted
TeaVirt	<---	TeaWisMech	.691	.041	.000	Accepted
TeaIntu	<---	TeaWisMech	.684	.039	.000	Accepted
InnPer	<---	TeaWisMech	.233	.074	.000	Accepted
InnPer	<---	TeaPrud	.282	.046	.000	Accepted
InnPer	<---	TeaVirt	.208	.049	.000	Accepted
InnPer	<---	TeaIntu	.132	.052	.006	Accepted

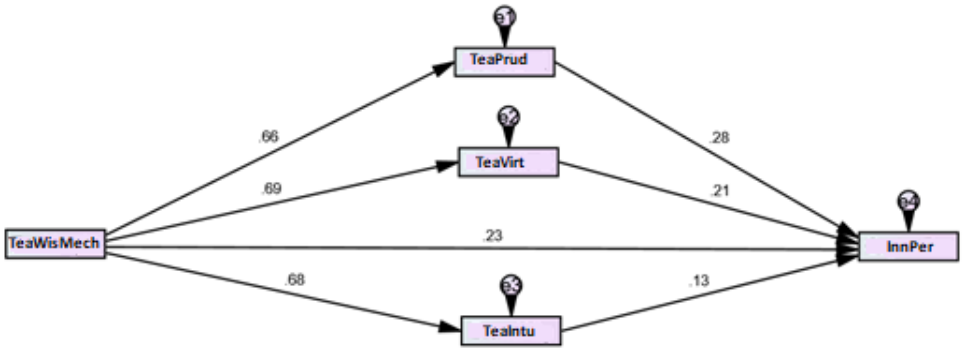

Figure 2: STWM

Discussion and Conclusion

5.1 Discussion

Team wisdom (TW) plays a significant role in enhancing different relationships between different entities and also enhances the overall performance of the team and firm. According to previous research by Kumari (2017), team wisdom is the ability of an organization or its team to work efficiently together to achieve common goals and objectives. Tem wisdom enables the members of teams to share knowledge and silks to improve the overall performance of the team which directly influences the performance of the firm. According to the initial results of the study, it has been suggested that the impact of the team wisdom mechanism has been positive on the innovation performance of the sector. Team wisdom mechanisms can positively be linked with team virtue and also enhances the morale of team members during the process of innovation, so, with this advantage; the innovation performance of the firm will automatically be improved (Salas & Bisbey, 2019). Therefore, the hypotheses regarding the direct impact of team wisdom mechanism on innovation performance have been accepted and supported to findings.

Furthermore, the outcomes of the study also suggest that team virtue and team intentions positively mediate the relationship between TW mechanism and innovation performance. Team virtue and intentions can provide benefits to firms in many ways such as by motivating the actions of other employees that work in the process of innovation.

5.2 Conclusion

The study suggests that the team Wisdom mechanism has a great and very effective role in the sense of innovation performance. This technique enhances the strategies of the firm and the industries by the means of Team Prudence, Team virtue, team intention. The research shows that innovation Performance increases when there are such rules adopted by the management to take the industry at a high rate of performance.

5.3 Implications and Limitations

The given study has a very positive impact when adopted by firms and industries. These techniques are very positive and effective to produce positive results. This study also opens the various dimensions for the future researchers and the industries to work on it and to lead the financial aspect of the firm is a very positive way.

There are some methodological limitations of this study that should be addressed by future researches and its analysts. First, this study used cross-sectional nature that cannot provide the causality between different dependent and independent variables, so, due to this limitation future studies should use a longitudinal type of study for better results. Second, this research is limited to the role of team wisdom and its mechanisms in the pharmaceutical sector of Thailand. Future analysts should add another type of independent variable to calculate more accurate results and suggestions.

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THE IMPACT OF FORMULATION FOR DEFINING THE INFORMATION MASTER PLAN OF ROAD SAFE FUND

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ABSTRACT

The aim of this study is to the impact of formulation defining the information master plan of road safe fund. The study is also designed to analyze the role of critical factors such as smart investment, efficiency, and accountability in the roadmaster plan. Indeed, the formulation of defining the master plan of the safe fund has certain challenges in its development. The random sampling method was used in this study and the data was collected from the 1,200 respondents with a response rate of 44%. The study concludes that there is an important role of smart investment, efficiency, and accountability for the information master plan of road safe fund. Also, the significance of this study is that it has a theoretical framework that was not developed by any of the earlier studies to consider its role in the formulation of defining the master plan of safe fund. Importantly, this study also provides practical implementations for the stakeholders to ensure a better information master plan for road safety funds.

Keywords. Road Safe Fund, Smart Investment, Efficiency, Accountability

Introduction

In the globalized era where the organizations have to work in collaboration and adopt different skills and techniques to improve the performance of the organization, however, at the same time some organizations are facing problems, particularly in the construction industry. In this regard, the government and the other stakeholders are working to develop strategies to improve not only the performance of the organization but ensure that the work in progress of the organization is according to the expected standard. However, as for as the construction of roads and their master plans are concerned, the organization is facing a different kind of crisis (Nævestad, Laiou, Rosenbloom, Elvik, & Yannis, 2022). These crises are not only the organizational crisis but at the same time, these crises are led by the stakeholders as well that are reducing the efficiency effectiveness of the projects.

Smart investment refers to the process of investment in which the companies are utilizing their resources to ensure that the right investment is being done at the right time for the right purpose to get the right objective in the right direction (Beldinne & Gachengo, 2022). Importantly, organizations that are working on the concept of investment to facilitate the team for working on the project in an effective way, these

organization or successful. Efficiency in the project refers to the minimum wastage level by the projects and getting the better and more advanced solution in the project to improve the standard of living (Barroso et al., 2022). It is noted that the organization that is developing the concept of efficiency to the target market for getting a better result, these organizations are building competitive advantage for getting the greater benefit. Accountability refers to the checks and balances on the stakeholders of any organization, particularly in the construction industry (T. A. Nguyen & Nguyen, 2022). It is important to understand that with the help of accountability the organizations that are willing to work effectively to develop efficiency and provide a unique solution to the problem of the project. Importantly, with the role of accountability in our organization have a stick to watchdog to ensure their performance. The roadmaster plan refers to the plan that is developed by the government and international firms to construct build and repair the road that is needed to satisfy the need of individual people of any society.

The purpose of the study is to the impact of formulate the defining information master plan of road safe fund to understand what are the critical factors that are needed to be improved for the construction of a road by the largest companies in the world. The study also supposed to draw a theoretical framework to understand what is the role of smart investment, efficiency, and accountability in the formulation of road plans. Also, this study was to understand the role of smart investment, because Olivera, Lopez, Manzon, Bernardo, and Villar (2022) highlights that in the construction industry it is understood that without the smart investment there would be a great loss to the organization and the stakeholders. Therefore, this study is to define what is the process of roadmaster planning and what are the key critical factor for developing this road master plan for the betterment of society.

Literature Review

2.1 Smart Investments in Road Master Plan

It is important to understand that for any kind of construction project there are key critical factors that are needed to be implemented accurately for getting better results. In this regard, investment is a critical factor in the construction project because without investment it is difficult to do budgeting forecasting and future planning (Domenella, Galasso, Marinelli, & Rotondo, 2022). No doubt, according to Olivera et al. (2022), investment is not only the critical factor but it is a necessary component of any project or plan for the construction of any future project for the greater benefit to the community. In this regard, over time the concept of smart investment has emerged after the failure of investment contact because in the investment concept there were the chances of lack of right decisions and errors in the forecasting (Miftachurochmah & Sukamti, 2022). However, Ait-Lamallam, Sebari, Yaagoubi, and Doukari (2022) demonstrates that the developers of smart investment concepts narrated that in the future the project would be handled with the help of the smart investment because it is the right option to do investment for the betterment of the community in the small and at the same time in the large projects. Smart investment refers to the concept of doing

the right investment in the right direction at the right time for the right purpose to achieve the right objective to get the right benefit from it (Ochieng & Odhiambo, 2022). In the countries, where the construction projects are supported with the help of some hard investment is countries are building a completed advantage on this factor of smart investing because, with the help of the smart investment, the wastage is reduced to the minimum level while getting the greater benefit from it. At the same time, according to Ogbeide, Ehiorobo, Osuji, and Ilaboya (2022), the large world construction companies are hiring the consultant from all over the world to make decisions regarding smart investment because these companies have under that there is a critical role of the smart investment in project planning and implementing the strategy for the betterment of the community and the prosperity of the country. The advance and prosperous countries are smartly investing in the construction project to reduce the wastage at the minimum level and get the benefit with the help of effectiveness to improve not only the quality but at the same time the standard of life of people (Ochieng & Odhiambo, 2022). However, on the other hand, in countries where public projects are facing the problem of corruption in such kinds of countries, it has become difficult for the authorities to implement the strategies for smart investment to get the results in the best way. Therefore, the successful organization, their success is based on smart investment because investment is the worthiest capital of any organization and investment should be done according to the plan and the level of vestige should be at the minimum point. Therefore, the developed hypothesis is;

Hypothesis 1. There is a relationship between a smart investment and a roadmaster plan.

2.2 Efficiency in Road Master Plan

Efficiency is to get things done in the right way at the right time while having a low level of wastage and a high level of achievement in any project or construction (Domenella et al., 2022). In the same way, in the construction projects at the largest level, the largest level of efficiency is required because in this regard it is understood that at the largest there are different people involved and some of them are trying to get the benefit that is not supported for the project. However, it is not limited to the corruption of people, but at the same time if the efficiency is not provided in the construction projects, particularly in the construction of building roads and flyover results could easily disturb the whole structure of the community (Ait-Lamallam et al., 2022). In this way, the concept of efficiency has been dragged into the construction project because it is understood that with the help of evidence the organization could achieve its goal while minimal wastage for their greater benefit. It is important to understand that the organization that is working for the benefit of the society these organization must consider the role of efficiency because if the efficiency is found in the projects of construction in result the long-term benefit to the society would be provided and it would lead the society into a productive way. However, on the other hand, if the organizations are not working effectively then it would be completely difficult for the organization to work sustainably and maintain the quality and standard of the construction project for the greater benefit of society. In Canada and Denmark,

the organizations are willing to implement the strategies of efficiency to improve not only the performance of the organization but at the same time in result to get the better-constructed project for the society (Olivera et al., 2022). No doubt, the smart investment if it is rightly done and the effective strategies are implemented not only the waste material would be reduced but at the same time the project would be done appropriately according to the standard level (HU, 2022). At the same time, the world-class companies are developing strategies for effective management of projects related to construction to minimize the level of invested cost and ensure that the profit would be gained from not compromising on the construction and nature of the project. In Sri Lanka and India, the organizations are not effective because these organizations are not led by professional people and due to corruption, the effectiveness and efficiency of the organization are at stake which is a critical challenge to the community at large (Porfiri, 2022). In this regard, according to Ogbeide et al. (2022), the organizations must consider the role of effectiveness and efficiency to ensure that all the project is going accordingly and nothing wrong is being done with the project that could ultimately have consequences for the community at the larger circle. Therefore, the developed hypothesis is;

Hypothesis 2. There is a relationship between efficiency and roadmaster plan.

2.3 Accountability in Road Master Plan

Accountability is referred to the system of check and balance in any project or development that could ultimately contribute to the effectiveness and efficiency of the project according to the desired goals (Ogbeide et al., 2022). It is noted that accountability is considered one of the critical factors that are contributing not only in the format of the organization to improve the mental models of the employee in the organization but at the same time is accountability is also responsible to improve the performance of the organization in the construction of the projects (Domenella et al., 2022). There are different kinds of accountability, on the one hand, the accountability is by the organization on the employees in which they are supposed to be answerable to the accountability panel of the organization on the effectiveness and the right working of the organization. On the other hand, according to Olivera et al. (2022), the accountability is being led by the third-party organization that is contributing not only to the worth of the project but at the same time these organizations are improving the standard of life of people to ensure that the people are living with prosperity and nothing wrong is provided to them in the term of construction. However, Miftachurochmah and Sukamti (2022) highlights that the accountability by the third party is dangerous for the organization because if the organization is involved in any kind of criminal activity while constructing a project in this regard the accountability would consider the organization as a party and it would be banned from work permanently. In this regard, the organization needs to ensure that the investment is rightly utilized in the construction project, and with the help of effectiveness and efficiency, all the improvements are being made to ensure the performance of the organization (Ait-Lamallam et al., 2022). The accountability not only has the social but at the same time

has high-quality pressure on the other teams because if the team believes that their misdeeds would be accountable in result the performance of the organizational team would be improved for the greater benefit of the society. Moreover, according to HU (2022), accountability should be considered and, in this regard, action should be taken with the help of the strategies to ensure that each individual is accountable if he is not working according to the policies of the organization. In this regard, Canada and the United Kingdom have developed strategies and laws that held all the organizations accountable no doubt organizations are from the construction sector as well (Porfiri, 2022). It is said by the technocrats of the United Kingdom that with the influence of accountability and pressure of fair working the behavior of an employee is increased to the effectiveness and efficiency and they are working for the prosperity of the community at the largest scale. The relationship between variables is presented in Figure 1. The developed hypothesis is;

Hypothesis 3. There is a relationship between accountability and the roadmaster plan

Methodology

In this study, to collect the data from the target respondents the questionnaire was prepared on the Likert scale. However, the questionnaire was based on two different sections. In the first section, the questionnaire was designed to collect the demographic information of the respondents. However, the second section of the questionnaire was designed based on scale items taken for each variable from the past studies to get the response from the target population. Importantly, these scale items were taken to measure the role of smart investment in the master road plan the role of efficiency in the master road plan, and the role of accountability in the master road plan. However, the scale items were used according to the content and requirement of the study. Moreover, to collect the data from the target population, an introduction about the study was provided to the respondents. After the introduction of the study, the respondents were required to fulfill the questionnaire by understanding each scale item for a better requirement. After collecting the data from the target respondents, the questionnaire was collected back from the target respondents to analyze the data for this study.

Results

4.1 Convergent Validity

In this section of the study, the convergent validity of the scale items was checked with the help of Smart PLS 3 Software. According to the calculation, the value of factor loadings for each variable was greater than 0.60 which is recommended by Wong (2013) for future studies. Furthermore, the value of CR for all the variables was greater than 0.70 which is recommended by Wong (2013) for modern studies. Also, the value of AVE for each variable was greater than 0.50 which was recommended for modern studies.

4.2 Table 1 Convergent Validity

Variable	Scale Items	Loadings	Alpha	CR	AVE
Accountability	AC1	0.628	0.812	0.877	0.595
	AC2	0.632			
	AC3	0.836			
	AC4	0.871			
	AC5	0.858			
Efficiency	EF1	0.881	0.833	0.888	0.667
	EF2	0.852			
	EF3	0.798			
	EF4	0.729			
Road Master Plan	RMP1	0.877	0.828	0.883	0.615
	RMP2	0.872			
	RMP3	0.837			
	RMP4	0.762			
Smart Investments	RMP5	0.499	0.848	0.907	0.768
	SI1	0.877			
	SI2	0.928			
	SI3	0.822			

4.3 Discriminant Validity

This section of the study has information related to the discrimination between the scale items taken for each variable. In this regard, the HTMT model was used to check the value of discriminant validity. Importantly, all the values of discriminant validity for each variable were less than 0.90 which is recommended by Sander and Teh (2014), for the modern studies available in Table 2.

Table 2 Discriminant Validity

	Accountability	Efficiency	Road Master Plan	Smart Investments
Accountability				
Efficiency	0.865			
Road Master Plan	0.852	0.813		
Smart Investments	0.803	0.511	0.655	

4.4 The PLS-SMEs Results

This section of the study has the information related to the hypothesis test available in Figure 3. In this regard, Hypothesis 1 was tested to check its significance and according to the results Smart Investments has a significant effect on Road Master Plan (β= 0.264, t= 4.779, p= 0.000) and Hypothesis 1 is supported. Hypothesis 2 was tested to check its significance and according to the results Efficiency has a significant effect on Road Master Plan (β= 0.686, t= 10.903, p= 0.000) and Hypothesis 2 is supported. Hypothesis

3 was tested to check its significance and according to the results, Accountability has a significant effect on Road Master Plan (β= 0.018, t= 3.600, p= 0.000), and H3 is supported (see Table 3).

Table 3 The PLS-SMEs Results

Hypotheses	B	STDEV	T Value	P Value	Decision
Smart Investments -> Road Master Plan	0.266	0.054	5.777	0.000	Significant
Efficiency -> Road Master Plan	0.687	0.053	11.903	0.000	Significant
Accountability -> Road Master Plan	0.028	0.014	4.603	0.000	Significant

Discussion and Conclusions

According to the results of H1, there is a significant relationship between a smart investment and a roadmaster plan. In this regard, it is important to understand that in modern times the construction industries are taking the project with the help of smart investment because smart investments have a different kind of benefits for this project. To begin with, with the help of the smart investment the forecasting error is reduced to the minimum level because all the calculations are carefully taken based on previous experience and intuition. Secondly, with the help of smart investment, the construction companies are understanding the important role of investment because if it is done in the right direction with the help of the right parameters to be understood, more productive and effective development would have resulted. Thirdly, smart investment helps the organization to utilize all of the data accordingly and make the right decision at the right time for greater productivity. The organizations in London and New York are working with the concept of smart investment because it is that developed concept is utilized by the modern and operated construction organization, to improve their business performance with effectiveness and efficiency (H. T. Nguyen, Le Thu, Thach, & Pham Diem, 2022). Oppositely, the organization that is not capable to ensure the investment process and failed to do smart investment these organizations are leading the project and development differently and creating problems not only for the organization but for the community at the same time. The top-rated organizations recommend smart investment as a critical success factor to generate more revenue by providing effectiveness and efficiency in business operations.

According to the results of H2, there is a significant relationship between efficiency and roadmaster plan. In this way, it is important to understand that the roadmaster plans are developed to provide greater productivity for the community. However, the stakeholders that are involved in the roadmaster plan should develop the strategy for efficiency in the operation management because without efficient age it would be difficult for the organization to work in productivity and reduce quality with effectiveness. Similarly, the organizations that are conceived in efficiency as the priority in the operation management, these organizations are leading the construction work including the roadmaster plan in a new way because these organizations are

working on the unique procedure (Cepriá et al., 2022). However, on the other hand, the organization that is very poorly managing the efficiency, as result the waste material and the scrap products have resulted in that is a direct hit to the right investment. In this regard, the construction companies need to consider the important role of efficiency in developing strategies to ensure productivity and get the greater benefit for the community at the larger level. It is also noted that the organizations in Netherland are considering priority has a superlative strategy for their battle performance in the operation management and construction projects including a road map plan.

According to the results of H3, there is a significant relationship between accountability and master road plan. In this regard, it is important to consider that the organization that is working with the procedure of accountability, the performance of these organizations is greater than the other organization. No doubt, the employee of the organization is diverse and they are from different cultures and values, some of them may go with the corrupt activities in this regard the important role of accountability must be established within the organizations to ensure that no corrupt people should be provided the opportunity to mislead the things in the wrong direction. However, the organizations in the United States are working on the systematic way of accountability because with the fear of accountability all the stakeholders are developing strategies and working in a progressive by not harming or less creating difficulties for the benefit of the organization (Majdzadeh et al., 2022). In this regard, it is also noted that the organization should consider the role of accountability not only within the organization but the consultants of accountability system should be hired to ensure that the people are not working against the vision and mission of the organization but all the resources are effectively utilized with the right investment to complete the projects. On the other hand, if the organization is failed to maintain accountability in organizations, as a result, project development of these organizations would be badly failed for developing strategies to ensure accountability within the organization. Importantly, the organizations should consider the important role of accountability in project management to ensure the effectiveness and efficiency in the strategic development of student master road plans.

Theoretical and Practical Implications

This study has theoretical implications because no earlier study has discussed the role of smart investment, efficiency, and accountability in road master plan funds. In this regard, this study provides insight into the relationship of smart investment, efficiency, and accountability in the master road plan to understand the relationship between the variable by developing strategies for a better understanding of the master road plan fund. Significantly, this study considered the important role of these variables to provide a detailed analysis and theoretical recommendation to address the gap in the literature. At the same time, the study has practical implications because the theoretical framework is designed to provide a detailed insight into the relationship between smart investment efficiency and accountability to the master road plan fund to understand the key factors that are affecting the master road plan fund. In this regard, by working on

the recommendation of this study it would be effective for the management and the stakeholders that are involved in the master road development plan to consider all of the critical factors by utilizing this study to ensure the effectiveness in the progress. However, this study also ensures that with the help of the relationship of variables and the discussion of the study would be quite useful for future planning of master road funds.

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INFLUENCING FACTORS OF ACCOUNTING SYSTEM MANAGEMENT EFFICIENCY UNDER THE OFFICE OF VOCATIONAL EDUCATION COMMISSION

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ABSTRACT

This research aims to 1) study the factors of variables affecting the accounting management efficiency (AME) and financial report quality (FRQ) of educational institutions under the Office of Vocational Education Commission, 2) to study AME affecting FRQ of educational institutions under the Office of Vocational Education Commission, and 3) to create a manual of AME and FRQ of educational institutions under the Office of Vocational Education Commission used to develop the accounting work of educational institutions in a concrete manner. Mixed methodology as well as research and development had a three-step process: step 1 - qualitative research using the Delphi Technique for collecting data to study the factors, step 2 - quantitative research for collecting data to create the model of factors, and step 3 - evaluation and validation of feasibility. The population and sample consisted of 429 educational institutions under the Office of Vocational Education Commission, the Ministry of Education in Thailand, arisen from a simple random sampling method. The respondents were directors/deputy directors of resource management and accounting supervisors/officers/operators. The research instruments were questionnaire and interview form. The data were analyzed using confirmatory factor analysis (CFA) and structural equation model analysis (SEM). The results showed that the CFA model was used to examine measurement model variability of five latent variables as follows: internal control and risk management (ERM), accounting performance (ACP), accounting technology (ACT), AME, and FRQ. It was found that CFA model that of ERM was fit to the empirical data.

Introduction

The State Fiscal Disciplinary Act 2018 has set government accounting standards and government accounting policies 2018, prepared for use with government agencies' reporting entities. The agencies, as specified in the State Fiscal Discipline Act 2018, must prepare financial reports to be sent to the Ministry of Finance to prepare a

consolidated financial report for the public sector. It includes all entities controlled by the government, an entity that operates with all or most of the money from the budget, including other government agencies as required by law, consisting of government agencies, state enterprises, agencies of the National Assembly, the Court of Justice, the Administrative Court, the Constitutional Court, constitutional independent organizations, prosecutors' organizations, public organizations, working capital as a juristic person, local government organizations and other government agencies as required by law. The objectives are (1) for government agencies to use as a guideline in determining the accounting system and prepare financial reports for general purposes on an accrual basis accurately and appropriately and within the same standard framework for the purpose of preparing the consolidated financial statements of the public sector; (2) as a guideline for auditors to examine the financial reports of government agencies to express their opinions that they have been prepared under the framework of government accounting standards and; (3) to help financial reporting users understand the meaning of the information presented in the financial report, prepared in accordance with government accounting standards and government accounting policies prescribed by the Ministry of Finance, and can compare with others' financial reports. The government agencies, presenting government reports, must prepare financial reports that include all types of money. If there is an entity under its control, a consolidated financial report that includes all sub-units under the control of that state agency must be prepared. According to the 35th Public Accounting Standard, Consolidated Financial Report (when it is published), the qualitative nature of the financial report refers to a feature that makes the information in financial reports useful to financial report users, consisting of understandable relevance to decision, reliability and comparability (The Comptroller General's Department, 2018).

From the auditor's report, the Comptroller General's Department has given an opinion to the Auditor-General that the financial statements of the Office of the Auditor-General have been audited. They consist of the statement of financial status as of September 30, 2018, the statement of financial performance and the statement of changes in net assets/equity for the year ended on the same day and notes to financial statements. In addition, a summary of important accounting policies and a report on the current and previous year's expenditure budget are included. These should be corrected in essence according to the standards and government accounting policies promulgated by the Ministry of Finance. As for the responsibilities of the management and those charged with supervising the financial statements, executives are responsible for the preparation and fair presentation of these financial statements according to the government accounting standards and policies promulgated by the Ministry of Finance and is responsible for such internal control necessary to enable the preparation of financial statements without misstatement due to fraud or errors in the preparation of financial statements. Executives, moreover, are responsible for evaluating the agency's ability to continue operating and disclosure matters related to continuing operations according to the appropriateness and accounting criteria. Significant issues found in the audit and significant deficiencies in the internal control system will be identified. It can be seen that the executives of the unit are important to the accounting practice and agency supervision (The Comptroller General's Department, 2018).

From the importance of the accounting system of government agencies, AME and FRQ of educational institutions and good corporate governance in risk management

of government agencies, including the results and recommendations of many studies on the factors related to the accounting operations of educational institutions, the success and efficiency of accounting work, the administration of school administrators, risk management of government agencies, therefore, it is summarized as the basic information for the research. The government agencies must perform accounting according to standards and criteria for evaluating the accounting performance of government agencies of the Comptroller General's Department and consistent with the laws, regulations and the Office of the Auditor-General of Thailand continuously and systematically. For this reason, the researchers are interested in studying the factors affecting the AME and FRQ of educational institutions under the Office of Vocational Education Commission to be used to create a manual for the accounting practices of the schools to report accurately and timely to their original agency.

Literature Review

Risk Management and Internal Control

COSO-ERM Framework or Enterprise Risk Management Framework is a framework or manual for enterprise risk management. It is one of the factors of Corporate Governance that goes hand in hand with IT Governance, consisting of 8 related factors, including Internal Control and Risk-based Internal Audit in the overall picture to create sustainable growth and achieve a good balance of management according to CG and ITG principles.

Risks and opportunities will affect the increase or decrease in value for the stakeholders. Risk management is a tool that helps managers deal with uncertainty (Kerdpitak, 2022) as well as the risks and opportunities involved effectively. This will increase the ability of the organization to add value to stakeholders. Risk management covers:

1. Considering organizational risks in strategic assessment, setting goals, and development of risk management tools;
2. Promoting decision-making in response to risks by identifying and choosing methods to respond to risks consistently;
3. Increasing the ability to identify and respond potential incidents to reduce the occurrence of unexpected events and harm;
4. Identifying and managing different types of risks throughout the organization in all levels;
5. Seizing opportunities by considering all possible events and identifying potential opportunities and making such opportunities real for organizational benefits;
6. Gathering risk information for management to assess necessary capital factors and capital factor distribution.

Accounting practices

The meaning of accounting refers to the collection, analysis, and recording of information arising from operations according to the events that occurred before – after and economic figure events in line with the correct accounting method based on international principles in the form of currency and classified into categories. It includes summarizing data in the form of financial reports for financial information for further

use. From the above definitions, the steps can be summarized as follows: (The Comptroller General's Department, 2018)

1. Bookkeeping is the duty of the bookkeeper, which has the following procedures.

1.1 Collecting means the collection of information or transactions that occur on a daily basis in the course of business related to money such as evidences of credit purchase and credit sale, evidences of receipt and payment, etc.

1.2 Recording means the recording of each transaction that occurs in the first-after order in accordance with generally accepted accounting principles along with saving data in the form of currency unit.

1.3 Classifying means bringing the information recorded in a general daily report through ledger account by categorizing them according to different categories of accounts such as asset, liabilities, equity, income and expenses, etc.

1.4 Summarizing means summarizing the information obtained from the classification in the ledger account into accounting report which shows the performance and financial position of the business as well as the acquisition and use of cash in an accounting period.

2. Providing financial information to various related parties such as management, lenders, creditors, government representatives, investors, etc. for use in financial analysis, budgeting, accounting system improvement and crediting.

Accounting Technology

Technology and accounting in today's era have a very important role in society. They also have an influence on business operations. Many businesses have introduced new technologies to help increase efficiency in work processes. As a result, the preparation of financial reports changes according to the business operation. Computer technology will help in accounting, analyzing, and detecting irregularities in data. It reduces repetitive or routine tasks, including tasks that take a lot of time or use few decisions. Technology, however, cannot fully replace the work of an accountant because of responsibility and ability to make decisions that requires experience as the heart of accounting work. The work of computers today has a network and internet systems that allow for faster data communication among various users. In addition, communication with financial institutions can be done quickly without having to travel by using a modem through a telephone line and a computer (Dharmniti Auditing Company Limited, 2021). In addition, modern accountants have to adapt to AI, for example, developing themselves to be knowledgeable in all areas, have analytical intelligence, be aware of the situation, and bring technology to help in accounting, analysis, and detecting anomalies of data. They need to adjust their roles to be a partner for the CEO. They must be able to think, analyze and distinguish to use existing data for summarizing the report so that the executives can make decisions in a timely manner. As superpowers are interested in news in financial world and want to develop their digital currencies, accountants must analyze and know good management. They must be creative and initiate out-of-the-box thinking (Kerdpitak et al.,2022) by practicing thinking for answers like designers and executives of today. Accountants are expected to increase their roles from accounting responsibilities to adding more value to the organization in business expansion or efficiency. Their assistance with tax planning creates maximum benefits and reduces business costs (Yodbua, 2020).

Financial report quality

For the importance of accounting, all types of business operations require reliable accounting information for consideration of making decisions on the budgeting, financial management, business resource management. Investors want the most benefits from the operation by using accounting information that is relevant both internally and externally to control and make decisions about operations. In order to obtain accounting information, computer program has been developed for more convenience, speed, and accuracy. Nowadays, computer programs are used to record accounts at present. Accounting information are applied to management, analysis, planning, control, and decision-making for benefits of stakeholders or financial statement users, including investors, executives, owners and governments who have used accounting information of each business in the administration of the country's economic and social affairs (Wiphadapornpong, 2017).

Accounting management efficiency

To achieve satisfactory results in improving operational efficiency, it is necessary to modify and promote human resource development in the organization based on knowledge, ideas, principles and practices from the beginning. The visualized components of supporting factors are used to create an overall picture, as a summary, increasing knowledge and ability to plan operations at both the organizational and individual level, leading to clearer implementation. The efficiency of organization depends on proficiencies of people and organization. Improving the efficiency of work in an organization is divided into four steps:

1) Measurement of Efficiency. Systematic and clear efficiency development will not be able to happen, if we are unable to understand the level of organization's operation efficiency. Therefore, we must establish concrete guidelines for measuring performance by considering the key factors that influence the operation to define benchmarks and methods of operation. At present, many industries may have indices that can be applied to measure efficiency. The continuous operation and preparation of databases both at the corporate and industrial level can be used as a guide for building business efficiency metrics. Even if a business doesn't have the basic information to build a benchmark, measuring tools can be built by considering output and input quantities that are important to the operation.

2) Evaluation of Efficiency. Data were compared, evaluated and analyzed to find differences, causes of inefficiency, and guidelines for planning to develop efficiency. The performance can be compared in 4 characteristics as follows:

1. Comparison in each time period by considering the difference of performances in each period will reflect the progress or backward of the business.

2. Comparison with objectives by comparing the performance with the desired goal allows the business to determine the consistencies, differences, and recommendations for improvement.

3. Planning for efficiency improvement by using the data from the assessment and the analysis of differences in the formulation of the organization's performance improvement plan concretely, called "Action Plan", will specify the details of the goals plus clear methods and procedures so that practitioners can perform tasks properly to achieve the goals.

4. Plan implementation by assigning people with direct responsibility, power to make decisions and clear orders make the operation systematic and unblemished so that the it can be monitored, evaluated, and adjusted accordingly in the future (Heuer, Kerdpitak & Kerdpitak, 2021; Gibson et al.,1988; Katz & Kahn, 1978).

Methodology

The researchers used mixed methodology research and development with 3 steps, comprising step 1: qualitative research with Delphi Technique for collecting data to study factors, step 2: quantitative research for collecting data to create the model of factors, and step 3: evaluation and validation of feasibility to study the probability of the model created.

The population and sample consisted of 429 educational institutions under the Office of Vocational Education Commission, Ministry of Education in Thailand, consisting of the Director / Deputy Director of Resource Management Department and Chief Accountant or Accounting Officer / Operator, totaling 2 persons per each institution. Therefore, the population of quantitative research was 858 persons and the sample was 469 persons, arisen from simple random sampling method. The tool used in this study was a questionnaire. The data were analyzed using confirmatory factor analysis (CFA) and structural equation model analysis (SEM). (Fornell & Larcker, 1981).

Results

To develop the Causal Relationship Model of Factors Affecting Accounting Management Efficiency and Financial Report Quality of Educational Institutions under the Office of Vocational Education Commission in Thailand, the researchers have synthesized documents and related research to obtain observed variables in the model. Preliminary data were examined by analysis of mean, standard deviation, coefficient of variation, Skewness and Kurtosis of the observed variables, as shown in Table 1.

Table 1 mean, standard deviation, coefficient of variation, Skewness and Kurtosis of the observed variables

Variables	Mean	S.D.	CV%	Skewness	Kurtosis
1. Enterprise risk management andinternal control					
1.1 Control environment	4.002	0.717	17.956	-0.456	0.407
1.2 Risk assessment	4.013	0.728	17.991	-0.464	0.390
1.3 Control activities	4.003	0.722	17.761	-0.402	0.312
1.4 Information and communication	3.857	0.806	17.835	-0.379	0.372
2. Accounting Practices					
2.1 Good characteristics of accountant	4.111	0.934	21.950	-0.870	0.364
2.2 Training on bookkeeping	4.315	0.851	18.730	-1.175	1.103
2.3 Understanding of the accountant's bookkeeping process	4.234	0.821	19.411	-0.945	0.838

3. Accounting Technology					
3.1 Accounting program skills	4.192	0.681	16.471	-0.511	0.276
3.2 Presentation of financial statements on Internet	4.124	0.654	15.876	-0.453	0.822
3.3 Accounting resource planning	4.107	0.677	16.491	-0.547	1.168
4. Accounting Management Efficiency					
4.1 Hierarchical principles	4.163	0.815	19.567	-0.790	0.493
4.2 Responsibility principles	4.054	0.817	17.679	-0.431	0.241
4.3 Reasonableness principles	4.017	0.839	18.407	-0.728	1.501
4.4 Success focus	4.118	0.708	19.910	-0.862	1.257
4.5 Specialization principles	4.051	0.736	20.480	-0.903	1.081
4.6 Discipline principles	4.190	0.853	17.920	-0.741	0.465
4.7 Professionalism	4.138	0.824	17.928	-0.533	0.717
5. Financial report quality					
5.1 Understandability	4.106	0.747	17.191	-0.672	0.764
5.2 Reliability	4.044	0.728	18.000	-0.503	0.572
5.3 Completeness	4.116	0.722	15.573	-0.545	0.592
5.4 Relevance to decision making	4.125	0.766	18.792	-0.730	0.992
5.5 Timeliness	4.113	0.811	16.869	-0.621	0.371

From the Table 1, the results found that the observed variables in the causal relationship model had the means between 3.957 and 4.316. Training on bookkeeping variable had the highest mean (4.316), whereas supervision, monitoring and evaluation activities variable had the lowest mean (3.957). Standard deviations (S.D.) of variables were less than 1 (0.655 to 0.944), indicating an appropriate distribution of the data. The variable with the highest standard deviation was good characteristics of accountant (0.944), while the variable with the lowest standard deviation was presentation of financial statements on internet (0.655).

The coefficient of variation (CV) of the observed variables portrayed the values between 15.886 and 22.950, which were similar values. Observed variable with the highest CV was good characteristics of accountant (22.950), indicating that the respondents had the highest different levels of perception. The observed variable with the lowest CV was presentation of financial statements on Internet (15.886), indicating that the respondents had the lowest different levels of perception.

Skewness of the observed variables represented the values from -0.379 to -1.175, not more than 2. The distribution of the data was slightly left-skewed (negative skewness). In addition, Kurtosis of the observed variables ranged from 0.241 to 1.506, not more than 10 according to the criteria (positive kurtosis), signifying normal curve distribution. The Skewness and Kurtosis results complied with the preliminary terms in structural equation analysis.

Table 2 Factor Loading

Structural Variables	Items	Standardized Estimates	T-Value	Loading	CR	AVE
Enterprise Risk Management and Internal Control (ERM)	X1	0.762	19.008	0.762	0.816	0.686
	X2	0.932	26.719	0.835	-	-
	X3	0.962	28.089	0.862	-	-
	X4	0.915	25.759	0.818	-	-
	X5	0.799	13.434	0.899	-	-
Accounting Practices (ACP)	X6	0.781	9.521	0.781	0.873	0.687
	X7	0.622	11.681	0.822	-	-
	X8	0.900	16.008	0.897	-	-
Accounting Technology (ACT)	X9	0.935	12.968	0.838	0.872	0.699
	X10	0.958	13.299	0.866	-	-
	X11	0.738	17.241	0.739	-	-
Accounting Management Efficiency (AME)	Y1	0.634	N/A	0.736	0.865	0.681
	Y2	0.869	14.714	0.867	-	-
	Y3	0.813	13.884	0.812	-	-
	Y4	0.751	13.136	0.851	-	-
	Y5	0.723	11.605	0.822	-	-
	Y6	0.775	13.961	0.874	-	-
	Y7	0.782	9.734	0.881	-	-
Financial Report Quality (FRQ)	Y8	0.712	N/A	0.715	0.882	0.677
	Y9	0.797	14.555	0.796	-	-
	Y10	0.832	12.575	0.835	-	-
	Y11	0.705	11.607	0.722	-	-
	Y12	0.718	11.666	0.718	-	-

Based on the CFA results of measurement model of five factors: enterprise risk management and internal control (ERM), accounting practices (ACP), accounting technology (ACT), accounting management efficiency (AME) and financial report quality (FRQ), with 23 observed variables, it found that the measurement model of all factors was fit to the empirical data. This reflected all observed variables were factors of the efficiency of accounting factors affecting financial report quality of educational institutions under the Office of Vocational Education Commission.

Table 3 Effects among variables

Effect variables	AME			FRQ		
Causal variables	TE	IE	DE	TE	IE	DE
AME	-	-	-	0.146*	-	0.146*
ERM	0.117 *	-	0.117*	0.125*	0.020*	0.108*
ACP	0.301*	-	0.301*	0.327*	0.044*	0.284*
ACT	0.197*	-	0.197*	0.130*	0.029*	0.101*

The test of causal factor model of the efficiency of accounting factors affecting the financial report quality of educational institutions found that enterprise risk management and internal control (ERM) had a direct positive relationship with accounting management efficiency (AME) (ß = 0.117, t - value = 2.466, p<0.05). Therefore, the following 7 hypotheses were accepted:

Hypothesis 1. Accounting practices (ACP) have a direct positive relationship with accounting management efficiency (AME) (ß = 0.301, t - value = 5.605, p<0.05).

Hypothesis 2. Accounting technology (ACT) has a direct positive relationship with accounting management efficiency (AME) (ß = 0.197, t - value = 3.867, p<0.05).

Hypothesis 3. Enterprise risk management and internal control (ERM) have a direct positive relationship with financial report quality (FRQ) (ß = 0.108, t - value = 2.137, p<0.05), and have an indirect positive relationship with financial report quality (FRQ) mediated by accounting management efficiency (AME) (ß = 0.020, t - value = 2.001, p<0.05).

Hypothesis 4. Accounting practices (ACP) have a direct positive relationship with financial report quality (FRQ) (ß = 0.284, t - value = 4.818, p<0.05), and have an indirect positive relationship with financial report quality (FRQ) mediated by accounting management efficiency (AME) (ß = 0.044, t - value = 2.405, p<0.05).

Hypothesis 5. Accounting technology (ACT) has a direct positive relationship with financial report quality (FRQ) (ß = 0.101, t - value = 2.074, p<0.05), and have an indirect positive relationship with financial report quality (FRQ) mediated by accounting management efficiency (AME) (ß = 0.029, t - value = 2.154, p<0.05).

Hypothesis 6. Accounting management efficiency (AME) has a direct positive relationship with financial report quality (FRQ) (ß = 0.146, t - value = 2.539, p<0.05).

Conclusions

The results of the components of factors affecting accounting management efficiency using Exploratory Factor Analysis (EFA) from 32 questions showed that the Kaiser-Myers-Olkin (KMO) was 0.836 (greater than 0.500), representing all the data and variables are well correlated. In addition, Bartlett's Test of Sphericity was statistically significant at the 0.05 level, indicating that the correlation matrix of all variables was correlated. Therefore, the correlation matrix was appropriate to be used for further factor analysis. Moreover, when extracting the factors by Principal Component Analysis (PC) method by rotating the factor axis, it was found that all 5 factors were obtained. The model fit of causal relationship of accounting factors affecting financial report quality of educational institutions under the Office of

Vocational Education Commission was analyzed using CFA to verify the validity of the model for measuring 5 latent variables: enterprise risk management and internal control (ERM), accounting practices (ACP), accounting technology (ACT), accounting management efficiency (AME), and financial report quality (FRQ). The result of model verification found that CFA of measurement model of enterprise risk management and internal control was fit to the empirical data.

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ANALYSIS BASED ON THE INDUSTRY OF THE HOTEL SECTOR IN MEXICO: POSADAS CASE
Análisis basado en la industria del sector hotelero en México: Caso Posadas

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ABSTRACT

The objective of this brief general market analysis is to determine with the VRIO framework how the Posadas group has managed to maintain itself in the Mexican lodging market. The aim is to understand how in the current panorama of tourism are the main challenges of the Posadas group. The main question that generated this analysis was: Is Grupo Posadas the current leader in the hospitality sector in Mexico? The hypothesis is that the strategies implemented by Grupo Posadas have allowed it to remain in the lodging sector; however, the current elements are not strong enough to be the market leader. So combining the analysis elements of the market and the VRIO, results were obtained that pointed to Posadas shares the leadership with IHG Hotels which begins to generate a more marked oligopolistic competition in the field of tourism.
Keywords: Tourism, hospitality, industry.
JEL: L83, F14, P36.

INTRODUCTION

According to the information of Posadas Group, the hotel company was born in 1967, when Mr. Gastón Azcárraga founded Promotora Mexicana de Hoteles, S.A. with the purpose of participating in the lodging sector with the construction and operation of a hotel in the Federal District called Fiesta Palace. Now known as Fiesta Americana Reforma. Two years later, it has a strategic alliance and partnership with American Hotels, thus forming the Operadora Mexicana de Hoteles. It is important to mention that the most emblematic franchise of Posadas is Fiesta Americana since the first hotel of this franchise was opened in 1979 in Puerto Vallarta. From then on, a new facet began in 1982. When Promotora Mexicana de Hoteles, S.A. and Gastón Azcárraga Tamayo bought 50% of the capital stock of Posadas de México.

Now, the birth of Posadas as such occurs in 1969 by Pratt Hotel Corporation of American origin for the purpose of operating and managing the Holiday Inn franchises in Mexico. In the year of 1990 Promotora Mexicana de Hoteles, takes the initiative to buy 50% of the shares of Posadas and with the acquisition allowed the emergence of the largest and oldest company in Mexico for modern times, with the operation of 13 hotels, then. One of the main advantages at the moment of having this acquisition and as a positioning was the management of the Holiday Inn hotels and the operation of the Fiesta Americana hotels.

The final transformation of the company occurred in 1992 when Promotora Mexicana de Hoteles changed its name to the current Grupo Posadas. That same year, the company began trading on the Mexican Stock Exchange (BMV). From then on Posadas began to attack the different segments of the tourism market starting in 1993 with business tourism with the opening of the first Fiesta Inn. In 1998 the company had its first elements of international expansion with the acquisition of the Caesar Park chain along with the rights to use the brand in Latin America, thanks to this purchase, in 2001 the first Caesar Business was inaugurated in Sao Paulo, Brazil.

In the 80's, Grupo Posadas realized that managing third-party hotels exported more reservations than it obtained. This was very common because the industry in these years was going through a period of saturation in the tourism sector. Posadas decided to focus then on the development of its own brands while continuing with the operation of the Holiday Inn franchise in the busiest destinations.

In 1992, the Company changed its name to Promotora Mexicana de Hoteles, S.A. of C.V. to the current Grupo Posadas, S.A. of C.V. In March of that same year, the Company was listed on the Mexican Stock Exchange. In 1993 it began to attack the business traveler segment with the opening of the first Fiesta Inn in city destinations. In 1998 the Company began its expansion in South America through the acquisition of the Caesar Park chain, together with the rights to the brand in Latin America. In 2001, the Company opened its first Caesar Business hotel in Sao Paulo, Brazil. Currently on year 2019 Posadas group has a positioning of 176 hotels and 27,573 rooms nationwide (Grupo Posadas, 2019).

1. Background and global panorama

As an economic activity, the so-called "industry without chimneys" maintains a strong link with hospitality in its different modalities, be it family, individual, business and in different ranges of services that can be considered as "additional". Tourism is often referred to as the "industry without chimneys", because it does not pollute. Although this is not entirely true, there is a great debate about the pollution of tourism that has a direct or indirect impact on the construction of the tourist infrastructure or the tourist destination.

The phenomenon ceased to be a privilege of a few rich families in the seventeenth and eighteenth centuries, to give way to mass tourism from the boom of the fifties of the twentieth century, with the development of new technologies in connectivity and logistics (media of transport) that have made tourism and hospitality of the world's most present industries.

Table 1: Main tourist destinations in the world by foreign currency income

Classification		Country	Year	
2016	2017		2016	2017
1	2	United States	206.9	210.7
2	2	Spain	60.5	68.1
3	3	France	54.5	60.7
4	4	Thailand	48.8	57.5
5	5	United Kingdom	47.9	51.2
7	6	Italy	40.2	44.2
9	7	Australia	37	41.7
8	8	Germany	37.5	39.8
12	9	Macao (China)	30.4	35.6
11	10	Japan	30.7	34.1
10	11	Hong Kong (China)	32.8	33.3
6	12	China	44.4	32.6
13	13	India	22.4	27.4
18	14	Turkey	18.7	22.5
14	15	Mexico	19.6	21.3
Total, world (Millions of dollars)			1246	1340

Source: Monitoreo Hotelero DATATUR 2018

Taking into account the above, it is expected that there will be greater accessibility in the following years for the hosting areas such as logistics, with which the trips and the phenomenon will have an exponential growth. In comparatives Mexico in tourism is among the top 15 in terms of foreign exchange earnings and in the top 10 of the most visited destinations in the world it can be considered Mexico as a stable country in terms of tourism up to its most recent published global statistics (tables 1 and 2) (SECTUR, 2018).

The document "OMT Panorama of International Tourism 2017", which is the most up-to-date document of the tourism ranking so far, indicates that in the arrival section of tourists Mexico is in sixth place with 39.3 million foreign tourists. With a scale from the eighth place to the sixth place in the international table. These results published by the World Tourism Organization (WTO) show a "favorable outlook" as some members who have faced security challenges in recent years have been sustained by the existing demand for travel to these destinations.

The other fundamental part is the entry of foreign currency, i.e. the amount of money spent in the country visited, there was a decrease from one position from 2016 to 2015 down from 14 to 15th. This indicates that, although the country is of the most visited at the international level does not have enough attraction to generate a greater demand in consumption for the tourist.

Table 2: Main tourist destinations in the world by arrival of tourists

Classification		Country	Year	
2016	2017		2016	2017
1	1	France	82.7	86.9
3	2	Spain	75.3	81.9
2	3	United States	76.4	76.9
4	4	China	59.3	60.7
5	5	Italy	52.4	58.3
8	6	México	35.1	39.3
6	7	United Kingdom	35.8	37.7
10	8	Turkey	30.3	37.6
7	9	Germany	35.6	37.5
9	10	Thailand	32.5	35.4
11	11	Austria	28.1	29.5
16	12	Japan	24	28.7
13	13	Hong Kong (China)	26.6	27.9
14	14	Greece	24.8	27.2
12	15	Malasya	26.8	25.9
Total, World (Millions of tourists)			1240	1326

Source: Monitoreo Hotelero DATATUR, 2018

Some elements already confirmed for the international tourism panorama 2018 indicate that there will be an assured decrease of a place since Turkey had an increase of 18% in its tourist attraction and will have displaced Mexico to position number 7. Another important factor is according to the head of the Ministry of Tourism (SECTUR) Miguel Torruco, the figures from the United Kingdom and Germany have not yet been taken into account due to the lack of consolidation, which could condition the country to drop another two places (Expansión, 2019).

2. National Panorama

Currently the tourism landscape is at constant levels since 2015 with a trend in an occupancy rate of 59.6 to 60.9 in 2018. The expectation for 2019 is to break the historical record of the year 2017 where it took place the highest percentage of occupation at the national level (SECTUR, 2018). However, as figure 2 shows with the data for 2018, the result was not as expected as, with the alerts to the tourist in the United States about not traveling to some Mexican states due to insecurity factors, environmental elements such as Sargasso and the uncertainty of the monetary value of the peso braked arrivals of international travelers, which, as already mentioned, affected the levels of the ranking without adding the data not confirmed by some countries.

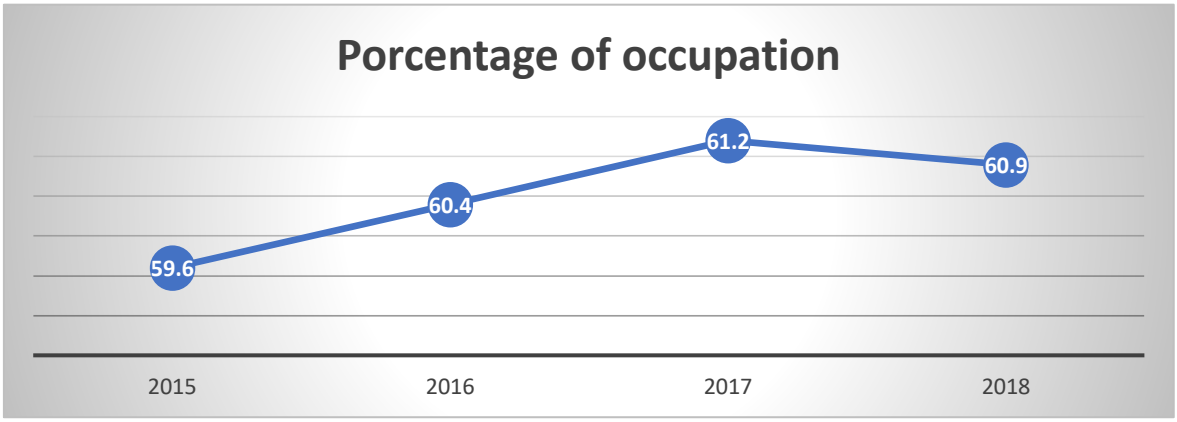

Figure 2: Percentage of occupation nationwide
Source: (SECTUR, 2018).

Now, in the percentage of current hotel occupancy talking about the year 2019 in comparison with the data of the month of March of the year 2017 and 2018 it is possible to have a forecast, that is to say; only the months of January, February and March have been measured, which in their accumulated and in comparison with the same months of the past years indicate a decrease in the tourist activity of 1.2%. It is necessary to mention that the occupation percentage does not necessarily reflect how important a destination could be in the influx of tourists, but rather that it reflects the saturation of the destination according to the tourist offer that exists in it (hotels, rooms available). That is why it is an indicator that shows us the importance of the investments that are made in the tourist poles (DATATUR, 2019)

Table 3: Percentage of Occupation (March).

Year	Total
2017	64.5
2018	65.7
2019	64.5

Source: Hotel monitoring program "DATATUR" March 2019

These elements of low tourist activity of 2019 with the comparison of the previous year can be linked to the little diffusion that has been done internationally in the tourism market and the competitive market that exists in Latin America. In an interview with Aristegui Alejandro Zozaya, director of the conglomerate Apple Leisure Group, Apple Vacations and the AMResorts chain, one of the strongest allies in the tourism sector in our country as the most important market that leads the country is the North American high-end, such as high-level weddings and honeymoons, since that represents 62% of tourism to Mexico by the group.

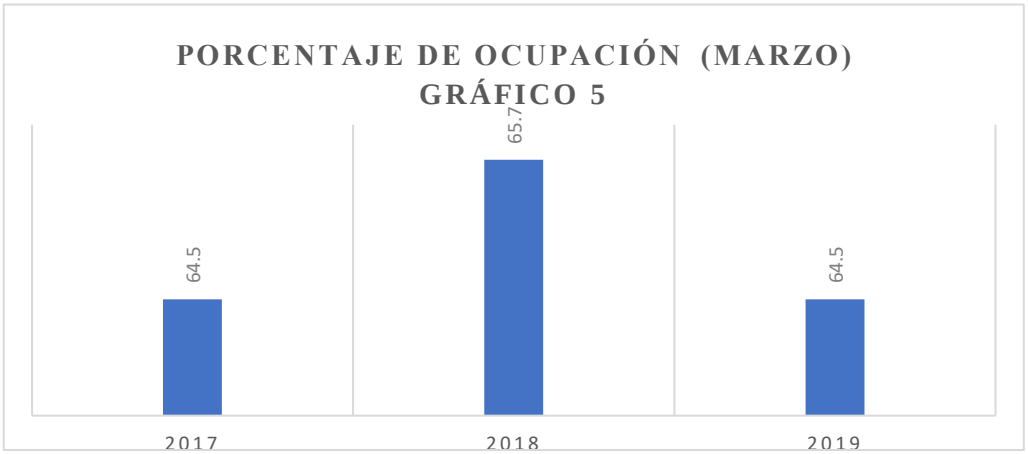

Figure 3. Comparative occupation rate (March)
Source: Hotel monitoring program "DATATUR" March 2019

In an interview it is detailed that what is happening with tourism in Mexico is not the result of a fall of the international market but a decision of the tourist to go to other destinations that are not Mexico (Kerdpitak, 2018; Aristegui News, 2019). That is the importance of the promotion, said in an interview explained that when the pleasure tourist is about to make a decision advertising is the main conduit that generates taste or preference and in the case of tourism (Aristegui News, 2019; Gülsün, & Miç, 2019).

Taking into account the above and analyzing hotel occupancy data at the state level, It can be seen the hotel market as a more accurate panorama to make a comparison of the 10 most competitive states that Mexico has. It is important to take into account as already mentioned before, that a percentage of occupation does not necessarily lie in the fact that the state has more "existing" or "available" quarters, if there is enough affluence for all the rooms to be occupied, so it is important that this be done specification to understand why a percentage of occupation directly affects the competitiveness of a destination and the importance as an indicator for future investors in these destinations as well as a possible trend of the expected percentage of occupation.

Table 3: Comparison of rooms at national level 2018

	Rooms 2018				
State	Existents	Average	Available	Occupancy	Percentage of occupancy
Quintana Roo	100,986	91,489	33,393,485	26,369,581	78.97%
Jalisco	75,422	45,099	16,461,135	12,346,827	75.01%
Ciudad de México	21,912	41,993	15,327,445	11,007,033	71.81%
Nayarit	34,745	19,926	7,272,990	5,145,101	70.74%
Baja California Sur	24,277	20,771	7,581,462	4,785,392	63.12%
Tamaulipas	26,818	11,829	4,317,585	2,719,076	62.98%
Aguascalientes	6,909	4,260	1,554,762	966,104	62.14%

Yucatán	13,076	8,657	3,159,805	1,915,721	60.63%
Sinaloa	20,942	14,108	5,149,420	3,017,403	58.60%
Nuevo León	18,923	14,365	5,243,225	3,049,344	58.16%

Source: Own elaboration with data from DATATUR 2018

These 10 destinations are the highest in hotel occupancy taking into account that it has been used only from the database of DATATUR hotels of 3 stars and up since the activity of the main hotel chains that are located in Mexico have their establishments positioned in these sectors. This with the purpose of generating an analysis of the Posadas group and its commercial strategy, as well as its competitors. The percentages of occupation more than the arrivals of national or international tourists shows the capacity of the destination and the "profitable" that it can be to invest in hotel matter in the state / area or type of destination depending on the variables used as can be seen in past graphs of the destinations can be cataloged in different ways depending on the specialization or type of study objective in hotels accounted for.

3. Current situation in the lodging

There are 13 face-to-face chains in the lodging market in Mexico, of which those with a higher level of hotels are: Posadas, IHG, Marriot, Hilton, Wyndham. Each one has different categories of hotels with different rooms and with different themes. In this way it can be seen what is the value proposition of each of the hotels and to which market segment they are related at a national level. Posadas' firm competes with the following companies:

Table 5: Comparison of the chains

Chain	Hotels	Rooms	Rooms percentage	Hotel percentage
Posadas	176	27573	23%	26%
IHG	139	21611	18%	21%
Marriott	76	7200	6%	11%
Hilton	55	7600	6%	8%
Wyndham	50	6200	5%	7%
Grupo Real Turismo	41	6885	6%	6%
Misión	37	3650	3%	6%
Vidanta	25	7000	6%	4%
Riu	17	9200	8%	3%
NH	16	5200	4%	2%
Hyatt	16	4600	4%	2%
Palace Resorts	12	6000	5%	2%
Melia	12	5400	5%	2%
Totals	672	118119	100%	100%

Source: Own elaboration with information of the corporate pages of the hotels 2019

It is also important to mention that the table reflects in general the number of hotels and rooms per corporate and does not make a distinction between its different chains or franchises that generate the main differentiator between each one in the

market for it in general terms of the market of 3, 4 and 5 stars these are the corporates which are located in Mexico. Taking into account the above, it can be affirmed that Posadas Group maintains the leadership in terms of hotels and rooms, which gives it the highest percentage of the market, however, its percentage is very close to that of the strongest chain globally with a difference minimal.

4. Market structure and concentration index

Taking into account the above, it can be assumed that the lodging sector in Mexico is a monopolistic competition. However, this may not be true. To understand more deeply how the market is, it is necessary to corroborate this information, which can be done with the indices of concentration which are in the annexes. Then, the results of the two concentration models that were obtained for the purposes of this analysis are added (See Annexes)

For the first analysis in the concentration index, the sum of the four companies was taken as a measure. The existing rank of concentration has a scale from 0 to 100 where 0 represents the case of perfect competition and 100 represents a monopolistic concentration. This is the main measure used to evaluate the structure of the market. The concentration coefficient is the sum of the 4 largest companies and the total sum which gives a result of 66.36%. According to Parkin, over 60% indicates a very concentrated market dominated by few companies in an oligopoly (Parkin, 2010) (Annex 1).

In order to corroborate the market concentration also for the analysis of this sector, the Herfindahl-Hirschman index (HHI) is used, which indicates that the lower the number, the more perfect the competition and the larger the market the more concentrated and begins to behave in a monopolistic manner. In the case of hospitality, the index has a value of 1470 which, according to the theory, puts us in a "moderately competitive" area since the interval for this definition is between 1000 and 1800 (Parkin, 2010) (Annex 2).

Therefore, it can be mentioned that in this confirmation of indexes there is an oligopoly. In which the participants are few and the market price is influenced at the same time as its competitors, that is, the profit of the participating companies is not only a function of their level of production, but also according to the production of the product, rest of the companies, And in particular in this sector, it is a differentiated oligopoly, that is, we have the same product, but different characteristics. (Kamasak & Cansever,2019). This is where the same differentiation makes the oligopoly have characteristics similar to monopolistic competition, however the assumptions are different.

5. Market differentiation

The differentiation of Posadas Group stands out for its different elements in the value proposals in each of its hotel franchises. Grupo Posadas has 7 hotel franchises with different market segments for each of them, these can be appreciated on their website.

1) Live Aqua: Live Aqua are hotels established for a segment of clients looking for "informal" but with luxury elements. They have simple but very elegant establishments and the first level service in kitchen, spa, lounge. It is the "highest" of the hotels Posadas has in its range of segmentation.
2) Fiesta Americana: The Fiesta Americana hotels are the most emblematic of the chain. They are five star and have luxury services as standard.
3) Fiesta Americana Grand: The Grand Hotels are a derivative of Fiesta Americana which offer a sense of "exclusivity" and "business" it can be mentioned that they are the VIP of the Fiesta Americana. They are those that have more percentage of entry with the "Awards" the loyalty program of Fiesta Americana.
4) D. Fiesta Inn: Fiesta Inn enters the "business" segment of Posadas which focuses on short stays and for work reasons, are suitable with elements to work in the room comfortably and with a series of services aimed at necessary to operate an office.
5) One Hotels: The One hotels are the second best brand positioned in the Posadas group market since they have 49 hotels nationwide as opposed to the 75 Fiesta Inn. The main market sector they are specialized in is low cost and short stays for work reasons. This mix follows the parameters of Fiesta Inn but with cheaper elements.
6) The Explorean: The Explorean offers luxurious and top-quality stays in natural and cultural sites for its guests to enjoy a feeling of relaxation and complete disconnection.

The value proposition of each of the brands explained competes in the market against similar elements and therefore substitutes, that is, goods or services that satisfy the need to a satisfactory utility for the agent and the price is the determinant for the election the client's. (Posadas Group, 2019). Taking into account the VRIO matrix, these are the main elements of the Posadas group in their value proposition.

Table 6: VRIO analysis comparison

VRIO Analysis	Posadas	IHG	Marriot	Key questions
Value	No	No	No	Is it valuable?
Rarity	No	No	No	Is it hard to find?
Inimitability	No	No	No	Is it difficult to copy?
Organization	Sí	Sí	Sí	Is there an organization to exploit the resource?

Source: Own elaboration.

The hotel sector is undoubtedly an intangible service, however, it is important to mention that it is a perfect substitute, that is, unless the "rewards" program of the different competences has already marked a preference or an alliance is chosen by the factor price and service and not so much for the intangible elements that are considered "plus". That is why Posadas' positioning analysis focuses more on the number of rooms and hotels that it has nationally than its VRIO. Taking this into account, the value proposition of each of the brands and the market segment to which they are directed generate the following panorama.

Table 7: Posadas Group

Table 7: Posadas Group

Scale ID	Chain Scale	Affiliation Name	México	Rooms
2	Upper Upscale Chains	Live Aqua	5	793
3	Upscale Chains	Fiesta Americana/ Grand/ VC	29	7,627
5	Midscale Chains	Fiesta Inn/ Fiesta Inn Loft	75	10,392
5	Midscale Chains	Gamma by Fiesta Inn	16	2,227
6	Economy Chains	One Hoteles	49	6,121
6	Economy Chains	Other	2	413
Total			176	27,573

Source: Own elaboration with data from DATATUR and STR Global.

It is not mentioned what these "other" hotels are or their prices therefore, it cannot make an accurate estimate. It is necessary to mention some key concepts to understand the table. Chain Scale refers to the name of "classification" where the chain is located, that is, the Upper Up are chains that are expensive for a high income segment and hence the chain starts to fall down to level 6 which is the "Economy" that it can considered the most accessible among the hotels registered by stars among the corporate ones (STR Global, 2018). The Affiliation Name on the other hand refers to the specific name of the chain and which is the group to which it belongs, which for the purposes of the study the Posadas column was removed as the object of study.

According to the Posadas group report as of December 31, 2018 Posadas is the leading hotel operator in Mexico with 1,751 hotels and 27,491 owned, leased, franchised and managed rooms in the most important city and beach destinations visited in Mexico. 84% of the rooms are located in city destinations and 16% in beach destinations (Grupo Posadas, 2019).

CONCLUSIONS

Taking this into account, the best feedback to conclude the hypothesis is that Posadas
is the leader of the Mexican market thanks to its history, past and purchases of hotel sector strategies at the time. Thanks to this, it remains the market leader with the largest number of rooms and the largest number of hotels, since lodging services are substitute goods. Indeed, the price factor is what often determines the choice of the consumer before the substitute goods.

Taking into account the development of the document, it is necessary to develop strategies for future hosting times because there is not enough government support for tourism promotion, although it is true that these elements can be considered unfair since It gives more diffusion to the touristic pillars of the country that are already positioned, leaving disadvantaged other destinations not so favored by the field of tourism but also not explored at all to generate tourism potential. Much remains in reflection if the occupation percentage is sufficiently determining for the tourist's consumption in the tourist site.

And also the elements of innovation in lodging that threaten the occupancy percentages of a tourist site with traditional hotels such as the Airbnb. It is important to take into account that the figures for a percentage of occupancy are those registered in conventional hotels and not in digital platforms, which generates a bias of the true level of saturation that can destination. Posadas, for its part, is still working on the positioning of its hotels and its themes depending on the preferences and opportunities it has in terms of convenience, whether by location or area with the consumer.

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