

# CONFERENCE PROCEEDINGS

## ICAIT 2018



**International Academic Multidisciplinary Research Conference 2018**

**Proceeding of**

**INTERNATIONAL CONFERENCE ON ADVANCE INNOVATION  
TECHNOLOGY IN LISBON 2018**

*Lisbon, Portugal  
6–8 December, 2018*

**ICAIT 2018**



**Edited by Kai Heuer, Wismar University, Germany  
Chayanan Kerdpitak, IBEST Conference & Publication, USA  
Bob Barrett, American Public University, USA  
Vipin Nadda, University of Sunderland, United Kingdom**

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# Conference Proceedings

## INTERNATIONAL CONFERENCE ON ADVANCE INNOVATION TECHNOLOGY IN LISBON 2018

*Lisbon, Portugal  
6 – 8 December, 2018*

### ICAIT 2018

**Organised by**

**ICBTS Conference Center & IJBTS** International Journal of Business Tourism and Applied Sciences

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## INTRODUCTION

We would like to welcome our colleagues to the International Business Education Social Sciences Humanities Tourism Transport Technology Research Conference. It is the nine series in 2018 of Conference on Business Tourism and Apply Sciences was held in Paris. As always many members of the ICBTS 2018 community look forward to meeting, sharing and exchanging their research ideas and results in both a formal and informal setting which the conference provides. Likewise, the concept of alternating the international conference every one month on April to October between Europe and the rest of the world is now well established. This year's event in Vienna (Austria) London (UK) Las Vegas (USA) Amsterdam (Netherlands) Zurich (Switzerland) Oslo (Norway) Helsinki (Finland) Berlin (Germany) Rome (Italy) Lisbon (Portugal) Lucerne (Switzerland) and another continues with the cultural following the very successful and productive event held in London in February 2018 in the field of various types for international academic research conference on Business Education Social Sciences Humanities and Technology. As usual The ICBTS 2018 brings together leading academics, researchers and practitioners to exchange ideas, views and the latest research in the field of Business Tourism and Apply Sciences.

The theme of this event The 2018 ICBTS International Business Tourism Social Sciences Humanities and Education Research Conference is "Opportunities and Development of Global Business Economics Social Sciences Humanities and Education" It is also represents an emerging and highly challenging area of research and practice for both academics and practitioners a like, The current industrial context is characterized by increasing global competition, decreasing product life cycles, Global Business, Tourism Development, Social Sciences Humanities Education Apply Sciences and Technology collaborative networked organizations, higher levels of uncertainties and, above all, and customers. In our view holding this event in Paris represents a timely opportunity for academics and researchers to explore pertinent issues surrounding Business Economics Tourism Social Sciences Humanities Education Sciences and Technology.

Potential authors were invited to submit an abstract to the International Conference Session Chairs. All abstracts were reviewed by two experts from the International review committee and final papers were further reviewed by this volume with 30 contributing authors coming from 18 countries. This book of proceedings has been organized according to following categories:

- Technology
- Information Technology
- Advance Technology
- Industrial
- Business & Economic
- Social Sciences
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## 2018 ICAIT CONFERENCE LISBON PROGRAM

ICAIT 2018 International Conference on Advance Innovation Technology Research	
<b>6 Dec 18</b> 9.00 – 09.45 (TH)	REGISTRATION & WELCOME  Welcome meeting at the Type Lisboa Aeroporto International, Portugal
	<b>Session Chairs</b>  <b>Prof. Dr. Barret Bob, USA</b> <b>Assis. Prof. Dr. Pibool Waijittragum, Thailand</b>
<b>6 Dec 18</b> 09.46 –12.00	<b>Session A1</b> <b>Paper 1 (101)</b> Information and Communication Technology (ICT) and programmed instruction for attainment of educational goals in Chuks Marcel Ezemoyih <b>Paper 2(102)</b> Entrepreneurship Education and Risk Taking Behaviour of Nigeria Graduates Falade Christianag Adekunbbi <b>Paper 3 (104)</b> Electronic payment in public transport Richard Oluwole Alademomi and Victoria Omoladun Oludu <b>Paper 4 (106)</b> VIX Futures as a Market Timing Indicato Nikolas Hour Vouliades <b>Paper 5 (108)</b> Entrepreneurship Dynamics: Entry, Survival and Firm growth of SMEs in West Africa Ajibike Abayomi A. and Akpojivi-Edewor, Mercy O. <b>Paper 6 (117)</b> Hotel Webbsite and Its Sustainable Development Goals Nga Thi Vo and Zuzana Tučková and Miloslava Chovancov <b>Paper 7 (118)</b> Challenges of Human Resource Management in West Africa Under Developed Economy Emmmanuel E.A <b>Paper 8 (120)</b> The Involvement of English Language Teacher in On-going Curriculum Development in the Saudi Arabian context: Suggested Model and Strategy Ayedh Dhawi Al-Mohana <b>Paper 9 (130)</b> Using Horton and Wohl’s Notion of "Para-social Interaction" To Understand the Current Popularity of Social Media Celebrities Nada Alahmari
12.01 – 13.00	Lunch
13.01 – 15.30	<b>Session A 2</b> <b>Paper 1</b> Electronic Sp[readsheet Package in office Management: A Key Drive for secretaries and Administrative Duties Chibuzor Emmanuel Amah N <b>Paper 2</b> A review of the impact of the national small micro and medium enterprise policy on youth employment and enterprise development: a case of the role of the Small Medium Enterprises Development Agency of Nigeria Emmanuel Ilori <b>Paper 3</b> The Psychological Problems of Ethnic Marginal Person’s and Adaptation Strategies Naira Hakobyan <b>Paper 4</b> Integration of Talent Management into Human Resource Practices in Public Universities in Ghana: Exploratory Study Tabita Ladzeh Akpey-Mensah <b>Paper 5</b> A Review of factors affecting the adoption, participation and usage of social networking websites in politics Dr.Goldi Puri <b>Paper 6</b> The Roles of Foreign Language in Business Administration Fadoju Gbenga Mathew <b>Paper 7</b> Body Image on Social Media: Photos, Profiles, and Popularity Samantha Dannielle C.Ariz <b>Paper 8</b> Social Studies Undergraduate Students’ Variables and their Attitude towards Examination Malpractice In the University of Calabar, Calabar, Cross River State, Nigeria. Odey, Edward Ogar

	<p><b>Paper 9</b> Effect of the use of mother tongue (igbo language) in teaching and learning of basic science among rural primary school pupils in Anambra State, Nigeria Anne Ndidi Meremikwu</p> <p><b>Paper 10</b> Effect of the use of mother tongue (igbo language) in teaching and learning of basic science among rural primary school pupils in Anambra State, Nigeria Anne Ndidi Meremikwu and Anulika Chinyere Okpara,</p>
	<b>SESSION A</b>
<p><b>7 Dec 18</b></p> <p>08.00 -10.30</p>	<p><b>Session A 1</b></p> <p><b>Paper 1</b> (101) New Consumers of Thai Halal Products Assis. Prof. Dr. Pibool Waijitraragum</p> <p><b>Paper 2 (102)</b> High porosity clay body for ceramic shelter from rice husk Assis. Prof. Dr. Suraphan Rattanavadi</p> <p><b>Paper 3 (103)</b> The Competency base of Information Technology and Communication for Education of Teachers in Demonstration School of Suan Sunandha Rajabhat University Assoc. Prof. Dr. Somkiat Korbuakaew</p> <p><b>Paper 4 (104)</b> Knowledge Transmission on Recyclable Waste Banks with the Active Learning Dr. Tubtimthong Korbuakaew</p> <p><b>Paper 5</b> (106) Study on PAPR reduction performance of SLM scheme for OQAM-FBMC under the non-linear channel Assis. Prof. Dr. Pornpawit Boonsrimuang</p> <p><b>Paper 6 (107)</b> Development of basketry manufacturing Assis. Prof. Dr. Ruedee Niyomrath</p> <p><b>Paper 7 (108)</b> Mobile Solar Water Pump Design Dr. Nichanant Sermsri</p> <p><b>Paper 8 (109)</b> Factors Associated with Knowledge, and Practice toward Safety Behaviors among Welder Students in Vocational Training School, Urban, Thailand Dr. Rapat Eknithiset</p> <p><b>Paper 9 (123)</b> The Effects of Using Animation Movies to Develop Listening and Speaking Skills and Satisfaction towards English Studying of Grade 8 Students Phuwitch Ngiwline</p> <p><b>Paper 10 (124)</b> The Effects of Using English Activity Based on CEFR to Develop English Proficiency of Grade 10-12 Students Suchat Nilsamranchit</p>
10.31 – 10.45	<b>Morning Break</b>
10.46 – 12.30	<p><b>Session A 2</b></p> <p><b>Paper 1 (112)</b> Positive Effects of Mathematics Camp on Mathematics Anxiety and Mathematical Resilience Dr. Ratchanikorn Chonchaiya</p> <p><b>Paper 2 (113)</b> The Safety Guideline for Natural Tourism Case Study Tum Luang-Khun Naam Naang Norn Forest Park, Chiang Rai Province, Thailand Dr. Supakit Mulpramook</p> <p><b>Paper 3 (114)</b> Community and Tourism Benefits from Building Conservation working with Social Enterprise Case Study: The Community Museum Bann Luang Rajamaitri, Chanthaboon Community, Chanthaburi Province Miss Phattita Pongthana</p> <p><b>Paper 4 (115)</b> The Study of Somoked Firing Traditional Wisdom to Develop Decorating Technique in Contemporary Design Mr. Jiravut Doungin</p> <p><b>Paper 5 (120)</b> Effectiveness of Drama Analytical Reading in Improving Critical Writing and Attitudes towards Writing Assis. Prof. Dr. Wipada Prasansaph</p> <p><b>Paper 6 (121)</b> Factors Influencing Mathematics Education Student's Anxiety in Learning Mrs. Chouang Utitasarn</p> <p><b>Paper 7 (122)</b> A study on Misconceptions in Calculus of Mathematics major students of Suan Sunandha Rajabhat University Dr. Thanatyod Jampawai</p>
12.31 – 13.31	<b>Lunch</b>
	<b>Conference Close</b>
8 Dec 2018	<b>Free day for Participants</b>



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# NEW CONSUMERS OF THAI HALAL PRODUCTS

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## ABSTRACT

A millennium generation can be classified as new consumers in the economic system as their consuming behavior has created a marketing opportunity in the modern trade cycle. This research intends to study the consuming behavior of the millennium generation of the Malaysian consumers in order to establish Halal food marketing strategy. An information in the field surveys, research tools, was derived from Malaysian Muslim students residing in Thailand.

The consumers' behaviors in the millennium generation can be characterized as brand ignorant, shopaholics, impersonator, media addicted, trend ignorant, anti-advertising, discount lovers, and marketing lovers. Due to various types of consumer behaviors, the marketing opportunities and a new marketing trend can be created in the modern-day Halal food markets: niche markets. The optimum way to introduce the premium food products into the Halal market is to inform the target consumers about the high-quality ingredients with an outstanding image of modern Halal.

The findings of this research reveal the solution to improve the marketing communication for Thai Halal food products. The marketing concepts of Halal food exported to Malaysia should be emphasized on an international theme entwined with Islamic rules.

The design of Halal food package in Malaysia tends to be based on the combination between an international feature and an Asian look. The consuming behaviors, attitudes towards the products, and purchasing reasons of Malaysian millennium generation have triggered the modern packaging design with a legible typography and an attractive picture. These components will catch attention of Malaysian consumers.

Keywords: New Consumers, Thai Halal Products, Halal

## INTRODUCTION

Halal means objects or products which are allowed to be consumed by Islamic rules commanded by Allah, the Islamic highest God. All Muslims absolutely believe in Allah as the one and only God who has created human beings [1], so the permissible objects from the god are believed to be useful and good for them. Halal can be generated into edible products: food, medicine, and herb, and non-edible products: clothes or any other basic equipment, etc. Therefore, any kinds of products or services, which are not contradicted to the religious rules, can be categorized as Halal products, as in Fig. 1.



**Fig.1.** Halal Food

Source(s): <http://www.discoverhongkong.com/ca/dine-drink/what-to-eat/halal-and-vegetarian.jsp>

According to the rules, it is forbidden for Muslims to take drugs and fermented drinks. Nowadays, not only do Muslims consume Halal food products, but other people also take these products as their consumable products. It may be because Halal food has been prepared with a hygienic process and is considered as healthy food [2].

Although there are almost 20 million Muslims residing in Thailand [3], Halal food seems to be unfamiliar to Thai people. Recently, Halal food and products with Halal trademark have gained substantial interest and widespread acceptance from the markets, as in Fig. 2.



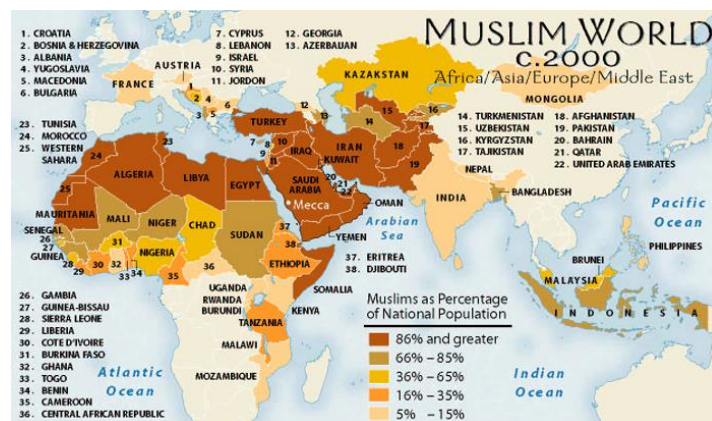
**Fig.2.** Halal Products from Thailand

Source(s): <https://www.thaitradeusa.com/home/?p=22570>

Department of International Trade Promotion among Muslim countries (2011) has illustrated the Muslim markets that there are 1,600 million Muslims worldwide which is proportionate to 23% of the world population. By the end of 2030, it is predicted that the number of Muslim will increase to be 2,200 people or 26.4% of the world population.

Halal markets can be listed into two groups:

1. Muslim countries: Algeria, Iraq, Morocco, Tunisia, Bahrain, Jordan, Oman, Turkey, Egypt, Kuwait, Qatar, United Arab Emirate (UAE.), Lebanon, Iran, Saudi Arabia, Yemen, Pakistan, Syria, Malaysia, and Indonesia [4], as in Fig. 3.

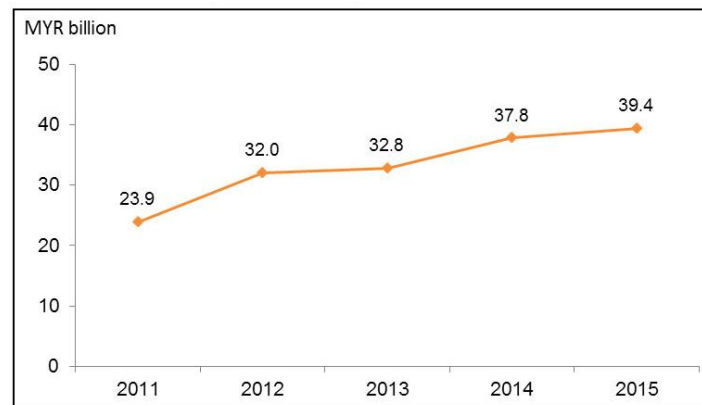


**Fig.3.** Islamic Countries – World Muslim Statistics

Source(s): <http://muhammadnazeefali.com/islamic-countries/>

2. Non-Muslim countries: India, China, United States of America (USA.), France, and Russia.

Recently, the largest raw material food exporter for Halal products is Australia followed by Brazil, Argentina, Canada, India, New Zealand, Britain, and the USA. Malaysia has aimed to be the center of the international Halal food. However, more than half of the Halal food sold in Malaysia is imported from Thailand in the form of raw food materials. Malaysian food manufacturers [5], then, process the Halal food products, themselves, which will be marketed into the other Muslim markets in different regions of the world. Those Thai raw food materials are transformed and repackaged under the Malaysian brands with Muslims' preparation, as in Fig. 4.



**Fig.4.** Malaysian Halal Export Value 2011 - 2015

Source(s): <http://economists-pick-research.hktdc.com/business-news/article/Research-Articles/Malaysia-A-Leading-Global-Halal-Food-Hub/rp/en/1/1X000000/1X0A92JB.htm>

Therefore, Thai exporters can only be an original raw material source for Malaysian food industries. This will cause the deficiency of brand building for Thai manufacturers in the Malaysian markets. This might be because the Muslim consumers are scarcely confident of Thai food manufacturers which are not originated in Muslim countries and might not proceed under Muslim code of conducts. Thus, this research has been inspired by the consuming behaviors of Muslims to study the consumers' behaviors, attitudes towards food products, and consumers' motivations so as to design Thai food package which can attract the millennium consumers' attention.

#### RESEARCH OBJECTIVES

1. To study the consuming behavior of the millennium generation of the Malaysian consumers.
2. To establish Halal food marketing strategy.

#### METHODOLOGIES AND PROCEDURES

This research has been conducted as qualitative research through interviewing 108 Malaysian Muslim students who took educational courses in Thailand. The samples were selected with Purposive Sampling Method because, according to the data from Office of the Higher Education Commission, a number of Malaysian students studying in institutions around Thailand in 2011 were well under 150 students. As well as this, the Malaysian market is counted as an important market for Thai food exporters.

#### RESULTS AND IMPLICATIONS

According to the Islamic rules, the standard of Halal food distributed in Malaysia is emphasized the proper process of food preparation which is refrained from any contaminated substances. Department of Islamic Development Malaysia (JAKIM) is an office who conducts the food inspection of domestic food and imported food including advertisement, regulations, and explanations on the package and label, as in Fig. 5.



**Fig.5.** Malaysian Halal (JAKIM)

Source(s): <https://www.halalverified.com>

The research findings have revealed the consumers' behavior, attitudes, and purchasing reasons and motivations, as follows.

### 1. Consumers' behavior

It is important for Malaysians to check the Halal trademark on the food package as they trust the inspection process delivered by Department of Islamic Development Malaysia (JAKIM). They do not consume the food without Halal trademark. Most of Malaysians are likely to buy the food from their own country, but imported food products can become their favorites, too. Hence, the millennium consumers tend to take graphic designs and features of the package, brand names, and the pictures on the package into their considerations. On the other hand, the middle age and the senior consumers have emphasized the Halal food process rather than the attractive package design, as in Fig. 6.



**Fig.6. Thai Halal (Instant Food)**  
Source(s): Waijittragum, P. 2010

### 2. Attitudes toward food products

Malaysians' attitudes toward their food products are in moderate level as they trust the food inspection standard from the Department of Islamic Development Malaysia (JAKIM). They believe that Halal products are suitable for Muslims and have been appeared with the international look. However, the millennium generations are not keen on the products with Middle East appearance. In order to serve their demands, the places of distributors need to offer a wide variety of Halal products from international suppliers such as Thai, Chinese, Japanese, and Korean suppliers, as in Fig. 7.



**Fig.7. Thai Halal (Ready to Drink)**  
Source(s): Waijittragum, P. 2010

### 3. Purchasing reasons

Malaysians' purchasing reason is always related to Islamic rules, so the marketing of the products in Malaysia have to strongly stick on the religious rules. Most products available in the market are produced by local manufacturers. Nonetheless, the millennium consumers are likely to buy imported products from Thailand, Japan, Australia, China, Korea, European countries, the USA., and the UAE. because of the reputation and embedded stories of the countries of origin. Unlike the middle-aged and senior consumers, those people incline to the healthy products, which are free from any chemical substance and money valued, as in Fig. 8.





**Fig.8. Thai Halal (Snack)**  
Source(s): Waijittragum, P. 2010

#### 4. Purchasing motivation

The biggest motivation for Malaysians to purchase products is Halal standard certification accredited by Department of Islamic Development Malaysia (JAKIM) followed by international look package, pictures of the products and ingredients on the package, logo or branding appearance, product descriptions, and motifs. The imported food products from Thailand, China, Korea, and Japan with unique patterns and designs can attract millennium consumers' attention, as in Fig. 9.



**Fig.9. Thai Halal (Health Care Products)**  
Source(s): Waijittragum, P. 2010

#### 5. Influential factors

The findings also suggested the indifference of opinions between males and females that both of them shared a similar level of purchasing motivation towards Halal products. Moreover, the consumers aged between 20 and 25 had different purchasing motivation towards Halal products than the other consumer groups whose age is older, as in Fig. 10.



**Fig.10. Thai Halal (Hygienic Products)**  
Source(s): Waijittragum, P. 2010

## CONCLUSIONS

This research has emphasized the study of consumers' behavior, attitudes, purchasing reasons, and motivation of Muslim consumers in order to apply on the Halal food packaging design for Muslim countries. This research is not responsible for the Halal food preparation. It can be concluded that Malaysia is a unique Muslim country as half of the citizens belong to the Islamic community. Many countries have long established their trades with Malaysia resulting in the western lifestyle of the people with slightly loose hold with Islamic rules. Therefore, various styles of packaging (international, western, and Asian styles) are available in the market and are highly accepted by the consumers who share a similar taste with the westerners, especially the millennium group of consumers whose purchasing behaviors can be rationalized by Udon (2001) [6], research findings. He conceptualized the numerous consuming behaviors of millennium consumers, who have played an important role in modern marketing, as brand ignorant, shopaholics, impersonator, media addicted, trend ignorant, anti-advertising, discount lovers, and marketing lovers. Moreover, the attractive design has been another element for the Malaysian millennium consumers to take into their consideration which can be supported by Waijitragum (2010 and 2013) [7], [8], who has related this concept of design to his globalization idea. His idea can be described as the communication through universal design and symbol which can serve unlimited needs of the consumers based on their behaviors and attitudes. Apart from millennium generation's purchasing behaviors, the middle-age and aged citizens are highly regarded Halal products as their necessity and they do not consume non-Halal products since they are doubtful about the food preparation or sources of ingredients. Therefore, it is important for them to select Halal food products with the right process of food preparation rather than an attractive design on the package or an image of the product. Every product available in the market needs to be labeled with comprehensive descriptions.

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# HIGH POROSITY CLAY BODY FOR CERAMIC SHELTER FROM RICE HUSK

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## ABSTRACT

Waste recycle is one of the interesting topic in both academia and industry. This research focuses on recycling the industry waste focus on rice husk ash to substitute as silica in the system of High porosity ceramic body for ceramic shelter. In this study, we used 11 point Biaxial Blend to verify the composition of ceramics body between rice husk ash and Bannasan Surajathane ball clay. All raw materials were ground, slip casting, and sintered at 1200 and 1250°C for 1 hour. The test piece were physical properties tested for firing shrinkage, water absorption, and porosity. The result shown the high volume of rice husk the lower firing shrinkage but high water absorption, and high porosity too. The test piece number 5 (40% rice husk ash and 60% of ball clay) sintered at 1200 °C were the best properties at 30.40 % of water absorption and 10.27 % of firing shrinkage. This sample were suitable to be produce the ceramic shelter because it has high porosity and low shrinkage.

**Keyword:** rice husk ash, ceramic shelter, High porosity clay body

## INTRODUCTION

Thailand is an agricultural country and exporting a lot of rice to many country around the world. There are a lot of rice husk from rice mill at the end of season. Many of researcher try to study how to recycling rice husk both in agricultural, industrial, sciences and technological. Biofuels is one of the potential of rice husk and give the huge of rice husk ash. Rice husk after firing at 800 °C give rice husk ash 15 – 20 % (by weight %). Rice Husk Ash is consist of silica 95 % (by weight %)[1,2]. Silica from rice husk ash after firing at temperature 800°C usually in amorphous phase with phases of Tridymite and Cristobalite with organic substance and non-metal such as Ca, Mg, Fe, Al, Cu, Na [3].

Jiravut (2011). The study of pattern identity and ceramic technique for Thepthidaram Temple Bangkok Thailand . The figure 1. Shown that the Ceramics shelter and decoration tiles on the buddhist temple were made from ceramics with glaze from ash. All of it were imported from China. Moreover the figure 1. shown more than 3 color were found on it[4].

Nowadays, many companies in the industrial sector have been awakening to industrial waste management. The principle of 3R implementation of industrial waste include (1) to reduce wastes and by- products from manufacturing process; (2) to reuse wastes and consume the products; (3) to recycle and recover wastes, consume the products and non reusable materials (Worapong Thiemsorn, 2011; Tanavadee. Leejakphai, 2003; Frank, H. and Janet Hamer, 2004)[5]. So in this research aim to study how to used silica from rice husk ash as a mail raw material to produce ceramics shelter.



**Fig. 1. Ceramics shelter and decoration at the buddhist temple of the Thepthidaram Temple.**

## METHODOLOGY

All raw materials were commercial grade supplied by C.K. Ceramics Co. Ltd. Only Rice husk ash was prepared by researcher. Chemical compositions of each raw material were shown in Table 1. Study the data about high porosity clay body synthesis technic, recycle the rice husk ash from the academic paper, research and data of material in the market. Study the possibility of the mixture and possibility of high porosity clay synthesis from rice husk ash.

Chemical compositions of rice husk ash were detected by Wavelength Dispersive type X-ray Fluorescence Spectroscopy (WD-XRF using Rh radiation in a Bruker® S4 Pioneer) were show in Table 1. And Crystal structures and their relative amount were determined by X-ray diffraction using  $\text{CuK}\alpha$  radiation with  $\theta$ - $2\theta$  scans in a Bruker® D8 Advance Diffractometer.

The mixture was blended in ball mill for 1 hour. Sample were forming with slip casting and fired at 1200 and 1250 °C for 1 hour. Sample with the dimension of 2.5 cm x 12 cm x 1 cm were used in water absorption tests. Specimens with the dimension 2.5 cm x 12 cm x 1 cm with 10 cm. stamp marking were used in linear shrinkage tests.

Physical properties of raw materials and samples were measured as the followings:

1. Linear shrinkage test: firing specimens were tested according to ASTM C326-03 (Reapproved 1999)[12].
2. Water absorption was observed in accordance with ASTM C373-88 (Reapproved 1999)[12].

## RESULTS

Rice husk ash from brick industry were 3 types as black, gray and white were shown in figure 2. Chemical compositions of the raw materials are shown in Table 1 and X-ray diffraction pattern of rice husk ash in Figure 3 shows phases of Tridymite and Cristobalite.

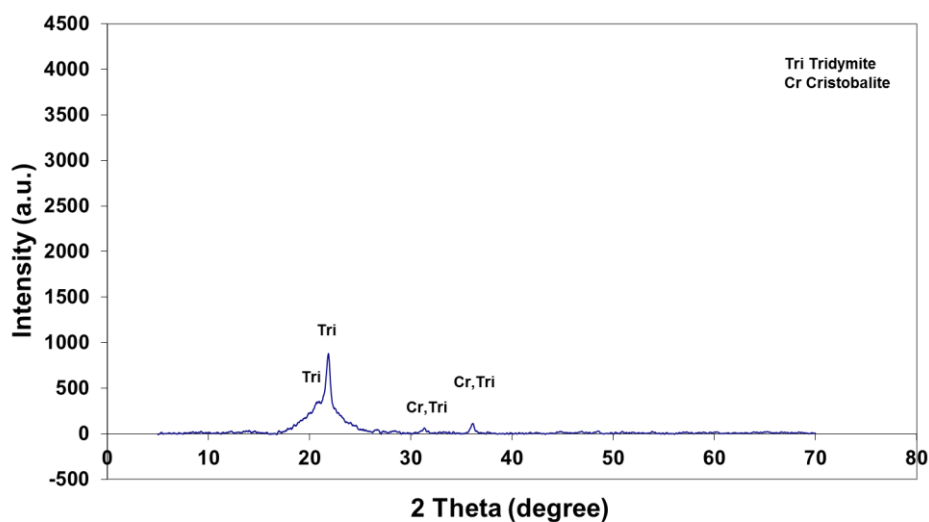


**Fig. 2. Rice husk and 3 types of Rice husk ash.**



**Table 1. Chemical composition of raw materials. (weight %)**

Oxide	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	CaO	MgO	Na <sub>2</sub> O	K <sub>2</sub> O	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	ZnO	L.O.I.
Aw	78.80	5.42	1.73	4.21	1.08	-	2.68	-	1.63	-
Rh	22.55	66.05	0.08	0.54	0.41	4.19	0.68	0.02	-	4.65



**Fig. 3** XRD pattern of the rice husk ash and the standard peak positions of Tridymite (Tri), and Cristobalite (Cr).

**Table 2: Raw materials in weight%.**

Sample	1	2	3	4	5	6	7	8
ball clay	100	90	80	70	60	50	40	30
rice husk	0	10	20	30	40	50	60	70

Table 4.2 displayed the linear shrinkage after firing of the samples at 1200°C and 1250°C. The sample 5 got the lowest shrinkage values of 10.27 % for and 9.38 % for both sintering temperature, respectively. The high volume of rice husk ash in the sample shown the lower linear shrinkage value.

**Table 3 The linear shrinkage of the samples after firing at 1200 and 1250°C**

	sample.1	sample.2	sample.3	sample.4	sample.5
1200°C	21.74	17.73	14.18	12.92	10.27
1250°C	22.18	19.18	14.72	11.74	9.38

Water absorption values of the sample after firing of the samples at 1200°C and 1250°C were shown in Table 4.3. The sample 5 got the highest water absorption value of 30.40 % for and 27.58 % for both sintering temperature. The high volume of rice husk ash in the sample the high water absorption value.

**Table 4. The water absorption of the samples after firing at 1200 and 1250°C**

	sample.1	sample.2	sample.3	sample.4	sample.5
1200°C	5.50	12.00	18.45	25.34	30.40
1250°C	4.13	12.68	16.72	22.75	27.58

## CONCLUSION AND FUTURE WORKS

1. The result shown the high volume of rice husk the lower firing shrinkage but high water absorption, and high porosity too. The test piece number 5 (40% rice husk ash and 60% of ball clay) sintered at 1200 °C were the best properties at 30.40 % of water absorption and 10.27 % of firing shrinkage.
2. This sample were suitable to be produce the ceramic shelter because it has high porosity and low shrinkage. However, further studies of firing the samples from rice husk ash at the lover temperature should be considered to develop the high porosity clay body.

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# THE COMPETENCY BASE OF INFORMATION TECHNOLOGY AND COMMUNICATION FOR EDUCATION OF TEACHERS IN DEMONSTRATION SCHOOL OF SUAN SUNANDHA RAJABHAT UNIVERSITY

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## ABSTRACT

This research was intended to explore information and communication technology competencies for education of teachers in Demonstration School of Suan Sunandha Rajabhat University. A simple random sampling was employed to obtain a sample of 53 teachers from Demonstration School of Suan Sunandha Rajabhat University. Investigation of the sample's basic information revealed the followings. The sample comprised predominantly 73.58 % female and 26.42 % male; equally 47.17 % bachelor's degree and master's degree holders; 5.66 % doctoral degree holders; the majority or 35.85 % with 5-10 years of experience; the majority or 73.58 % in the position of instructor and 26.42 % in the position of expert instructor. Results showed that ICT competencies for education of teachers in Demonstration School of Suan Sunandha Rajabhat University in all of the 7 areas was at a high level in overall, with 5 areas at a high level ranked by their mean values as: use of operating system program ( $\bar{X}=3.97$ , S.D.=0.98), use of internet network ( $\bar{X}=3.88$ , S.D.=1.03), use of hardware ( $\bar{X}=3.80$ , S.D.=0.87), applying computer in teaching and learning ( $\bar{X}=3.76$ , S.D.=1.02), and use of e-office ( $\bar{X}=3.62$ , S.D.=0.98); and another 2 areas at a moderate level: use of application program to develop instruction materials ( $\bar{X}=3.76$ , S.D.=1.02), and laws and ethics related to computer and information technology ( $\bar{X}=3.50$ , S.D.=1.02).

**Keywords:** Teacher competencies / Information and Communication Technology

## INTRODUCTION

Competency as a trait is essential to the development of all professions. Competency changes over time. The competencies to empower the learning and communication innovations for the 21st century (2001-2100) are required for Thai society in this world of competition in all dimensions especially those skills in information and communication technology (ICT). Such skills enable preparedness for entering new challenging economy as called "Wisdom Economy and Learning" for which ICT competencies serve as key driving force for Thai people to acquire knowledge and wisdom. In doing so, ICT is used as a basis for comprehensive or well-rounded development of the country where knowledge and wisdom are sustainably attained by the year 2020, and where human capital is well developed for their effective and creative use of ICT [1]. A key to education process for human development is teacher as a profession that requires consistent adjustment to changes and development in the midst of innovations and technologies of the 21st century. [2] Teachers will have to focus more on hands-on learning, instructional improvement, shifting their role from instructor to coach as learning facilitator, as well as ensuring a learning friendly environment. According to Bryant and Poustie [3] knowledge and skills are competencies needed in doing a job; the knowledge used and appropriate attitude are beneficial to job development. Consistently, McClelland [4] professor of psychology at Harvard University, addressed about the concept of competency as a behavior associated with successful job performance.

Given rapid changes and increased efficiency of information technology, it has thus been utilized to enhance the efficiency of academic work and educational management. Today, information technology plays a

vital role in education reform. Rosukhon Makaramani [5] described that “ICT in teaching and learning concerns all teachers not only computer teachers”. Accordingly, teachers are required to have ICT literacy and competencies to enable their work, self-development, as well as planning for suitable and effective learning management. Teachers’ role is expected to change from teacher to learning facilitator for learners by giving them advice and counseling to aid learners’ self-learning and promote their lifelong learning. It is therefore necessary for teachers to develop their essential competencies in particular of effective use of ICT at work for the achievement of educational aims as it was termed “Competency-based Development”. Competency refers to the ability of an individual to do things with the performance shown in measurable and evaluable behavior. In similar, ICT competencies of teachers mean the ability of teachers to use ICT at work in education with their performance shown in measurable and evaluable behavior. Everyone can evaluate their own competencies. The UNESCO [6] investigated the ICT competency standards for teachers under its project “ICT Competency Standards for Teachers” (ICT-CST) and specified 6 ICT competency standards, namely: 1) Technology Literacy 2) Basic Knowledge 3) Integrate Technology 4) Basic Tools 5) Standard Classroom 6) Digital Literacy

With such significance and rationale, the author intends to explore ICT competencies for teachers in Demonstration School of Suan Sunandha Rajabhat University, and propose a guideline for further development of teachers in ICT.

## **MATERIALS AND METHODS**

This research explored ICT competencies of teachers in Demonstration School of Suan Sunandha Rajabhat University, and proposed a guideline for development of teachers in ICT. The author took on the following research procedure.

1. Investigate, analyze, and synthesize the data from relevant documents, texts, and research.
2. Construct research instruments including a questionnaire on ICT competencies of teachers.
3. Review of research instruments by experts; revise the instruments upon experts’ recommendations.
4. Administer the instruments for data collection with the sample of 53 teachers in Demonstration School of Suan Sunandha Rajabhat University,
5. Analyze, draw conclusions, prepare a research report, and disseminate research results.

## **RESULTS**

### **Part 1: General information of the sample**

Investigation of the sample’s basic information revealed the followings. The sample comprised predominantly 73.58 % female and 26.42 % male; equally 47.17 % bachelor’s degree and master’s degree holders; 5.66 % doctoral degree holders; the majority or 35.85 % with 5-10 years of experience; the majority or 73.58 % in the position of instructor and 26.42 % in the position of expert instructor.

### **Part 2: Investigation result on ICT competencies of teachers in Demonstration School of Suan Sunandha Rajabhat University**

Results based on the collection of data on 7 aspects of competencies are summarized in Table 1 below.

**Table 1.** Summary of ICT competencies for education of teachers in Demonstration School of Suan Sunandha Rajabhat University

List of Competencies	$\bar{X}$	S.D.	Level of Competency
1. Use of hardware	3.80	0.87	High
2. Use of operating system program	3.97	0.98	High
3. Use of e-office	3.62	0.98	High
4. Use of application program for developing instruction materials	3.26	1.16	Moderate
5. Use of internet network	3.88	1.03	High
6. Applying computer in instruction management	3.76	1.02	High
7. Laws and ethics related to computer and information technology	3.50	1.00	Moderate
Total	3.68	1.01	High

As Table 1. suggests, ICT competencies for education of teachers in Demonstration School of Suan Sunandha Rajabhat University in all of the 7 areas were at a high level in overall ( $\bar{X}=3.68$ , S.D.=1.01), with 5 areas at a high level and another 2 areas at a moderate level.

According to the above results, conclusions were drawn to provide a guideline for developing ICT competencies for education of teachers in Demonstration School of Suan Sunandha Rajabhat University as outlined in the followings.

1. Training workshop programs should be developed and conducted for teachers in those competencies rated at moderate level including the use of application program for developing instruction material, and laws and ethics related to computer and information technology.

2. Those competencies rated at high level should be promoted and further developed to attain higher level and become mastery in response to the 21st century essential skills, by conducting training workshops for various skills required for the practice of teachers, which can be prioritized by the level of needs.

3. There should be ongoing supervision and monitoring on teachers' competencies to ensure their steady and sustained skills.

4. Administrators should provide budget support for developing instruction materials of necessary and relevant equipment and supplies in order to facilitate goals achievement and encourage school teachers.

## DISCUSSION

Based on the investigation, ICT competencies for education of teachers in Demonstration School of Suan Sunandha Rajabhat University in all of the 7 areas were found at a high level in overall. There were 5 areas at a high level ranked by their mean values as: use of operating system program ( $\bar{X}=3.97$ , S.D.=0.98), use of internet network ( $\bar{X}=3.88$ , S.D.=1.03), use of hardware ( $\bar{X}=3.80$ , S.D.=0.87), applying computer in teaching and learning ( $\bar{X}=3.76$ , S.D.=1.02), and use of e-office ( $\bar{X}=3.62$ , S.D.=0.98); and another 2 areas at a moderate level: use of application program to develop instruction materials ( $\bar{X}=3.26$ , S.D.=1.16), and laws and ethics related to computer and information technology ( $\bar{X}=3.50$ , S.D.=1.00). It accords with Poranee Loatong et al. [7] in their research on development of competency in information and communication technology (ICT) of teachers in Rajamangala University of Technology Isan. It reported that the need in information technologies was at a high level in all of the 9 aspects, and ICT competencies were at a high level in 5 aspects and a moderate level in 4 aspects. In similar,

Namphueng Khachenthon and Niracharapa Tongdhamachart [8] carried out a research on the components and development of information technology competencies of primary school teachers in education expansion schools under Sa Kaew Primary education service area office 1. It found the level of information technology competency was at a moderate level.

## CONCLUSION

Competencies is a fundamental feature of a person which related to the performance of the work or has outstanding performance in the workplace. The era of technology and communication is full of information. Teachers need to have the skills and knowledge to use the technology to help them in teaching and learning. The technology-based learning activities will stimulate interest among learners. Moreover if the instructor has effectively designed the teaching and learning activities, it will greatly enhance the learning skills of the students.

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# KNOWLEDGE TRANSMISSION ON RECYCLE WASTE BANK WITH AN ACTIVE LEARNING PROCESS

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## ABSTRACT

Waste and human living now become inseparable. The problem of city waste flood was found to stem partly from the lack of public involvement. This is because waste management varies from area to area in terms of types of activities and policies, and other limitations to urge for serious and constant actions to be taken. In addition, the lack of consciousness in proper waste disposal has caused serious environmental problem in the society. The current research was aimed to transfer the knowledge and measure the satisfaction of participants in the transfer of knowledge on recycle waste bank by using an active learning process. A sample of 40 participants, selected by a simple random sampling, included 10 teachers and 30 students of Wat Doadong School, Samutsongkram province, Thailand. The transfer of knowledge on recycle waste bank with an active learning process involves 4 stages: 1) Educating on waste separation through playing games; 2) Educating on recycle waste bank through group process of knowledge bases rotation including such as working group setup base, bank members base, recycle waste deposit base, recycle waste bank accounting base; 3) Brainstorming to develop recycle waste management project; and 4) Presenting results, discussion and conclusion. Research procedure began with asking participants to complete a pretest and participate in the knowledge transfer activities on recycle waste bank. At the completion of the 4 stages, participants were again asked to complete a posttest and a satisfaction scale. Results suggested participants' learning achievement on recycle waste bank knowledge was higher at posttest than pretest at .05 level of significance, and highest level of satisfaction ( $\bar{X} = 4.58$ , S.D. = 0.74).

**Keyword:** Knowledge Transfer, Recycle Waste Bank, Active Learning

## INTRODUCTION

Given the current age of growing materialism, production process seeks to draw consumers with attractive colorful packaging. Most people prefer consuming products in beautiful packaging and good looking and as a result the amount of waste accumulates. Larger amounts of waste from packaging are papers, plastics, and metals which can be reused or processed to produce monetary value as well as to reduce the use of natural resources.

The intensity of waste problem continues to grow day by day due to increasing number of population. It is partly because people focus on the look and convenience when they buy things for consuming, coupled with the consumption value that disposal in single use is preferable. Some materials might be usable but mixed with waste. It is difficult to find suitable ways to manage such waste and even more difficult when they pile up and cannot be managed in time. Waste is refuse from human activities generally includes those non-hazardous such as papers, clothes, plastics, food scrap and those hazardous such as germs, foams, rubbers, broken glasses, colors, cleansing agents, chemicals that are harmful to health. As a community grows to become a city, the number of population will increase along with the growth of economy and new technologies, resulting in an increase of production and consumption. As a consequence, the amount of household waste and city solid waste will rise by increased number of population and their activities. The problem of waste management is that the total volume of country wide municipal solid waste is around 3,420 ton/day while 2,667 ton/day or 88 % of them can actually be

disposed with residual waste about 753 ton/day or 22 %. If waste management in this way continues, the amount of waste in communities around the country would reach approximately 7,370 ton/day and with residual waste around 1,620 ton/day. It was found that waste management in some communities was not that hygienic. Sanitary waste management system is in place in many communities however inefficient operation was the problem, and residual waste remained there at the management site. Urban communities in each city, for example, are capable of disposing certain amount of waste only during particular time. Huge pile of residual waste left outdoor have caused environmental problems, spoiled the landscape, produced undesirable odor, and even worse became germs breeding ground. These all can pose health effect on both the people involved in waste management and general public. Waste management will be more difficult in the future if local authorities failed to operate properly and effectively on waste management. Different waste management approaches exist, each however has its limitation in terms of environmental concerns especially with air and water since it usually needs a piece of land in the neighborhood to manage it. It can be seen that just a small amount of human-produced waste can cause many other problematic impacts. One way to reduce such problems is to minimize the volume of waste to be managed possibly by means of raising awareness among public and encouraging them to cooperate in waste separation. Management of waste problem currently practiced involves managing usable waste for direct use (Reuse) or processing (Recycle) for other uses, and some are processed as compost. [1]

Organizations today are competing for their success. Part of their success certainly comes from quality development of staffs. In doing so, a knowledge transfer process is a key to facilitate knowledge development of staffs. [2] Knowledge is accumulated from investigation, learning, proficiency, experience, and values that provide a framework for incorporating information with individual environment so that it can be utilized however in a way varied by individuals. [3] The hierarchy of knowledge as defined by Yamazaki [4] was depicted in the form of pyramid consisting (1) Data as facts, raw data, without interpretation; (2) Information as analyzed, synthesized data ready to use for management and decision making, incorporating context of belief, common sense or experience of information users, and in the form of measurable and tangible data, however with limitation of scope and time of use; (3) Knowledge as information through thinking process, comparing and connecting to experience to enable understanding of certain matter and usability in different situations without time limitation; and (4) Wisdom as knowledge within an individual that is usable. Knowledge is of 2 types: 1) Tacit Knowledge as a kind of knowledge within an individual originated from learning experience, belief and attitude which is difficult to transfer in written form, however, can be developed and shared with others; and 2) Explicit Knowledge as a kind of knowledge that can be transferred explicitly and logically, and can be stored and conveyed in any kind of medium such as books, reports, manuals for easy access and fast application.[5] The transfer of knowledge on recycle waste separation will help reduce the amount of waste that might impact the environment, by means of recycling and reuse, and even processing for other uses. It is important to promote teachers, students, all school staffs, and the locals to see the value of recycling and processing waste to make use of waste residues. Just like depositing money to general banks, setting up recycle waste bank is one way to facilitate systematic waste separation by depositing separated waste to waste bank from which these waste will be bought later by recycle waste collecting shops. Waste bank can also serve as an active part of local waste management system in which positive attitude are promoted among people to participate in setting up recycle waste bank in schools and communities. [6]

In the light of waste management problem, it is thus the author's focus to conduct this research on the transfer of knowledge on recycle waste bank in an attempt to provide knowledge and understanding on waste management and how to operate recycle waste bank with the hope of raising consciousness among people to practice waste separation as an indirect way to sustainably reduce or remove waste.



## MATERIALS AND METHODS

In this research, a sample of 40 teachers and students of Wat Daodong School was included, and the following procedure was undertaken.

1. Examine relevant documents, texts, and research.
2. Construct research instruments including a learning achievement test (Pretest and Posttest) and a satisfaction scale.
3. Design a process of knowledge transfer activities on recycle waste bank using an active learning process in the 4 stages below.
  - 3.1 Educating on waste separation through playing games;
  - 3.2 Educating on recycle waste bank through group process of knowledge bases rotation including such as working group setup base, bank members base, recycle waste deposit base, recycle waste bank accounting base;
  - 3.3 Brainstorming to develop recycle waste management project; and
  - 3.4 Presenting results, discussion and conclusion
4. Collect data began with asking participants to complete a pretest and participate in knowledge transfer activities on recycle waste bank and at the completion of the 4 stages, participants were asked to complete a posttest and a satisfaction scale.
5. Analyze the data, draw conclusions, discuss the results, and disseminate the results.

## RESULTS AND DISCUSSION

Table 1 shows the result that the sample demonstrated their learning achievement on recycle waste bank knowledge at posttest than at pretest at a significance level of .05.

**Table 1. Comparison of learning achievement at pretest and posttest through the knowledge transfer on recycle waste bank using an active earning process**

	Number of Learners (n)	Mean Score ( $\bar{X}$ )	Standard Deviation (S.D.)	t-test
Pretest Score	40	11.05	1.60	16.77*
Posttest Score	40	17.13	3.01	

\*Significance level .05

In Table 1, learners performed higher learning achievement at posttest than pretest at a significance level of .05. This can be explained by the value of t-test computed by SPSS program that was higher than that obtained from T-Distribution Table at  $\alpha = .05$ ,  $df = 40-1$  for One-tailed, and  $t = 1.6991$ , suggesting that learning through knowledge transfer on recycle waste bank using an active learning process was effective in promoting learners' learning and increased knowledge.

In addition, the sample reported a highest level of satisfaction ( $\bar{X} = 4.58$ , S.D. = 0.74) toward the knowledge transfer on recycle waste bank through an active learning process. This may be attributable to the design of this activity that offers fun from paying games, and group activity that allowed for their hands-on practice, shared creativity, and group work presentation. In this way, learners were constantly alert and eager in doing activities. This also aligns with the principles of active learning process that applies a range of teaching and

learning methods and techniques to design lesson plans and activities that encourage learners' participation in class as well as learner-learner and learner-teacher interactions. Active learning process is thus a type of instruction management to equip learners with desirable traits to deal with changes in the current age. [7] Yananda Siraphattada [8] in a research on the learning behavioral and effectiveness development of students in principles of marketing study by the active learning teaching, indicated that learner-focused active learning plan was effective in improving learning behavior and learning achievement of students majoring marketing. Such active learning approach can improve students' knowledge and understanding with a statistically significant difference of .05. Students expressed a highest level of satisfaction ( $\bar{X} = 4.58$ , S.D. = 0.74) on the knowledge transfer. This is possibly because the knowledge transfer process took a variety of activities that focus on practicing, brainstorming, shared learning that allows learners to acquire knowledge and learn with enjoyment.

## CONCLUSION

Recycle waste bank not only helps reducing the amount of community solid waste but also serves as an important learning source for children and the locals. One among the participating adults in this recycle waste bank project responded to the interview that "The waste bank not only helps community people to learn about the value of waste that it can be exchanged for money but it makes children learn to save up as well." Another adult who assisted in overseeing waste bank revealed that "We focus children on separating household waste and those waste on their way from school but never searching into any rubbish bins as they can be infected and it is against the principles of recycle waste bank." It can be observed that the operation of recycle waste bank had brought about a true new form of learning since it offered children opportunities to think by themselves, become ownership, and learn together in many ways. Children learned about how the recycle waste bank operates, savings, separating and recycling waste, working together in group, including how to run small business by themselves.

## ACKNOWLEDGEMENTS

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# CULTURAL REGENERATION AND SOCIAL IMPACTS OF INDUSTRIAL HERITAGE TRANSFORMATION: THE CASE OF WESTERGASFABRIEK CULTURAL PARK, NETHERLAND

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## ABSTRACT

The purpose of this study is to strengthen the social cohesion of the local community by injecting the cultural and creative concept into the industrial heritage transformation. The paradigms of industrial heritage research tend to explore from the perspective of space analysis, which concerned less about the cultural regeneration and the development of local culture. The paradigms of cultural quarter research use to from the perspective of creative economy and urban planning, concerned less about the social impacts and the interaction between residents and industrial sites. This research combines these two research areas of industrial heritage and cultural quarter, and focus on the social and cultural aspects. The transformation from the industrial heritage into a cultural park not only enhances the cultural capital and the quality of residents' lives, but also preserves the unique local values. Internally it shapes the local identity, while externally establishes the image of the city. This paper uses Westergasfabriek Cultural Park in Amsterdam as the case study, through literature analysis, field work, and depth interview to explore how the cultural regeneration transforms industrial heritage. In terms of the planners' and residents' point of view adopt the theory of community participation, social capital, and sense of place to analyze the social impact of the industrial heritage transformation. The research finding is through cultural regeneration policies like holding cultural activities, building up public space, social network and public-private partnership, and adopting adaptive reuse to fulfil the people's need and desire and reach the social cohesion. The results are expected to use the operating experience of the Amsterdam cases and provide directions for Taiwan's industrial heritage management to meet the cultural, social, economic symbiosis.

**Keywords:** cultural regeneration、community participation、social capital、sense of place、industrial heritage transformation

## INTRODUCTION

In 2011, the International Committee for the Conservation of the Industrial Heritage (TICCIH) proposed for the joint ICOMOS/TICCIH Principles for the Conservation of Industrial Heritage Sites, Structures, Areas and Landscapes, identified that there is some disagreement about the scope of the field covered by the term Industrial Heritage. The point of concern was the emphasis on the Heritage of "Industrial Revolution" as being the focus of Industrial Heritage. TICCIH's own charter, the Nizhny Tagil Charter, states "The historical period of principal interest extends forward from the beginning of the Industrial Revolution in the second half of the eighteenth century up to and including the present day, while also examining its earlier pre-industrial and proto-industrial roots".

Industrial heritage consists of the remains of industrial culture which are of historical, technological, social, architectural or scientific value. These remains consist of buildings and machinery, workshops, mills and factories, mines and sites for processing and refining, warehouses and stores, places where energy is generated, transmitted and used, transport and all its infrastructure, as well as places used for social activities related to industry such as housing, religious worship or education.

The industrial heritage is the evidence of activities which had and continue to have profound historical consequences. The motives for protecting the industrial heritage are based on the universal value of this evidence, rather than on the singularity of unique sites. These values are intrinsic to the site itself, its fabric, components, machinery and setting, in the industrial landscape, in written documentation, and also in the intangible records of industry contained in human memories and customs.

This study aims to further investigate the cultural regeneration of industrial heritage transformation and residents' emotional connection of the site. It is hoped that such a research will contribute to the theoretical understanding the transformation of industrial heritage by highlighting the social impacts, there is a need to emphasize the link between the residents and the space visited. It will also investigate whether the emotional connection is search for community participation, social capital, and sense of place. Such new understanding of industrial heritage site will also have implications for the management of such places. Identifying that cultural regeneration included community participation etc., may lead to positive social impacts. It may also contribute to more direct marketing, where groups of residents are approached based on their own motivation and feeling for visiting the site. The article starts with a literature review in which the study of industrial heritage is briefly discussed. Then, the methodological framework is set out. Finally, the results are given, and the conclusion and the discussion are presented

## **LITERATURE REVIEW**

### **1. Cultural Regeneration**

Regeneration is a kind of sustained degeneration, defined as the transformation of a community or place that has displayed the symptoms of environmental (physical), social and/or economic decline. What has been described as: "breathing new life and vitality into an ailing community, industry and area bringing sustainable, long term improvements to local quality of life, including economic, social and environmental needs" (Evans and Shaw, 2004).

Three perhaps semantic but significant distinctions have been made in this relationship between culture and the regeneration process: Culture and Regeneration; Culture-led regeneration; and Cultural Regeneration. These have been expanded as follows (Evans and Shaw, 2004; Evans, 2005; Evans, 2009a; Evans, 2011).

#### **1. Culture and regeneration**

In this model, cultural activity is not fully integrated at the strategic development or master planning stage often because the responsibilities for cultural provision and for regeneration sit within different departments or because there is no „champion“. The intervention is often small-scale: a public art programme once the buildings have been designed; a heritage interpretation or local history museum. In some cases, where no planned provision has been made, residents - individuals or businesses - and cultural organisations may respond to the vacuum and make their own interventions - lobbying for a library, commissioning artists to make signs or street furniture, recording the history of their area, setting up a regular music night, etc. Although introduced at a later stage, cultural interventions can make an impact on the regeneration process, enhancing the facilities and services that were initially planned.

#### **2. Culture-led regeneration**

In this model, cultural activity is seen as the catalyst and engine of regeneration. The activity is likely to have a high-public profile and frequently to be cited as the sign of regeneration. The activity might be the design and construction or re-use of a building or buildings for public or business use, for example, Baltic and Sage Music Centre in Gateshead, Tate Modern in London, Besides; the reclamation of open space, for example, the garden festivals; or the introduction of a programme of activity which is then used to rebrand a place -City of Culture.

#### **3. Cultural regeneration**

In this model, cultural activity is more fully integrated into an area strategy alongside other activities in the environmental, social and economic sphere. Examples include Birmingham's Renaissance where the arts were incorporated with policy, planning and resourcing through the city council's joint Arts, Employment and Economic Development Committee, and in the "exemplar" cultural city, Barcelona with an "apolitical" tripartite agreement between industry, government and citizens and a ten year cross-cutting Cultural Strategy. This model is closely allied to the "cultural planning" approach to cultural policy and regeneration, i.e. where culture is embedded and prioritised in mainstream urban planning and policy-making (Evans, 2011).

## **2. Cultural Quarter**

It is important to review a number of existing cultural quarters, to characterise each place, identify what is unique to it, establish points of similarity across the various quarters and consider whether any lessons can be learned and applied to other nascent or emerging quarters. However, it is also possible to identify a set of necessary conditions and success factors in establishing cultural quarters, in large part by deriving these from the various urban literatures. Following from Canter's Metaphor for Place (Canter, 1977), one can posit that all successful urban places are comprised of three sets of elements (Montgomery, 2003):

1. activity—economic, cultural, social;
2. form—the relationship between buildings and spaces;
3. meaning—sense of place, historical and cultural.

Within this framework it is possible to build up a set of indicators that can be used to assess the relative success of cultural quarters.

## **3. Creative Milieu**

A creative milieu is a place that contains the necessary requirements in terms of hard and soft infrastructure to generate a flow of ideas and inventions. A milieu can be a building, a street an area, a city or a region. It advocates that a culture of creativity be embedded in how urban stakeholders operate. By encouraging legitimizing the use of imagination within the public, private and community spheres the ideas bank of possibilities and potential solutions to any urban problem will be broadened. This requires infrastructures include the hardware - buildings, roads or sewage. The built environment – the stage and the setting - is crucial for establishing the milieu.

Creative infrastructure is a combination of the hard and the soft. The latter includes a city's mindset, how it approaches opportunities and problems; its atmosphere and incentives and regulatory regime. To be a creative city the soft infrastructure includes: A highly skilled and flexible labour force; dynamic thinkers, creators and implementers. Creativity is not only about having ideas, but also the capacity to implement them. The Creative City identifies, nurtures, attracts and sustains talent so it is able mobilize ideas, talents and creative organizations.

## **4. Community Participation**

'Community participation' is interpreted differently by different people. Some people support the concept of 'community participation' because they believe that a programme looks better and is justified if the people are involved in it. For others, it is a practical consideration; they feel that a programme is more likely to be understood if people are involved in it. Some people regard community participation to be important because people's involvement and assistance reduces programme and project costs, while for others it is a political tool to assist the 'victims' of urban deprivation in acquiring their share of services and resources available. The varied interpretations offered to the term 'community participation' are prompted by different motivations; they present paradoxes, promises and frustrations to those who have to translate them into practice.

The term 'participation' as proposed by Bagnall (1989) is a continuum, operating from more than mere presence at an activity to full control of decision-making through several stages of active involvement. 'Presence' implies only that the learner is attending the programme. The interests of the learners are not necessarily taken into account. The learners may be entirely passive. 'Involvement' is when the learners, either individually or as a group, interact with other learners or the facilitators. 'Control' is the degree of the learner's control of the content, aims, objectives and outcome of non-formal education.

## **5. Social Capital**

The concept of social capital has been linked by Putnam (1993) with effective civic engagement. According to Putnam (1993), social capital "refers to the collective value of all 'social networks' and the inclinations that arise from these networks to do things for each other." In his analysis, the norms and networks born out of systematic face-to-face association enable participants to act together more effectively to pursue shared objectives. They

generate the trust, reciprocity and capacity for civic engagement which are essential to the functioning of modern democracy. Putnam (1993) believes that social capital can be measured by the amount of trust and "reciprocity" in a community or between individuals.

Putnam (2000) speaks of three main components of the concept: *bonding social capital*, *bridging social capital*, and *linking social capital*. *Bonding capital* is akin to strong social ties between like individuals (e.g. family members or an ethnic grouping), often located in the same neighborhood, which enable people to 'get by'. *Bridging capital* on the other hand, consists of weaker, less dense, cross-cutting, weaker social ties between heterogeneous individuals such as friends from different groups, friends of friends, business associates, which enable people to 'get on'. Lastly, *Linking capital*, Woolcock (2001) refers to vertical rather than horizontal connections, such as relations between the powerful and the less powerful, the political elite and the public, or between social classes.

## **6. Sense of Place**

Sense of place means the attachments to a place held by a person or a group. Place is distinguished from space by being socially constructed and local, rather than quantitatively described and universal (Tuan, 1977). In other words, people make places out of space, and a given locality or landscape can hold widely divergent meanings for different individuals or cultures (Gruenewald, 2003). The environment appears to play a major role in creating and shaping sense of place (Relph, 1997).

Creswell (2004) explains how different spaces can be made meaningful by individuals and how people can become attached to certain spaces in a variety of ways. Following this, he then begins to explain the concept of space, stating that space is viewed as an area without meaning, as something basic and unrelated. However, he then says that once a human invests meaning into a space, they then become attached to it in some way, thus, it then becomes a place.

Therefore, my research questions are as following:

- (1) How industrial heritage transform by injecting the cultural and creative concept ? (Industrial heritage transformation history)
- (2)How the planners build up the social cohesion? (adopt the theory of community involvement, social capital, and sense of place)
- (3)What are the residents' opinions of social impacts? (adopt the theory of community involvement, social capital, and sense of place)

## **RESEARCH METHODOLOGY**

### **Research objective**

The Westergasfabriek was constructed in 1883 by the British Imperial Continental Gas Association. At the time it was the largest gas works in Amsterdam and originally the gas was mainly used for public lighting. Most of the Westergasfabriek buildings were designed by Isaac Gosschalk, in a variation on the 'Dutch Renaissance' style. After the discovery of natural gas in the 1960's, gas production was stopped and some of the buildings were demolished, while others served as storage. In 1989 the remaining buildings were officially recognised as industrial heritage monuments and need to be transformed. Therefore, in 1996 the district council approved the development plan for the Westergasfabriek, in which the biggest task was to design it into the new cultural park which was opened in 2003.

This master plan was done by Kathryn Gustafson and Francine Houben of Mecanoo architects, who use a simple layout proposed a park that guaranteed various experiences both in space and time, fulfilling the original intention to maintain the cultural activities in the park. The plan was titled "Changement" and proposed a place that changed as you moved through it in time throughout the year. The nature of the park changes as you move west to east. The more rigid or classical design opens up to a more varied and freer design. The plan combines classical elements such as a strong central axis, orchards and meadows with winding paths and variety of native plantings. There is a strong structure and then variety is created by the detailing. The east, where the district offices are located looks to the design of a formal city park in the middle of the park there are references to 1950's and 1960's parks and this is the space for recreation. At the northwest end the plants are native and the

focus is on nature and ecology referring to parks of the 1980's. The most contemporary part is the Westergasfabriek site, which refers to the confrontation of humanity and nature as shown in landscape.

As an industrial heritage site, the Westergasfabriek Cultural Park has a number of key characteristics specifically relevant to this research. First, the transformation process of the Westergasfabriek industrial plant particularly emphasizes on cultural regeneration. This was born of necessity – after the departure of the gas and electricity authority it was feared that the empty buildings would be squatted – and it proved to be an excellent idea. Between 1993 and 2001 hundreds of events took place at the site and there were over one hundred temporary tenants. The possibilities were endless: from rehearsal space to studio, from opera to house party and from circus to congress. When the intended permanent tenant withdrew from the project in 1995, the various cultural tenants and events had already been in place for two years. The creative energy had such a power of attraction that the temporary uses became permanent. The combination of permanent tenants in the form of cultural enterprises, temporary rentals for festivals and events, and commercial and cultural letting provides a sound basis for a healthy operation. Therefore, Westergasfabriek has become one of Amsterdam's main cultural venues. Its success is largely due to the phase when it was made available for temporary cultural uses.

Second, Westergasfabriek Cultural Park has a unique and creative personality.

The combination of the atmospheric industrial monuments and the tranquillity of the surrounding make the Westergasfabriek a unique multifunctional space. There are all the creativity found in a spacious city park – Sunday market, and dozens of vibrant creative entrepreneur, galleries, cafe's, bars, restaurants, a [theatre](#) and even a [cinema](#). Through clustering, flexible specialization, experimental character, and informal networking, the creative industries are able to maintain their dynamism.

Third, the heavily polluted industrial plant transform into a cultural park which held a diversity of cultural activities. It not only brings the regeneration in the north-west part of Amsterdam, but also shapes a sense of place and identity of local residents. Scott(1997) argued that elements of identity and lifestyle are important. A place has a cultural identity that is the product of its communities. This provides a place with culture and meaning, shaping the lives and tastes of the people that live and work there. Westergasfabriek Cultural Park based in the concept of change and transformation, represents not only the transition from city to garden, to landscape, to nature (Bokern, 2006), but also the effort to build a resilient and adaptable park, according to the inputs acquired throughout the public participation process.

### **Research implementation**

A qualitative research approach was applied in this study. To address the research problem, it was necessary to investigate the residents' opinion of the site in relation to their emotional connection to the heritage. An interview protocol was designed to explore the residents' motivation for visiting a heritage site given the possible personal meaning associated to the site. After a short introduction, participants were asked series of questions to determine if they were residents or tourists and what their experience was. The protocol was designed to exclude those who are not familiar with the site or the heritage it represents. In addition, participants were asked if they were familiar with the history of the site and if they were aware of the former industrial sites. Those who suggested that they were unaware of either the history of the site were not included in the analysis. Then, a series of questions about residents' perception and emotion of the site was presented. At the end of the interview, the residents were also asked several questions about their emotional connection of the site in relation to their willing to join the cultural activities in this site. The interviewer provided participants to deeply share their own perception or feeling about the industrial heritage site rather than relying solely on literature.

Data were collected through face-to-face interviews by one of the authors. The interviews were conducted in Westergasfabriek Cultural Park in Amsterdam, and the interviewees were randomly sampled on the sites. When couples or groups were sampled, each time an attempt was made to approach the opposite sex. The objective of the sampling strategy (a theoretical sample) was to enable generalization of the findings to other heritage sites. The sample comprised residents able to speak and understand English, and older than 15 (at this age, cognitive abilities are considered to be stable; Apter et al. 1998).

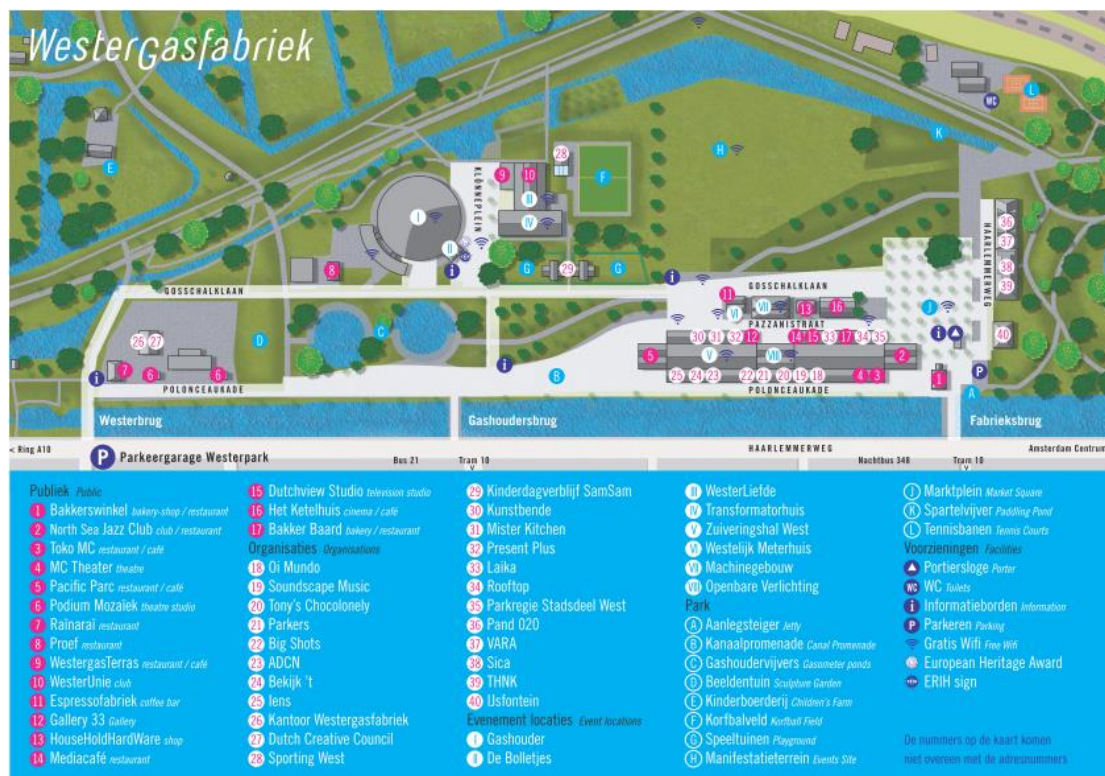


The actual study took place first in August 2013 and second field study in July 2014, and 50 interviewees were conducted, including locals, tourists, employees and employers of cultural and creative industry, manager of cultural park, government official. The interviews took place at daytime and night time on weekdays and weekends, usually taking around 30 minutes. A small token incentive was given to the interviewees at the end of the interview.

## Case study: Westergasfabriek Cultural Park

### 1. Cultural regeneration

At the end of the 19th century, the Imperial Continental Gas Association (ICGA) built two coal gas factory complexes in Amsterdam: the Ooster Gasfabriek (Eastern Gas Factory) and the Wester Gasfabriek (Western Gas Factory). The latter was completed in 1885, strategically located near to waterways, the rail network and access roads. Originally, the gas was used for street lighting. In 1898, Amsterdam's city council took over the running of the factory. Production increased and the site was expanded. Later, gas production was gradually reduced as the city council started sourcing more and more of its gas from Hoogovens in IJmuiden and, from 1963, natural gas from Slochteren. The Westergasfabriek ceased gas production in 1967. By the time the factory shut down, the site was heavily polluted, making it difficult to find a new purpose for the area. In the meantime the GEB, the municipal energy company, used it for storage and as a workshop. From 1992, the buildings were used temporarily for creative and cultural activities. Adventurous entrepreneurs and artists flocked to the site. It was immediately clear that Westergasfabriek was the ideal location for events such as De Kunstvlaai art fair, the Holland Festival and Awakenings club events. It became the meeting place of choice for creative and innovative Amsterdam residents. The site and the creative buzz around it ultimately led to the area becoming a permanently designated cultural zone. Now, the Westergasfabriek is providing a new surge of energy and light. The redeveloped factory site and the beautifully laid out park are an asset for the local area. Creative entrepreneurs work in the renovated historic buildings and many high-profile events and festivals are held here. Since the cultural activity is fully integrated into the Westergasfabriek area strategy alongside other activities in the environmental, social and economic sphere, the Westergasfabriek (picture 1) is regarded as a successful model for cultural regeneration far beyond the Netherlands' borders.



Picture 1 Wester Gas Fabriek

## 2. Cultural Quarter

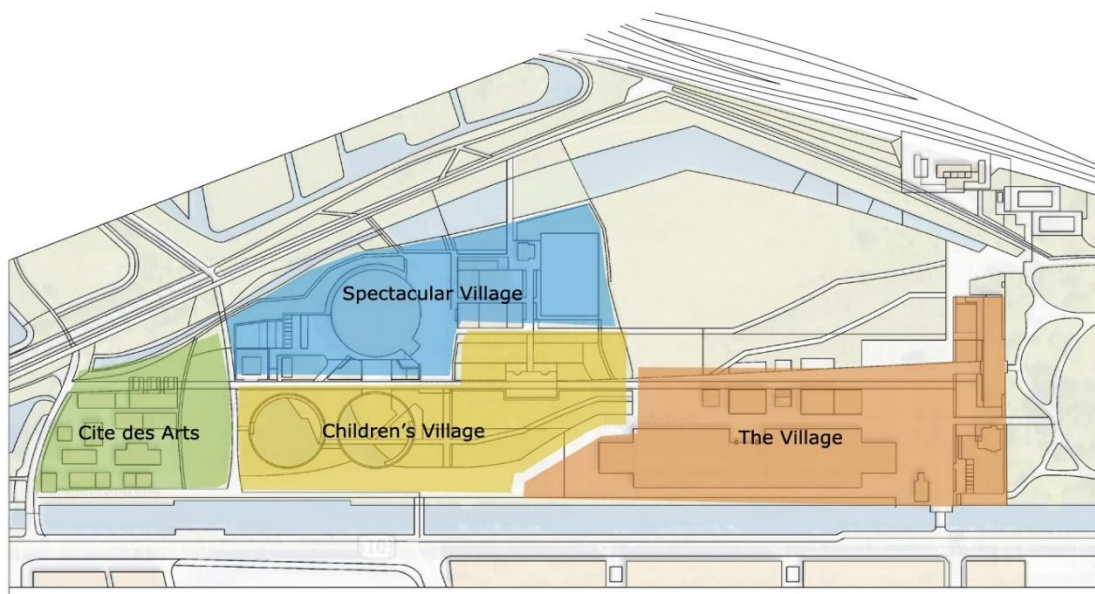
Westergasfabriek Cultural Park includes four main clusters (picture 2), each cluster is to have been unique and have a feel distinct from the others.

(1) The Village: It is the group of buildings between the canal and the Events Field. A large hall for events, shops, studios and cafes are housed in the Purifier Building. The Westergasfabriek BV offices are in the Regulator House. The Machine Building is for incidental leasing and the metering buildings are for public functions such as a kiosk.

(2) Spectacular Village (“The Spektakeldorp”): It is for larger events and is comprised of the Gasholder and Transformer Buildings. The Gasholder is the largest indoor space on the site and is to be used for opera, theater and other performances. It is expected to be a major draw for the site.

(3) Children’s Village (“The Kinderdorp”): It is set aside for children’s activities. The two supervisors’ houses are in this area.

(4) Cite des Arts: It is the area farthest to the West and will contain new buildings, most of which will be offices for the cultural activities rather than performance or display space.



Picture 2 Westergasfabriek Cultural Park includes four main

## 3. Creative Milieu

Westergasfabriek Cultural Park has its own creative character; about 20 spaces are occupied by businesses at The Westergasfabriek: most of them are creative entrepreneurs, such as graphic designers, web- and game developers and interactive media producers. The Westergasfabriek is also home to two television studios where several national shows are broadcasted daily, art house cinema *Het Ketelhuis*, the *MC Theatre*, the International School for creative leadership *THNK*, the *North Sea Jazz Club*, several galleries and also eight restaurants, cafes and nightclubs. So in total The Westergasfabriek has a very broad variety of companies somewhere in the field of creative industry, entertainment and IT. Every year about 700.000 people come to The Westergasfabriek: locals, people from greater Amsterdam, but also people from abroad. The surrounding park attracts 5.2 million visits a year.

## 4. Community Participation

During the regeneration of Westergasfabriek, the residents and their organizations played an essential role in the redevelopment of the area. Neighbourhood associations became essential, especially at the beginning of the project, when the land reclamation process was effectively stopped. The idea to use more flexible solutions was

put into practice as a result of the collaboration of residents and the City Council. Moreover, another typical characteristic of the case, which can be related to the Dutch planning system in general, is the ability to divide managerial and political responsibilities at different levels. In particular, the portfolio holder and the project alderman have been critical in the coordination of different stakeholders' needs and demands at the local level while directing the renewal from a higher perspective.

## 5. Social Capital

According to Putnam (2000) the three main components of social capital are bonding social capital, bridging social capital, and linking social capital; meanwhile, Westergasfabriek fulfills the need of these three criteria.

First, Westergasfabriek provide space for enhance bonding capital, like the water pool and big grassland, which enable family members and friends to meet and chat with each other, increasing the emotional communication.

Second, Bridging capital consists of weaker, less dense, cross-cutting, weaker social ties, like the cooperation between different creative entrepreneurs in Westergasfabriek, they held the festival together and get benefit by the network.

Last but not least, linking capital refers to vertical rather than horizontal connections, such as public-private partnership. The present state of the Westergasfabriek and the surrounding park is the result of the successful efforts and collaboration between the local government and the Westergasfabriek BV. The Westergasfabriek BV is a private company. One of the positive effects of it being privately owned by the family Meijer is that The Westergasfabriek is ruled on a 'human scale' and in a personal way. The company is run by a director and a team of 10 highly skilled professionals. The company does not get any funding or subsidy from the government. The yearly cash flow is about 5 million euro. The local government is responsible for the park area. Given the diverse range of activities in the buildings and the park, a strong relationship with the City Council is crucial and a lot of effort is put in maintaining that. Next to regular consultations on both operational and strategic level, The Westergasfabriek and the local council also look towards the future. Last year the presented 'The Green Manifesto-Vision for the Westergasfabriek 2025': a renewed shared vision that builds on the achievements of the original development program and the success of the public-private cooperation, while also taking a critical look at what could be improved or done differently.

## 6. Sense of Place

*"After regenerate from the gas factory to cultural park, this really makes a different. People come here to do all kinds of activities, now here make me feel at home. I have to say that I am Amsterdam and I am Westergasfabriek."* - local resident, a woman around 30 years old

Scott(1997) argued that elements of identity and lifestyle are important. A place has a cultural identity that is the product of its communities. This provides a place with culture and meaning, shaping the lives and tastes of the people that live and work there. Westergasfabriek Cultural Park creates a great harmony and identity of local residents, it adopts the concept of "adaptive reuse"-retains 22 of the buildings of the power company's former gasworks, to which several different functions and activities had been attributed (e.g.restaurants, cafes, clubs, offices, galleries, a cinema, a kindergarten, a basketball club, etc.). By doing this, people has place to meets and interact with each other, creating the feeling of "sense of place". Besides, the Westergasfabriek Cultural Park's program proposed by Kathryn Gustafson is very diverse responding both to site and context, and listen to people's needs and desires, leading to strong narrative interpretations often apparent in the use of memory and history in design.

## CONCLUSION AND SUGGESTION

Dolores Hayden (2000) has written: *"cultural landscapes (including industrial ones) tell us who we are, far more effectively than most architecture or exhibits in museums ever can"*. Because of this, the transformation of industrial heritage should be seen as part of larger, ongoing processes of architectural preservation and urban regeneration, once, it is not confined to the most symbolic factories. It includes, also, all the additional elements and structures associated with the industrial activities. In this regard, it is essential that government officials,



planning developers, cultural and creative stakeholders and management professionals understand that the maintenance of the urban layout is one of the most important features for the cultural identity of a city, and that the industrial landscape is an important part of it. A place is only a fragment of a cultural space, which was given consciously or subconsciously certain meanings during the development of its creation.

By doing this, industrial transformation and reclamation becomes more than the celebration of the past, as important as that is; it becomes part of reconstructing the future. Thus, industrial heritage transformation that connects people, place, and history fosters a “sense of place” and the power for community awareness. Industrial transformation proposals should therefore be a part of an overall urban project – a local development strategy - which requires a broad, integrated approach comprising all urban policy areas and promoting the reconciliation of heritage conservation with social progress and sustainable economic development. The development of an increasingly multicultural urban society, emphasizes the need of rising the “socio-cultural dimension” of the city, where the rehabilitation of the industrial patrimony appears to be an essential contribution to the creation of a shared local identity and hence to the cohesion of the urban society. For this reason post-industrial landscapes should be viewed as a resource and its recovery as an opportunity to develop new multi-functional landscapes.

Reflect on the transformation of Taiwan's industrial heritage into cultural and creative quarters, industrial landscape is the catalyst of the urban renewal, is the opportunity of urban regeneration. However, the study examine the five main cultural and creative quarter in Taiwan, Huashan 1914 creative park is the oldest one and most mature, but in the end it becomes too commercial mainly for the exhibition and high-class shops and restaurants. Visitors are attracted by consumer behaviour; as a result, the spirit of original wine factory and the identity of local nearly gone. Therefore, try to learn from the operating experience of the Westergasfabriek cultural park and think about what should be improved. First, it is important to build up public spaces for both visitors and locals, like movie theatre, water pool for children, Sunday market etc. By doing so, people have places to relax and communicate, even to establish their social network. Second, listen to the people’s need and desire is the successful key of the Westergasfabriek cultural park. Therefore, set up the community organization, let the community participate in the development of cultural and creative park, and make their own decision about what future will be. Third, use the memory and history in design, like Westergasfabriek use the “code symbol (picture 3)”, in so doing, visitors and locals could easily scan it and know the industrial history, creating the feeling of “sense of place”.



### Picture 3 Taiwan's industrial heritage

In summary, it is possible to conclude that through cultural regeneration policies like holding cultural activities, setting up public space, building social network and public-private partnership, creating creative milieu, and adopting adaptive reuse to fulfil the people's need and desire and reach the social cohesion. Cultural regeneration and community participation encourage awareness of "sense of place", sharing common culture and creating identity. It improves community network and responsibility while fostering the "social capital". This kind of identity is considerable importance in the development of new, satisfying and concerted post-industrial landscape transformation projects, fostering sustainability and urban development.

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# INNOVATION PROCESS MANAGEMENT IN SME / SMI

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## ABSTRACT

Faced with increasing competition and rapidly changing markets, innovation is a key component of competitiveness. The complex process of innovation involves the company and its environment and must be organized to ensure its performance and durability. Initiating an innovation process is far from being an easy task for any organization. Complex, generating and using a large amount of information, this process must be optimized to meet a specific need and provide a comfortable choice of solutions. Information is an essential resource for the proper management of this process while its establishment shall fit accurately and efficiently with the customer needs, from which the innovative product is intended. The aim of this study is to design an information system for the innovation processes management in SMEs / SME, to do this we have proposed a specific model innovation for SMEs / SMIs.

**Keywords:** SME / SMI, creativity, innovation, innovation process, information system.

## INTRODUCTION

The evolution of any business depends on its ability to compete and ability to remain in the market. Globalization has forced companies, especially SMEs / SMIs, to be challenged and be competitive to withstand international competition. Such organizations are needed to innovate or disappear from the market. Indeed, one of the ways where a company shall achieve these objectives, innovation presents itself as a strategic lever to gain a competitive advantage and respond to the market needs.

However, hiring an innovation process is far from being an easy project for the company. Complex, generating and using a large amount of information, this process must be optimized to meet a specific need and provide a comfortable choice of solutions. The information is an essential resource for the proper management of this process, its system establishment would adapt accurately and efficiently to understand the customer needs methodology for which the innovative product is intended.

At first, based on the work of my end of studies project [1], we have detailed the process of the innovation process. For each step we presented different methods and tools to achieve them. In order to ensure better management of innovation, we proposed to define a '*dash of innovation*'. To this, a number of necessary indicators have been defined and explained for the management and mastery of innovation in SMEs / SMIs. In a second step, after identifying all the information inherent in the process, the information system was developed. There are several design tools among which we have chosen UML (**object-oriented language**) modeling software which is a powerful and unified language. This tool must be accompanied by a process that will guide the design, step by step to achievement. The UP process, for which we have chosen is an approach that can support the UML tool. Its purpose is to allow the production of a software with a high level of quality corresponding to the needs of the end user. To define the system features, it is important to understand each modeling stage.

The objectives of the innovation information system process are:

- Ensure effective management of the ideas collected and information gathered. Make a commercial success in a preliminary step to reduce business investment ideas.

## Product innovation process

The innovation process can be structured into three phases, each one consists of a set of steps as follows:

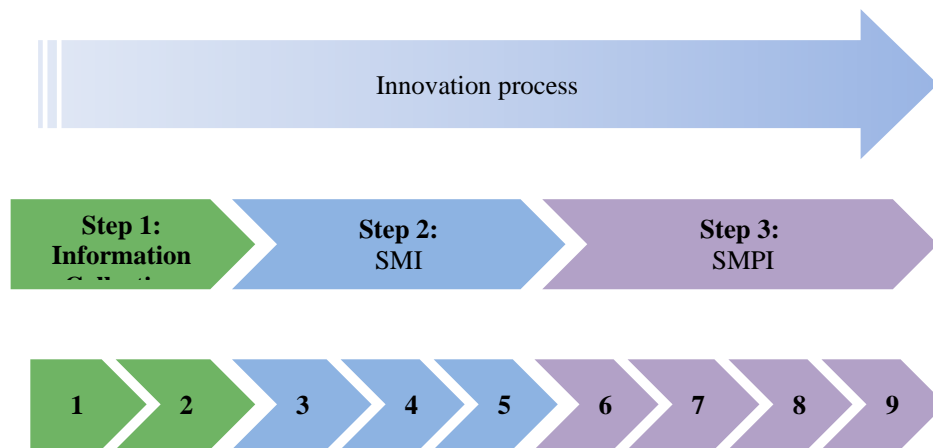


Fig 1: Structure the innovation process

#### ***Step1: collecting raw information***

There are two types of sources: external on markets and competitors, and internal on the environment of the company.

#### ***Step2: Filtering Data***

Once the raw data are collected, it must be processed and selected. Selection is primarily on external raw information. Among the selected methods proposed by Martinet [2], to classify the relevant information, we shall use the following two parameters:

- The probability of truthfulness of the information,
- The challenge it poses to the company.

#### ***Step 3: idea generation***

It is important to develop a culture of innovation in an organization to encourage and motivate all employees to be creative.

#### ***Creativity***

Creativity is the ability to produce creative and workable ideas. This ability exists in every human being. However, it depends on several factors: flexibility (out of established ideas), fluidity (to allow the amount), originality

*Some approaches of creativity:*

Creative methods can be classified into two broad categories: rational and non-rational (Table 1).

Table 1

Methods of creativity

<b>Rational Methods</b>	<b>Irrational method</b>
Value Analysis [3]	Brainstorming [6]:
QFD (House of Quality)	Synectics
Analyse morphologique [4]	Lateral thinking (six hats method) [7]
TRIZ [5]	
ASIT	

#### ***Step 4: Evaluation of ideas***

Among the flood of ideas generated and found, we can now: Select those that have the greatest chances of success.



- Eliminate the unrealistic ones.

Ideas selection phase is based on a set of criteria: technical feasibility; Feasibility market; financial feasibility and competition test

Evaluation Grid of John T. O'MEARA

The grid has 17 criteria, each with 5 levels of responses grouped into four areas:

- Marketing opportunities,
- Lifetime,
- Growth potential,
- Production potential.

**Although assessment has few criteria, the analysis is complete.**

*Step 5: Concept development.*

*Step 6: Market Research*

*Step 7: Prototyping*

*Step 8: Protection*

*Step 9 et 10: Production and Marketing*

**Expression of needs :**

The expression of needs is an important step in the process of building the software.

As mentioned above, the UP method and UML have been retained.

Identification of stakeholders:

An actor represents the abstraction of a role played by external entities (users, hardware or other system device) that interact directly with the system.

Actors in the system are:

**Contractor:** He has the right to access, modify, evaluate and propose ideas and / or information, it is also required to make decisions

**External actor (Client / Employee / Vendor):** He can provide ideas.

**Employees:** They have the right to access the relevant information (collected and sorted), view and offer innovative ideas

**Researcher / Expert from R & D unit:** He can view, modify, evaluate and propose ideas and / or information

**Administrator:** The administrator has the right to create a new user and to define the roles and privileges of users of the system.

**Identification of use cases**

- Functional requirements based on user requests; these needs are structured in the form of use cases. After studying the innovation process, the use cases that need to be supported by the proposed system have been identified. They are summarized in Table 2:

Table 2 Use Cases

Use Cases	Details
1: Collection and dissemination of information	1- Information Collection 2- Filtering data collected. 3- Consultation data.
2: Generating and harvesting idea	1- proposal idea 2- Generation and harvesting idea. 3- Consultation data.
3: Filtering and evaluating ideas	1- Selection of ideas for product innovations 2- Establishment of mapping ideas 3- Development of the grid O'MEARA 4- Consultation of ideas accepted.
4: User Management	Emet: -The information about the user. Receives: - confirmation (password) - The list of users with roles and privileges.
5: User Authentication:	Emet - coordinates. Receives: - Identification Card. - Confirmation of the entry. - Interface Working
6: Viewing statistics:	Emet: demand for statistics. Receives: statistics in different formats (charts, graphs ...).

An object approach makes used cases through a collaboration between objects. The storylines, instances of the use cases are represented by interaction diagrams (collaboration diagram and sequence diagram). To illustrate this, we present two use cases 'idea management' and '**Idea Evaluation**'.

*Use case "Idea Management"*

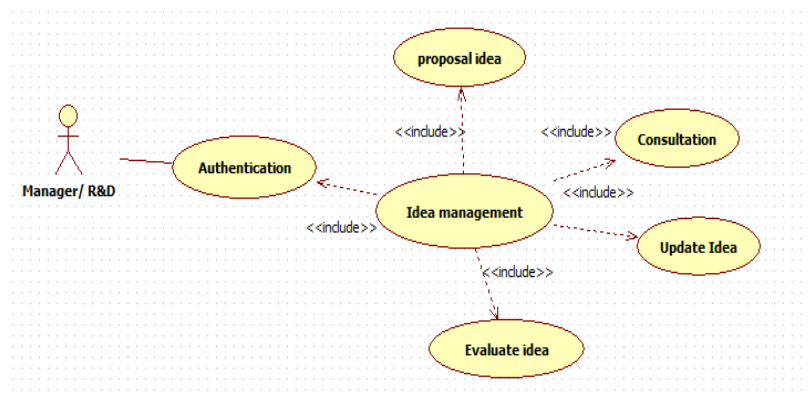


Fig 2: Use case diagram Management Ideas

**Purpose:** This use case allows the leader and / or service R & D to manage the ideas collected. They can consult, evaluate, update, modify and also offer ideas.

**Actors:** Officer and / or R & D

**Supplemental Information:** After authentication, the user can request a specific task to perform, consult or evaluate of an idea. According to the chosen task the system displays the appropriate interface to enable the user to perform the desired treatment.

*Scenario:*

**Consultation:** You can see a particular idea in the following sequence:

- 1- The actor selects the idea he wishes to consult
- 2- The system displays the corresponding idea card

**Update:** You can update an idea the following sequence:

- 1- The actor asks to perform the update of an idea
- 2- The system displays the data and makes it possible for the player to change the data
- 3- The actor captures the desired changes
- 4- The system saves the change

**Activity diagram:**

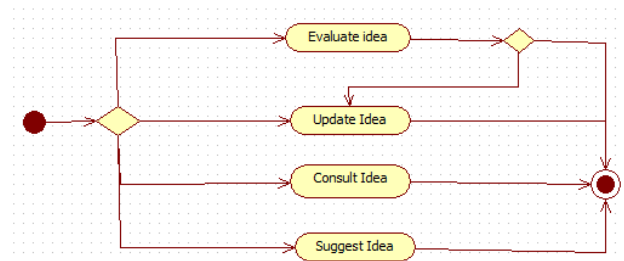


Fig 3: Activity diagram "Management Ideas"

The humain-machine interface:

- **Evaluation of ideas form.**
- **Form M.A.J ideas.**
- **Nomination Form ideas.**
- **Form research and consulting idea**

**Sequence diagrams:**

*Consultation*

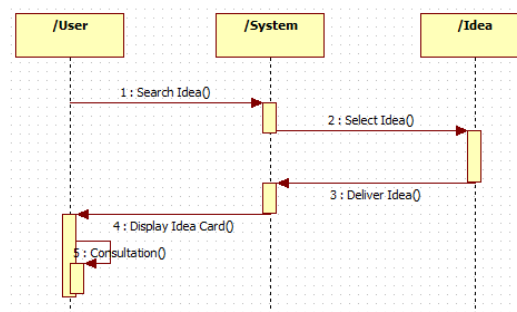


Fig 4: Sequence Diagram "Consultation Idea"

## Use case « Evaluation Idea »

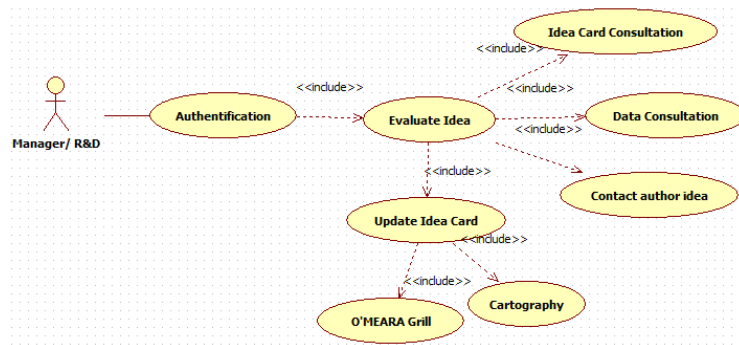


Fig 5: Use case diagram "assess idea"

**Purpose:** This use case allows the leader and / or R&D to evaluate ideas gathered to judge their relevance and select the ideas with the greatest chances of success.

**Actors:** Officer or R&D

**Supplemental Information:** After authentication of the actor.

**The scenarios:**

Consult idea.

Look given.

Contact author.

Evaluation.

**Cartography :**

1. The actor selects an idea to evaluate
2. The system asks the user to choose the criteria to build the mapping. The system offers a choice of 2 or 3 criteria, the user must specify their choice.
3. The user selects the number and nature of the criteria.
4. The system displays all the ideas one by one; for every idea he displays a scorecard according to the criteria
5. The actor fills out the evaluation form
6. The system records the assessment and proceed to the next idea
7. Once all the ideas evaluated, the system sets and displays the mapping of all ideas evaluated, and offers the user to select the segment of ideas to choose from.

The user selects the segment that contains the ideas with the greatest chance of success.

**Grid O'MEARA:**

1. The system retrieves the ideas contained in the selected segment and shows the assessment criteria grid O'MEARA
2. The user enters the assessment for each idea and valid.
3. The system calculates the total and moves to the next idea, while supplies all the ideas learned.

Activity diagram:

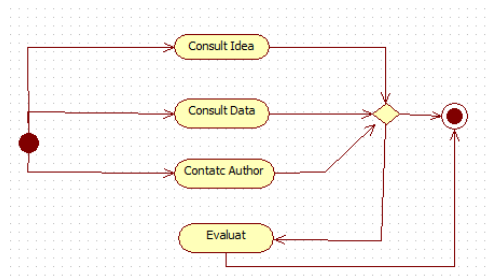


Fig 6: Activity diagram (Assessment Ideas')

The human-machine interface:

- Form research and consulting ideas
- Form selection criterion to map ideas
- Form the grid O'MEARA
- Form research and consulting data

*O'MEARA grid*

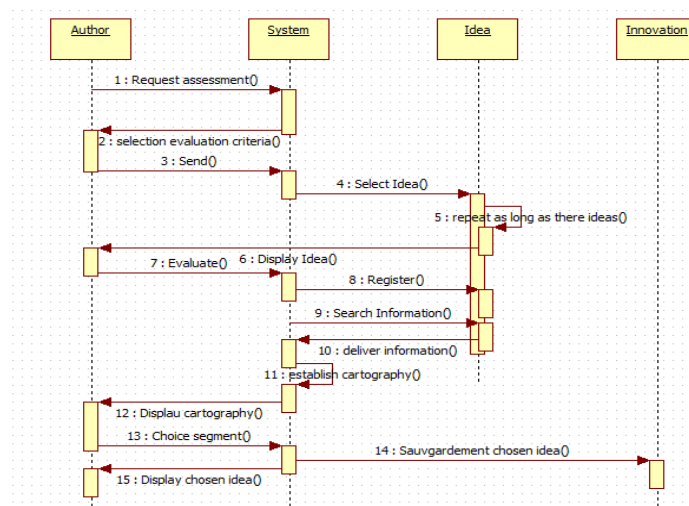


Fig 7: Sequence diagram Idea evaluation "O'MEARA"

### Dashboard:

The dashboard is a set of indicators designed to enable managers to learn about the state of the systems they are operating, and to identify trends that will influence a consistent horizon with nature of their duties. [8]

The dashboard of innovation is an essential tool for good management of innovation. it will become the barometer of director of innovation, and provides an effective communication tool for management.

It is important to define a dashboard that will track the progress of the innovative project and track any modifications. The indicators for the project: Planning, tracking time spent of goods sold and different costs.

They can integrate external criteria to the company: market trends, competitor behavior, withdrawal of a partner, changing regulatory environment. In what follows, we describe a set of indicators that we have defined, partly constituting the dashboard for the innovation management and innovative projects.

Identifying indicators: Because the dashboard is for people other than the person who develops, choose different modes of representation that are understandable by users. The key indicators are intended to illustrate synthetically relevant changes in the innovation progress.

Customer indicators (satisfaction, number of complaints, after-sales)

- Rate of customer satisfaction (surveys, polls,)
- Claims rates

**Financial indicators:**

- Budget for innovation.

Indicators related to employees:

- Rate creativity

Indicators related to ideas:

- Rate ideas that led,
- Number of evaluated ideas,
- Sources of ideas (internal and external)

Related to the evolution of innovative projects indicators:

- Number of innovative projects underway,
- Progress of an innovative project,

Indicators related to prototypes:

- Number of prototypes,
- Rate prototypes validated,

Competitors indicators - Number of competitors

- Market share of each competitor

Related to intellectual property indicators (patents)

This indicator tracks the published patent applications, whether they are natural or legal persons. It concerns either national patent applications under INAPI or PCT international applications under the Global Office of Industrial Property (WIPO).

Indicators on supplier relationships:

- Rate of compliance of products delivered by supplier,
- Delivery time,

## CONCLUSION

The aim of this study is to determine the structure of the innovation process for a business, especially SMEs / SMIs and to emphasize the contribution and value of an information system to manage this process. We have shown that, for an organization to innovate, to improve its competitiveness and gain new markets, it is necessary to ensure the mobilization of various resources that enable effective innovation process management of the.

The study of concepts related to information systems in organizations has enabled us to understand the issues and how to apply them in the objective of designing an IS to manage the innovation process. The study of the characteristics of SMEs / SMIs and the presentation of the state of the art innovation have enabled us to situate this class of business to innovation.

Through this, a detailed description of a process specific to SMEs / SME innovation has been developed and has helped design an information system for the management of the innovation process. This approach was inspired by a study conducted in the context of project graduation, consisting develop an approach to innovation for SMEs / SMIs.

The model of the innovation process presented in this study is conceptualized for SMEs / SMIs reflecting the innovation process at the business category.

The information system for the management of the innovation process in a business was developed. It provides a framework for business needs of SMEs / SMIs such as innovation management. Specifications from used cases were formalized in UML from a structural angle with the class diagram, and under the dynamic angle with sequence diagrams, state transition and activity.

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# MEASURING THE PERFORMANCE OF THE KUWAITI BANKING SECTOR BEFORE AND AFTER THE RECENT FINANCIAL CRISIS

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## ABSTRACT

The objective of this research is to investigate the determinants of the performance of the Kuwaiti banking sector before and after the recent financial crisis over the period of 2006-2012. The data utilized is based on the yearly financial statements of the Kuwaiti banks that are listed on Kuwait Stock Exchange over the same period. There are several methods have been used to identify the determinants which impact the performance of the banking sector. In this research, a ratio analysis technique is considered efficient and more reliable method than other approaches. Other factors such as trend, government regulations and other economic factors are also included. The study found that the overall banking sector performance increased considerably in the first two years of the analysis. A significant change in trend is noticed at the onset of the global financial crisis in September 2008, reaching its peak before the global financial crisis. This resulted in decreasing the profitability, return on equity, assets and capital.

**Keywords:** Banking Sector, Financial Performance, Financial ratios, Interest Spread Rate, Kuwait Stock Exchange (KSE), Growth Ratios, Financial Crisis.

## INTRODUCTION

The banking industry in general is an old industry and it is one the major factors behind the development of the countries' economies due to the contribution that it provides to the countries and societies. In Kuwait the banking sector is different than the banking sectors in other countries. The banking sector in Kuwait is considered one of the major sectors that are contributing to the Kuwaiti economy. The banks in Kuwait are divided into two categories which are the traditional banks and the Islamic banks.

The study will be based on the yearly financial statements of all the Kuwaiti listed banks form (2006-2012) except Warba Bank which will be excluded due to the unavailability of its data since it's a newly established bank. The performance measurement of the banking sector will include an analysis for some internal factors that have a direct affect on the banking sector performance in Kuwait such as the interest rates and the financial ratios. Other factors will be considered such as external factors will be considered such as the growth rates and the Kuwait stock Exchange (KSE) movements during that period since the banks that are included in this research are all listed on the KSE. Our main source of data and financial information are the Kuwait Stock Exchange website, banks websites and Zawya research in addition to the available market news and information.

## LITERATURE REVIEW

In light of the change in the economic, market conditions and new management needs, banks started to work on improving their capabilities to measure their performance after the recent financial crisis that took place in 2008. Measuring the performance of the banking sector in general is related to many factors that directly affect this kind of institutions. One of these factors is the cost management which requires a better management. Other factor is about managing the relationship with the clients which requires a deeper relationship, in addition to the pricing decisions and its appropriation to the market. Many scholars have discussed measuring the performance of the banking sector tools and devices such as Tarawneh (2006), Halkos and Salamouris (2004), Webb (2003) Lacewell (2003) and Yeh (1996). Measuring the performance of the banking sector topic has received high attention by the researchers over the previous years, Seiford and Zhu (1999). However, little research has been



done on measuring the banks performance in the gulf region in general and Kuwait in particular. Some researchers have discussed the banking institutions performance and focused mainly on the cost efficiency and the key performance indicators. However, Isik and Hassan (2002) and Berger and Mester (1997) in their study believe that looking on both profit efficiency and cost would lead to a more accurate results than focusing on the cost efficiency only.

The literature on measuring the banks performance shows that the accounting indicators are the main tools such as the profitability and cost financial ratios, Yen (1996). However, other researchers have criticized using these accounting tools to measure the performance and recommended using other approaches such as Berger and Humphrey (1997)

Many scholars from many countries have implemented the performance indicators method to measure the banks performance, whilst other researchers suggest that the use of these indicators could lead to incorrect results. Some of the researchers that criticized the previous method are Marginson (1995) from Australia, Barnett (1992) from the United Kingdom and Ijin and Acherman (1990) from Netherlands.

Modell (2004) and Vakkuri et. al. (2006) in their research recommend using the financial performance indicators due to the importance of the results that it would lead to. De Kool (2004) and Weick (1995) confirm the conclusion of the previous two studies and add that this measurement tool makes sense and a good management method. Samad (2004) examined the performance of the banking sector in Bahrain and used the financial ratios of seven commercial banks over the period from 1994 to 2001. The performance of these banks was compared to Bahrain banking sector which was considered as a benchmark. The study results indicate that these commercial banks are less liquid, less profitable with a high credit risk.

## METHODOLOGY

This paper uses the ratio analysis approach to examine the performance of the banking sector in Kuwait. The study relies on the financial statements of the past seven years from 2006 till 2012 for the banks that are listed on Kuwait stock exchange. This research paper is different than other studies in two things they are the methodology and the sample coverage. The methodology used in this research is the ratio analysis method considering the banking industry financials for the period after 2009 financial crisis until 2012 and compared to the period before the financial crisis, 2006 to 2008. Using the ratio analysis method to measure the performance of the banking industry shows clearly the effect of the recent 2008 subprime breakdown on the banking industry and identifies the banking sector weaknesses and strengths (Samad, 2004).

### *Data and Descriptive Statistics*

The number of observations for each bank is 7 observations while the total number observations are estimated to be 63 observations as follows:

#	Bank Name	Ticker	Observations
1	National Bank of Kuwait	NBK	7
2	Gulf Bank of Kuwait	GBK	7
3	Commercial Bank of Kuwait	CBK	7
4	Ahli Bank of Kuwait	ABK	7
5	Kuwait International Bank	KIB	7
6	Burgan Bank	BURG	7
7	Kuwait Finance Bank	KFH	7
8	Boubyan Bank	BOUBYAN	7
9	Ahli United Bank	AUB	7
<b>No. of Obs.</b>			<b>63</b>

## RESULT AND DISSCUSION

Below are the average major financial ratios of the banking sector in Kuwait for the period between 2006 and 2008 (before the financial crisis) and the period between 2009 and 2012 (after the financial crisis).

Ratios	Average 2009-2012
Interest Received	5%
Interest Paid	2%
Spread in Interest Rate	4%
Return on Assets	1%
Return on Equity	5%
Return on Capital	24%
Net Profit Margin	23%

Ratios	Average 2006-2008
Interest Received	8%
Interest Paid	2%
Spread in Interest Rate	5%
Return on Assets	1%
Return on Equity	14%
Return on Capital	42%
Net Profit Margin	46%

### Financial Ratios

*Return on Assets (ROA)* is an indicator of how profitable the company is relative to its total assets. Moreover, it gives an idea of how the management is using its assets efficiently to generate profits. In our case, the banking sector seems to be having a stable ROA rate of 1% between year 2006- 2008 (before the financial crisis) and 2009- 2012 (after the financial crisis).

*Return on Equity (ROE)* is the amount of net income returned as a percentage of shareholders equity. In addition, it measures the banking sector profitability by revealing how much profit the bank generates with the money shareholders have invested. The table above shows that the ROE during the period from 2006 till 2008 (before the financial crisis) was 14% while the period after the financial crisis between 2009 and 2012.

Concerning the *Return on Capital (ROC)*, it measures the returns of the Banking sector as a percentage of its capital. Therefore, ROC in years 2009 till 2012 has witnessed a decrease by 18% if we compare to the period before the financial crisis.

*Net Profit Margin (NPM)* indicates how the company effectively is controlling the cost and expenses whether it was operating or non-operating expenses. In our case the banking sector profitability seems to be decreased by nearly the half after the recent financial crisis, 23% if we compare to 46% before the financial crisis period.

*Spread in Interest Rare (SIR)* is the difference between the average of the interest received and interest paid by the banks. The net interest rate spread is a key determinant of the banking sector profitability. I our case, the average SIR decreased after the financial crisis by 1% to become 4% (2009-2012) after it was 5% (2006-2008).

### Growth ratios

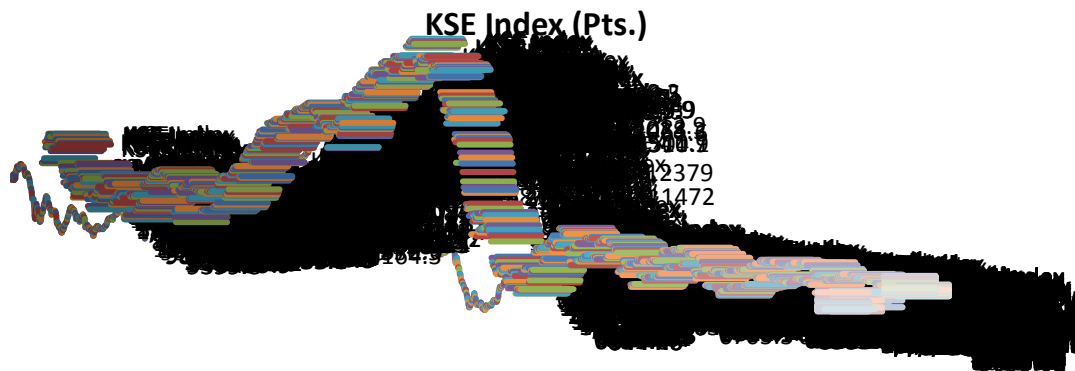
The table below shows the growth percentages of the major indicators for both periods 2006-2008 (before the financial crisis) and 2009-2012 (after the financial crisis).

Growth Rates	Average 2009-2012
Total Assets	7%
Total Liabilities	6%
Total Equity	12%
Net Income	-16%

Growth Rates	Average 2006-2007
Total Assets	20%
Total Liabilities	22%
Total Equity	5%
Net Income	-22%

It is clear from the figures above that the recent financial crisis has affected the performance of the banking sector in Kuwait negatively. Through looking at the major financial ratios for the two periods mentioned, we conclude that the average growth in total assets was decreased to 7% after it was 20% in the period before the

## KSE Index



## SUMMARY AND CONCLUSION

Despite these alarming features, Kuwaiti banks have managed to continue with their normal day to day business during the global financial crisis. Kuwaiti banks' low leverage and profitability allowed them to remain liquid and well-capitalized; avoiding any need for extraordinary liquidity or government support.

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# STUDY ON PAPR REDUCTION PERFORMANCE OF SLM SCHEME FOR OQAM-FBMC UNDER THE NON-LINEAR CHANNEL

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## ABSTRACT

Abstract - The Filter Bank Multi-carrier (FBMC) has increased considerably in the field of research for the next generation of future wireless communications. However, one of the drawbacks of the FMBC signals is the Peak to Average Power Ratio (PAPR). We study the SLM scheme in Offset-QAM based filter bank multi-carrier (OQAM-FBMC) under the non-linear channel. In this paper, we investigate a solution to reduce the PAPR and the computation complexity by using the algorithm of Trellis for SLM (TSLM) based sub-optimum algorithm when applying to the OQAM-FBMC system. The performance of the study scheme is verified by using various computer simulations.

Keywords: OQAM-FBMC, High-OQAM, PAPR, SLM, and Nonlinear channel.

## INTRODUCTION

Orthogonal frequency division multiplexing (OFDM) has already been adopted as the transmission technology for many standards of wireless communication system because of the efficient use of frequency bandwidth. On the other hand, OFDM on each sub-carrier the signal uses rectangular pulse shaping, which leads to high out-of-band radiation, susceptibility, and sacrifices to carrier frequency offset (CFO) and a cyclic prefix (CP) respectively.

The filter bank multi-carrier (FBMC) has attracted to be a candidate for future radio communication [1],[2]. This modulation scheme is the potential usage of signals with high spectrum efficiency, low sidelobes, and robustness to the narrow-band interference making it more enable to the higher data rate transmission than OFDM signal.

One of the fundamental drawback OQAM-FBMC systems is similar to OFDM that is the high peak-to-average power ratio (PAPR) [4]. Which has the large fluctuation of the power signal in the time domain that degrades the efficiency of a non-linear High Power Amplifiers (HPA) bring the lower spectrum re-growth when of compare with the ideal of Power Spectral Density (PSD) in the OFDM signal has higher spectrum re-growth then OQAM-FBMC signal [3].

Many techniques to solve the PAPR for the OQAM-FBMC signal have proposed among Tone Reservation (TR) [8], Partial Transmit Sequence (PTS) [7] and Selected Mapping (SLM) [6],[10]. However, all of the research results showed that it is not effective directly employ to the OQAM-FBMC scheme as it is for the OFDM scheme that because of the upsampling and overlapping of the inter-symbol interference (ISI)

The conventional SLM scheme in Offset-QAM based filter bank multi-carrier (OQAM-FBMC) can reduce PAPR in the time domain, the addition dispersive and trellis-based algorithms can improve more PAPR reduction, However it causation to high computation complexity for jointly the optimum phase pattern and the number of stages when it takes more than two times.

In this paper, we study and investigate in jointly optimize multiple data blocks sequence of dispersive in SLM scheme. To reduce the high PAPR of OQAM-FBMC signals and computation complexity, we object to evaluate the efficiency of OQAM-FBMC signal, also the performance of Bit Error Rate (BER) in the non-linear channel when changing the Input Back Off (IBO) and Signal to Noise Ratio (SNR) respectively.

The rest of the literature is organized as follows: Section 2 gives an overview of Conventional OQAM-FBMC signal and shows the SLM PAPR reduction schemes with the dispersive algorithm is put into account the overlapping pass symbols. Next, in Section 3, described the HPA model, exhibiting of AM/AM and AM/PM characteristics to evaluation the PSD. And followed by Section 4, Which shows the various simulation results when changing IBO and SNR in the non-linear channel to evaluate the high performance for OQAM-FBMC system. Finally, gives the conclusion of this work in Section 5.

## OQAM-FBMC SYSTEM MODEL

### A. Conventional OQAM-FBMC Signal and PAPR

In this paper, we assume the transmitted random data at the transmitter side of the OQAM-FBMC system, the complex random data shown below.

$$X_{m,n} = R_{m,n} + jI_{m,n}, \quad 0 \leq n \leq N-1, \quad 0 \leq m \leq M-1 \quad (1)$$

,where  $R_{m,n}$  and  $I_{m,n}$  are random data in the real and imaginary parts of the  $m$ -th symbol on the  $n$ -th sub-carrier, respectively. The real and imaginary parts of the OQAM symbol are time delayed by  $T/2$ , where  $T$  symbol period are passed through the filter, which has the time-frequency conversion of  $h(t)$ . The OQAM-FBMC modulated signal with  $M$  symbol can be expressed as

$$s_{m',n}(t) = \sum_{m'=0}^{2M-1} \sum_{n=0}^{N-1} a_{m',n} h(t - m'T/2) e^{j\frac{2\pi}{T}nt} e^{j\phi_{m',n}} \quad (2)$$

,where  $h(t)$  is defined by the impulse response of the prototype filter, the complex  $X_{m,n}$  is real symbol mapping defined as  $a_{m',n}$  with  $m$  from 0 to  $M-1$  as follows

$$m' = \begin{cases} 2m & m' \text{ is even} \\ 2m+1 & m' \text{ is odd} \end{cases} \quad (3)$$

,where  $\rho \in \{0,1\}$  is defined as  $n$  modulo 2. The phase offset of QAM is taken by the delay as phase term  $\phi_{m',n}$ , which is set to be  $\frac{\pi}{2}(m' + n) - \pi m'n$  as the following equation,

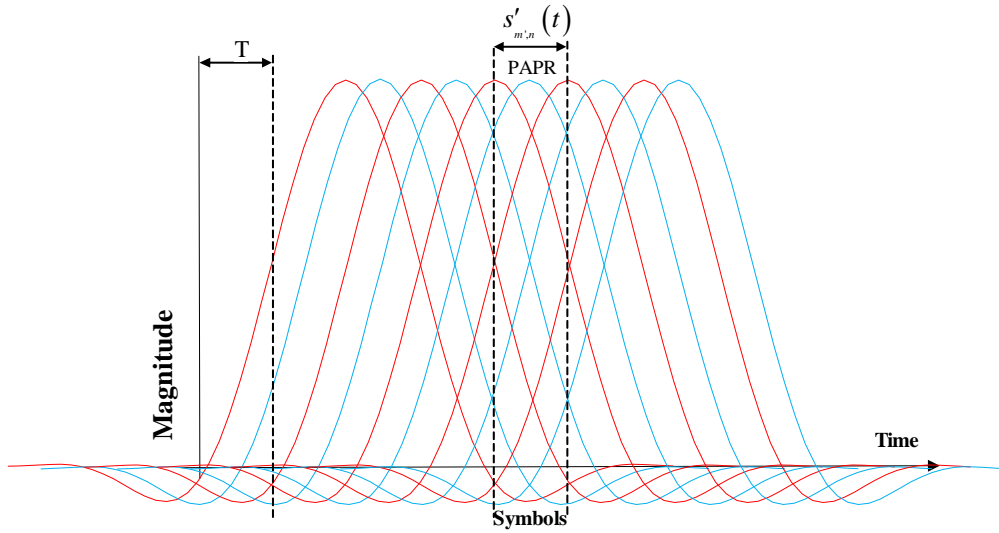
$$a_{m',n} = \begin{cases} (1-\rho)R_m^n + \rho I_m^n & m' \text{ is even} \\ \rho R_m^n + (1-\rho)I_m^n & m' \text{ is odd} \end{cases} \quad (4)$$

In this paper, the prototype filter is employed by PHYDYAS Filter (PF). It can be explained by the equation,

$$h(t) = \begin{cases} \frac{1}{\sqrt{A}} [1 + 2 \sum_{l=1}^{K-1} (-1)^l F_l \cos\left(\frac{2\pi l t}{KT}\right)] & t \in [0, KT] \\ 0 & elsewhere \end{cases} \quad (5)$$

The PAPR evaluation is one of the schemes, which shows the fluctuation of the transmitted signal. The PAPR performance of OQAM-FBMC symbol is period  $T$  in the equation (2), which different the OFDM system is period  $T$ . The PAPR performance of OQAM-FBMC symbol is period  $T$  with a summation of overlap signal both previous, current and advance symbols as shown in figure 1. From figure 1, PAPR of conventional OQAM-FBMC system  $s_{m',n}(t)$  signal symbol in period  $T$  is written by,

$$PAPR_{s_{m',n}(t)} = \frac{\max_{0 \leq t \leq T} |s_{m',n}(t)|^2}{\frac{1}{T} \int_0^T |s_{m',n}(t)|^2 dt} \quad (6)$$



**Fig.1.** PAPR performance evaluation of OQAM-FBMC symbol is period  $T$ .

### B. Impact of PAPR on OQAM-FBMC

SLM scheme is one kind of PAPR reduction that call the representation signal. The representation signal is a scheme for PAPR reduction for the multicarrier communication systems. The OQAM-FBMC symbol with low PAPR can be generated by  $a_{m',n}$  multiple  $\phi^{(u)}$  with different phase pattern as shown in the following equation,

$$X_m^{(u)} = a_{m',n} \circ \phi^{(u)}, \quad 0 \leq u \leq U-1, \quad 0 \leq m \leq M-1 \quad (7)$$

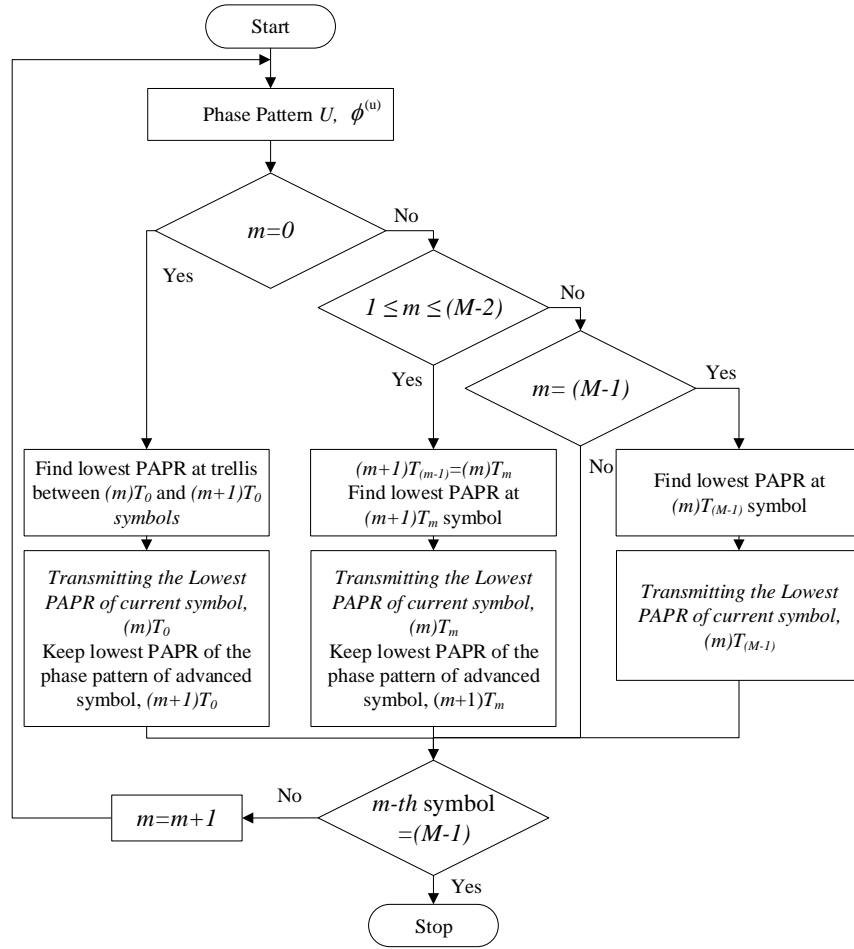
,where  $U$  is a number of phase patterns. The conventional SLM schemes in the OFDM system calculate the low less PAPR performance when phase optimization is only accounting on the current symbols. The PAPR reduction performance becomes worst because the passed symbols will regenerate the high peak again. One of the good scheme, the dispersive algorithm in the SLM scheme has been proposed by calculation the overlapping pass and current symbols as shown in the following equation,

$$s'_{m',n}(t) = \underbrace{\sum_{m'=0}^{2M-1} \sum_{n=0}^{N-1} a_{m',n}^{(u_{min}^p)} h(t-m'T/2) e^{j\frac{2\pi}{T}nt} e^{j\phi_{m'n}}}_{\text{overlappings pass symbols}} + \underbrace{\sum_{m'=2m}^{2M-1} \sum_{n=0}^{N-1} a_{m',n}^{(u)} h(t-m'T/2) e^{j\frac{2\pi}{T}nt} e^{j\phi_{m'n}}}_{\text{current symbol}} \quad (8)$$

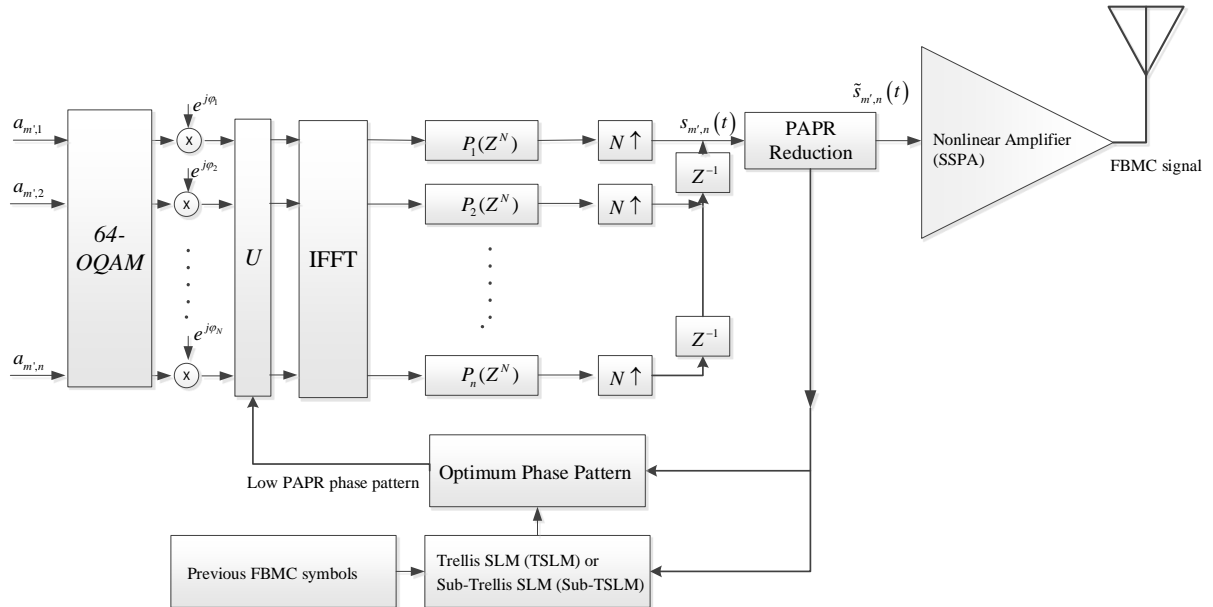
,where  $a_{m',n}^{(u_{min}^p)}$  means the previously selected symbols of  $X_m^{(u_{min}^p)}$ . The best PAPR reduction performance is designed by the optimum phase  $\phi^{(u_{min}^m)}$  for each stage as shown in the following equation,

$$\Phi = \left\{ \phi^{(u_{min}^0)}, \phi^{(u_{min}^1)}, \phi^{(u_{min}^2)}, \dots, \phi^{(u_{min}^{M-1})} \right\} \quad (9)$$

The PAPR value is reduced very much when the number of phase patterns is increasing, and a number of trellis stages are more than 2. The computation complexity for determination of optimum phase pattern will also dramatically increase. The Sub-Trellis SLM algorithm is shown by figure 2. The best path of PAPR reduction of Sub-Trellis SLM scheme can be explained by following these steps. First, the first and second symbols employ the trellis algorithm for  $(m+2)$  stages and gather the optimum phase both  $m$  and  $(m+1)$  stages. Second, the optimum phase rotation vector on  $(m+1)$ -th is kept in the memory, which will be the passed symbol at the next iteration as shown in the equation (8). the optimum phase rotation vector on  $(m+1)$ -th will employ in the  $m$ -th symbol at the next iteration. Finally, the second step employs until the last symbols  $(M-1)$ , and the last symbols do not calculate again because the best phase pattern has taken the calculation the previous iteration.



**Fig.2.** Sub-Trellis SLM scheme with different  $U$  phase patterns.



**Fig.3.** A simulation model of OQAM-FBMC system at the transmitter side with PAPR reduction schemes under the SSPA nonlinear amplifier.



### High Power Amplifier model

The nonlinear amplifier is required by the transmitter to increase the transmitted signal power, which can increase the distance between the transmitter and receiver. However, the nonlinear amplifier at the transmitter has the nonlinear characteristic, which cut the peak of the OQAM-FBMC signal in the time domain. The characteristic of the nonlinear amplifier can be modeled by Rapp, which are shown by the following equation,

$$F_E(\rho) = \frac{v\rho}{\left[1 + (v\rho/A_0)^{2p}\right]^{1/2p}} \quad (10)$$

$$\Phi_E(\rho) = \alpha_\phi \left(\frac{v\rho}{A_0}\right)^4 \quad (11)$$

,where  $F_E(\rho)$  and  $\Phi_E(\rho)$  are the AM-AM and AM-PM conversion characteristics of SSPA, respectively,  $\rho$  is the amplitude of OQAM-FBMC signal,  $v$  is the gain factor of SSPA amplifier,  $A_0$  is the saturated output level of SSPA amplifier,  $p$  is the non-linear characteristic of SSPA amplifier and  $\alpha_\phi$  is phase displacement of SSPA amplifier. The Input Back-Off (IBO) or operation point of SSPA amplifier can be defined by,

$$IBO = 10 \log \frac{P_{in}}{P_0} \quad (12)$$

,where  $P_{in}$  is input power of OQAM-FBMC signal and  $P_0$  is output power of OQAM-FBMC signal. The output power is increased when IBO is near the saturation point of the power amplifier. On the other hand, the output power is decreasing when IBO is getting low.

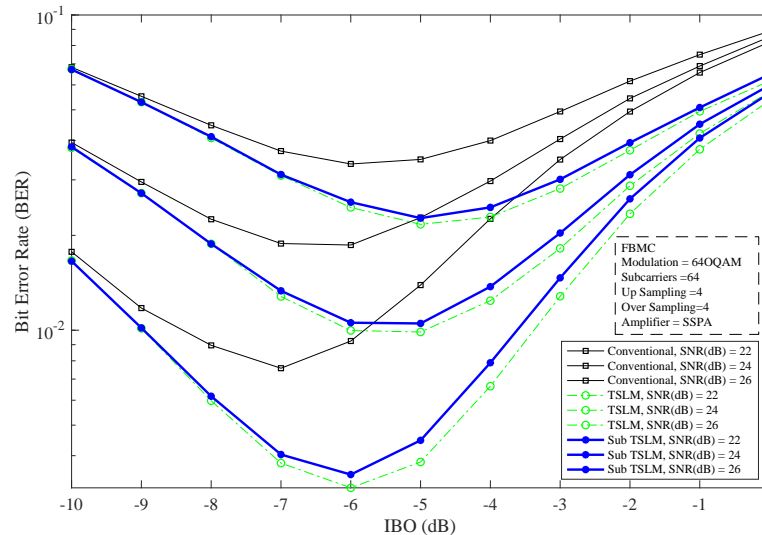
### SIMULATION RESULTS AND DISCUSSION

The simulation parameters of OQAM-FBMC are shown in table 1. The high-QAM modulation is taken by the 64-QAM because it's can easily observe the nonlinearity effect. And the non-linear characteristic of the SSPA amplifier in practice is taken by 2. We clearly show the nonlinear effect for the OQAM-FBMC when the modulation is taken by High-QAM more than QPSK and 16QAM.

**Table 1.** List of simulation parameters of FBMC systems

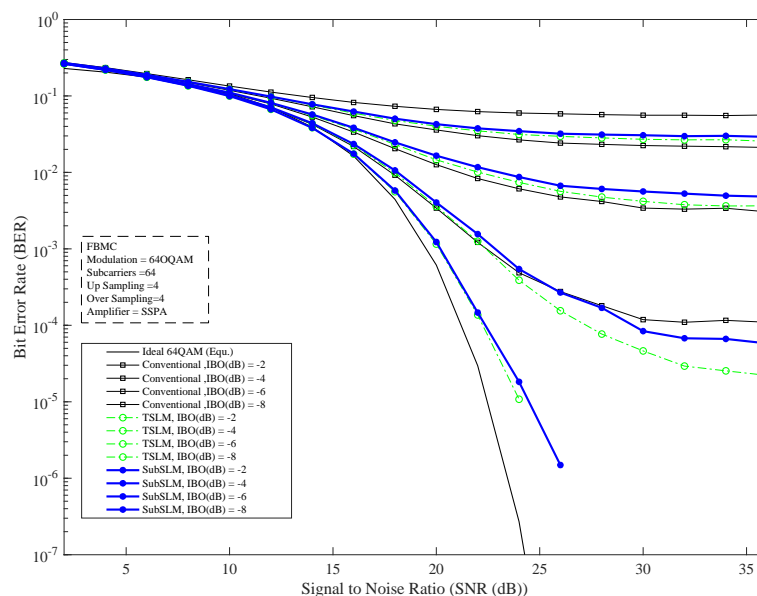
Schemes	OQAM-FBMC
Modulation	64QAM
Demodulation	Coherent
Allocated bandwidth	5MHz
Number of sub-carriers( $M$ )	64 sub-carriers
Number of FFT points( $N$ )	256 points
Up sampling factor( $K$ )	4
Over Sampling	4
Prototype filter: PHYDYAS Filter (PF)	$F_0 = 1, F_1 = 0.97196, F_2 = 1/\sqrt{2}, F_3 = \sqrt{1 - F_1^2}$
Number of Phase Pattern ( $U$ )	16
Nonlinear Amplifier (SSPA)	$A_0 = 1, v = 1, p = 6$ and $\alpha_\phi = 0.025$
IBO (dB)	-2 dB, -4dB, -6dB and -8dB
CNR(dB)	22dB, 24dB and 26dB

Figure 4 shows the different optimum IBO values. The output power of FBMC signal is controlled by IBO. The IBO is taken by 0; it's mean that the point of the nonlinear amplifier is operating at the saturation point of the amplifier. This FBMC will be clipped by the saturation of the nonlinear amplifier, and the nonlinear amplifier will generate the intermodulation noise into the FBMC signal. The BER performance at the saturation of nonlinear amplifier is worst than low IBO. However, the transmitted FBMC signal at the low IBO also is low output power. We get the different IBO when the SNR is taken by the 22dB, 24dB, and 26dB, respectively. The simulation results show the optimum IBO that shows the best BER performance at the 22dB, 24dB, and 26dB because of the intermodulation and AWGN noises.



3 Comparison BER performance of FBMC signal when the IBO and SNR are changing.

Figure 5 shows the BER performance of OQAM-FBMC system when the SNR is changing. The output power of the nonlinear amplifier is fixed when IBO is taken by -2dB, -4dB, -6dB and -8dB because we want to keep the same SNR in the X-axis. Form the simulation results show the BER performance is degraded by the lower IBO. Because of the low intermodulation noise from the nonlinearity of the amplifier is generated by low PAPR. The low PAPR also avoid the intermodulation noise at the IBO. Figure 5 shows that BER performance of Sub-Trellis SLM is better than conventional and is similar to the Trellis SLM scheme. But the Sub-Trellis SLM have lower computation complexity when compare with the Trellis SLM scheme.



4 BER performance versus SNR when IBO is changing.

## CONCLUSIONS

The PAPR reduction schemes for OFDM signal have been proposed. However, those PAPR reduction schemes cannot directly apply to the OQAM-FBMC because the FBMC symbols are overlapped in the time domain. The efficient of PAPR reduction is degraded by this reason. The best optimum the phase pattern have to calculate the relation between previous, current and next symbols. In this paper, the proposed compound the dispersive and Sub-Trellis SLM (Sub-TSLM) with less computation complexity that shows a good PAPR reduction performance. The BER performance of 64 OQAM modulation is improved by the low PAPR under the nonlinear channel. The operation point of the nonlinear amplifier also effects to the BER performance, which degrades from the intermodulation and AWGN noises. The proposed scheme can improve the BER performance with less computational complexity that we verify the proposed using the computer simulation.

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# DEVELOPMENT OF BASKETRY MANUFACTURING

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## ABSTRACT

The purpose of this research were to improve the efficiency of basketry manufacturing. The target groups were 12 manufacturers of wickerwork in Ban Dung district, Udon Thani province, Thailand. The results of the study were as follows: (1) The production efficiency improvement of basketry in aspect of production cost was found that when adding boiling step and sun drying in the raw material preparation process, costs of production and production efficiency were constant is equal to 5. (2) The development of basketry production in aspect of the manufacturing process was found that when adding 2 activities of raw material preparation, the raw material preparation time was increased by 2 hours, but it could reduce the manufacturing time or the weave time by 2 hours. (3) The development of basketry production in aspect of the satisfaction in the work was found that manufacturers are satisfied with the development of production efficiency. Because the process of preparing raw materials improves the quality of the product by reducing defects and production time.

**Keywords:** Efficiency Development; Manufacturing Improvement; Basketry

## INTRODUCTION

Udon Thani Province is a province in Northeast of Thailand. There are 46 handicraft products that can be classified into two categories: 1) Housewares such as pillows, blankets, silk, steamed rice boxes, flowers, ornamental products from pearls, and so on 2) Costumes include loincloths, bags, clothing and woven fabrics. Most of the products are in basketry and woven products. Udon Thani has a unique basketry and is a famous product of the province [1].

Basketry production is a handicraft based on the agricultural society, and Thai people in the Northeast and the North consumes glutinous rice as the main food. Originally, the container was made of sticky rice made of bamboo, cut into short cylinders, used as a sticky rice container.

Later on, the amount of bamboo in the area was reduced and it was not easy to carry. Bamboo weaving is a container of sticky rice (Kra-Tip), which is lightweight and breathable. The sticky rice inside is also hot and not wet, easy to carry, and there are many variations in size, consistent with the use. The local people choose to use natural resources to produce basketry for household use.

Basketry is a work that is often done within a family or community that produces local wisdom and goes from generation to generation. The product range is a folk art that reflects beauty, independence, and expression of the craftsman's ingenuity and skill. Indicates the civilized values of understanding the use of natural materials in harmony with the environment of life. It also has a long tradition of cultural identity.

At present, the business operation of all levels and all types of business is more competitive and the global economic volatility has increased the cost of production and transportation. Entrepreneurs need to be alert and ready for the competition to find opportunities to improve, develop, and manage the processes that are most effective and competitive. Competitive organizations must be able to respond quickly to customer needs, manage costs effectively, and have strategies to grow the organization sustainably. Especially, process management helps to improve business competitiveness by improving processes, working methods, and information systems to increase efficiency within the organization. Including process optimization (cost reduction), human resource optimization (work time reduction), and customer satisfaction [2].

As a result, producers are interested in managing their production systems, starting with the use of the most valuable and useful resources to maintain and keep the profits to an acceptable level. It means that the profit does not fall below the defined profit or breakeven point of production, considering the limited use of resources (personnel, machinery, raw materials, money, information, and time) to maximize the value of the product, to increase productivity and increase efficiency.

Production efficiency generally refers to the performance that results in satisfaction and profit from the production, taking into account the relationship between inputs and outputs. Efficiency measurement is measured by the ratio of output to inputs to production or cost per unit, taking into account quantity in terms of profit or output. Therefore, the development of basketry production is based on: 1) the efficiency of inputs that are production factor, which include energy costs, labor costs, and raw material costs, 2) the efficiency of product

that is ready to sell, and 3) the efficiency of the results of the manufacturer's satisfaction as a result of the improvement of production process efficiency.

The purpose of this research is to improve the productivity of basketry. The result of the research is the response to the strategy of Thailand and the strategy of Udon Thani province which give importance to increasing the competitiveness of the country. Opportunity and income generation, including small and medium enterprises (SMEs) and community economy, development of competitiveness. Benefits to small industry and home industry in most industrial sectors of Thailand and generating income for local communities. Generally manufacturers can bring knowledge to the study and development of their production, increase their income to handicraft producers. It can also be used indirectly to raise awareness and manage the business to reduce costs, get better productivity, profit and increase.

## **MATERIALS AND METHODS**

1. The target group of the study included 12 basketry product manufacturers in Ban Dung district, Udon Thani province, Thailand

2. Research process

2.1 Select one manufacturer of basketry

2.2 Understand and collaborate on data storage about production and operation, marketing, and financial of manufacturers.

2.3 Study Production information by recording workflows from interviews and observations from the process beginning (raw materials finding) till production is ready (finished product to sell).

2.4 Analyze data used for plan the development of basketry production.

2.5 Report production development plan for wicker basketry to understand and accept and cooperate in the plan implementation, or provide suggestions and opportunities to work on production conditions.

2.6 Improving the productivity of basketry production as planned.

2.7 Study on the satisfaction the production efficiency of basketry production after improved.

2.8 Comparison of operating results and production efficiency before implementation and after planned operations.

## **RESULTS**

The development of basketry production has been considered and agreed to conduct research with the manufacturer of basketry (Kra-Tip), which is made of bamboo weave. Currently, the raw materials for weaving are divided into 2 groups: 1) raw materials already produced by the manufacturer, namely bamboo and 2) raw materials to be procured: (1) Water-based adhesive, 18 baht per box and (2) Nylon rope, 12 baht per roll. This material is used to produce a month, can produce 10 units with the price of 150 baht each. After deducting the purchase price of raw materials, the profit is 1,470 baht per month. Products are sold to customers who purchase directly, it also sells to merchants who buy. The cycle of production process is divided into 2 stages: 1) Raw material preparation is divided into 2 steps, namely, 6 steps of bamboo preparation and 5 steps of Petiole of sugar palm preparation, 2) There are 3 stages of weave production.

The results of the efficiency improvement of basketry production were as follows:

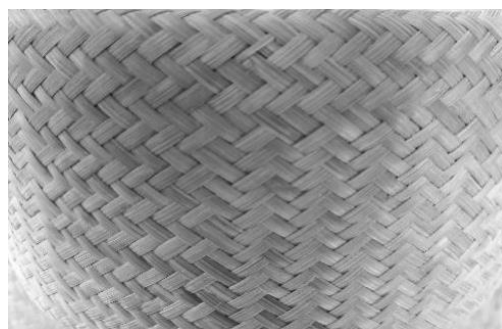
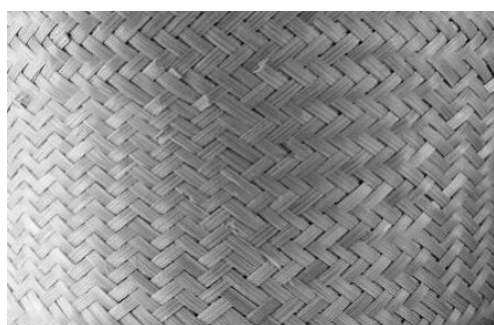
1. The production efficiency improvement of basketry in aspect of production cost was found that before improve the manufacturing process had cost of production is 30 baht consisting of adhesive cost 18 baht and 12 baht nylon rope. The production efficiency calculated by formula:  $\text{Efficiency} = \text{Output} / \text{Input} = 150 / 30 = 5$ , and equal to the production efficiency after improve.

2. The development of basketry production in aspect of the manufacturing process was found that when adding 2 activities of raw material preparation (bamboo preparation); boiling step and dry out from sun, the raw material preparation time was increased by 2 hours (from 5 hours 53 minutes to 7 hours 53 minutes). The steps of weave was takes 14 hours 30 minutes before improve production time. After the update, take 12 hours 30 minutes can reduce the time in the production process by 2 hours as seen in the Table 1.

**Table 1.** Compare Basketry Production Steps Before and After Improvement

Steps	before improve the manufacturing process		After improve the manufacturing process	
	Activity	time	Activity	time
1. Raw material preparation : Bamboo	1.1 Bamboo cutter	5 minutes	1.1 Bamboo cutter	5 minutes
	1.2 Bamboo peeling	3 minutes	1.2 Bamboo peeling	3 minutes
	1.3 Bamboo surface to smooth.	15 minutes	1.3 Bamboo surface to smooth.	15 minutes
	1.4 Bamboo split	30 minutes	1.4 Bamboo split	30 minutes
	1.5 Dry out from sun	1 hours	1.5 Dry out from sun	1 hours
	1.6 Surface finishing	4 hours	1.6 Surface finishing	4 hours
			1.7 Boiling	1 hours
			1.8 Dry out from sun	1 hours
Total	6 steps	5 hours 53 minutes	8 steps	7 hours 53 minutes
Steps	Activity	time	Activity	time
2. Raw material preparation : Petiole of sugar palm	2.1 Split the petiole of sugar palm	5 minutes	2.1 Split the petiole of sugar palm	5 minutes
	2.2 Peel the petiole of sugar palm	3 minutes	2.2 Peel the petiole of sugar palm	3 minutes
	2.3 Cut the petiole of sugar palm	1 minutes	2.3 Cut the petiole of sugar palm	1 minutes
	2.4 Soak in water	1 hours	2.4 Soak in water	1 hours
	2.5 Dry out from sun	1 hours	2.5 Dry out from sun	1 hours
Total	5 steps	2 hours 9 minutes	5 steps	2 hours 9 minutes
Steps	Activity	time	Activity	time
3. Weave	3.1 Weave	10 hours 15 minutes	3.1 Weave	8 hours 15 minutes
	3.2 Cover cut	15 minutes	3.2 Cover cut	15 minutes
	3.3 Parts assembly	4 hours	3.3 Parts assembly	4 hours
Total	3 steps	14 hours 30 minutes	3 steps	12 hours 30 minutes

Development of basketry production efficiency has improved the production process in the process of bamboo preparation. There are 2 steps added from the previous 6 steps to 8 steps after the process has been updated. Steps to increase are: 1) Boil bamboo and 2) Dry out from sun. Improvement of the process by increasing the stage of bamboo preparation can reduce the waste or reduce the fracture of the bamboo in the process of weaving. Comparison of wastes based on the fracture points of 6 Kra-Tips before and after the improvement of the process was found to be different. After the improvement, the bamboo had an average breaking point of 1.67 points per units. Less than before the improvement with the broken point of bamboo averaged 4.33 points per units. (Shown in the in Fig. 1.)



**Fig. 1.** Compare the fracture of bamboo before and after the improvement.

3. The development of basketry production in aspect of the satisfaction in the work by interviewed manufacturer was found that; manufacturers are satisfied with the development of production efficiency. Because the process of preparing bamboo; boil the bamboo, increase the moisture and stickiness of bamboo lines. Easy to carry, no need to spray water or carpet while weaving, it also reduces the fracture of bamboo in the process of weaving.

Comparison of results of improved production of basketry shown in the Table 2.

**Table 2.** Comparison of Results of Improved Production of Basketry

<b>Manufacturing Efficiency</b>	<b>before improve the manufacturing process</b>	<b>After improve the manufacturing process</b>
Production cost	Costs of production 30 Baht Production efficiency 5	Costs of production 30 Baht Production efficiency 5
Manufacturing process	Raw material preparation (Bamboo) 6 steps	Raw material preparation (Bamboo) 8 steps *Adding boiling and dry out from sun steps
	Preparation time 5 hours 53 minutes	Preparation time 7 hours 53 minutes *Increase 2 hour
	1 woven basket for 14 hours 30 minutes	1 woven basket for 12 hours 30 minutes *Reduced by 2 hours.
	Breaking point on basketry is 4.33 points per unit	Breaking point on basketry is 1.67 points per unit *Decreased by 2.66 points per unit
Satisfaction in the work		Manufacturers are satisfied with the efficiency of the production process. Enhance the efficiency of raw materials can reduce the fracture of bamboo in the process of weaving.

## CONCLUSION AND DISCUSSION

1. The research found that the basketry had a constant cost before and after improvement, the constant production efficiency also. Production efficiency in this dimension of cost is often unrelated to quality. But take into account the amount of profit or the maximum output. Efficiency in economics is the ratio between investment and the result of investment [4]. In the case where the output is the same, the original price, if it can reduce the cost, can increase production efficiency in this dimension of cost.

2. The research found that the improvement of the production process of basketry production increased the production process. The efficiency improvement approach is to reduce wastage from ineffective production methods that result in loss of operating costs and loss of time [5]. Improving the efficiency of this production process increases productivity by reducing production time and reduce the cost of raw materials [6] and also increases the quality of product by resources plan for most utility [7]. All of the above, leading to the development of efficiency, resulting in satisfaction to the manufacturer. Considering that time, even from the research was found that, from 1 production cycle starting from the preparation of raw materials to the finished product, the time to prepare the raw materials increases, resulting in lower production time. However, considering the long-term production of raw materials or bamboo, it can be used for more than one production, thus reducing production time. In addition, it has been found that the process of preparing raw materials improves the quality of the products.

## ACKNOWLEDGMENT

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# MOBILE SOLAR WATER PUMP DESIGN

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## ABSTRACT

Abstract: This research aims to present concept of Mobile Solar Water Pump Design for Subdistrict Administration Organization (SAO) to provide service to citizens in Subdistrict Administration Organization in Muang Ngam Sub-district, Sao Hai District, Saraburi Province to use in agriculture and household consumption because people needed to pump water from natural water body or irrigation system during summer for utilization and caused more expenditure. A 24V, 320 W Poly Crystalline Silicon Solar Cell was designed to produce electricity for charging and storing in 130 Ah battery to distribute electricity to 24 V specialized canned motor pump which is able to install at trailer truck or trolley and moved to agricultural areas easily. From experiment, water pump could pump at approximately 3,800 - 4,000 liters per hour and could pump at plain level of approximately 50-80 meter. The pump could pump for 8 - 10 hours without sunlight when utilized with 24-volt 130 ampere hour (Ah). Solar cell power generation systems could generate electricity between 7:30 am and 5:00 pm, but the peak hours that can produce most electricity are between 11:00 am and 14:00 pm. The voltage could be produced are about 26 - 30 V and about 12-13 A for current.

Keywords: Water pump, Mobile water pump, Direct current pump, Solar cell

## INTRODUCTION

Subdistrict Administration Organization (SAO) is local sub-district government organization. It is responsible for the development of the district in the economic, social and cultural aspect. For example, providing water for consumption, agricultural group promotion and agricultural cooperatives, protection and maintenance of public domain property [1]. The Subdistrict Administration Organization in Muang Ngam Sub-district, Sao Hai District, Saraburi administers 8 villages covering an area of 8.77 square kilometers. In the district, the majority of citizen earn a living by cultivating such as farming and gardening. The total area is about 6 square kilometers [2]. The results of area surveying to find the needs of the community in Muang Ngam Sub-district and bring the demand or community problem to proceed academic service project to integrate teaching and academic and social services showed that the community needs to use water for agriculture in summer and need to use water pump to pump water from natural water sources or irrigation system and send to agricultural area which caused high expenses and air pollution from burning fuel and the noise from power engine. Besides, pumping is used to pump water for household consumption. Therefore, Solar Mobile Water Pump has been developed to provide to Subdistrict Administration Organization in Muang Ngam Sub-district to serve the people in the area.

Water pump is a device to increase water pressure. Most of them work with electric motors and the engine used to serve as the rotation power of the water pump, increase water pressure and send water along the pipe. Water pump is divided into 2 types according to its features.

1. Piston water pump. The mechanism of the pump is the reciprocating of piston with an on-off valve for water entering the piston which helps increase water pressure. In the past, it was used in agriculture. The advantage of a piston water pump is that it can generate high water pressure. However, the disadvantages are that it gives less water which is not enough for the demand.

2. Impeller water pump. The mechanism is the rotation of the rotor which generates the pressure distributed along the water pipe. The advantage of the impeller water pump is that it has small size, has few components and can supply large quantities of water and can build moderate water pressure. If require the high pressure, the pump can be mixed together in a multi-state. Impeller water pump is widely used now.

Electric water pump is mostly used with solar cells because it can be used easily and is not necessary to convert the DC voltage from the solar cell to an AC voltage before use. Electric water pumps can be divided into several types as below examples;

1. Centrifugal pump. The pump is widely used because it is suitable for agriculture due to capacity to pump a lot of water. The water is not necessary to be clean as the dirtiness adulterated in the water has not many negative effects on this type of pump. It was used extensively such as in farms, vegetable gardens, orchards, or even in animal farms. This water pump is suitable for pumping in water from rivers, streams, ponds, ditches, or reservoirs

below the ground level of 10 meters. The operation of the pump will use a high-speed rotor system to obtain a large amount of water as shown in Figure 1.



**Fig.1** Centrifugal pump

Source(s): <https://www.solarshop-th.com>

2. Bilge pump. The pump is used for pumping out water. The advantage is it can be store the pump in limited storage conveniently. The pump must be in water and send the water to the desired area through rubber tube or water pipe. The disadvantage is that the water pressure is quite low and the distance is quite short. Bilge pump is suitable for draining water in confined areas, poring the garden or farm in agriculture, arboriculture, fountain in the pool or water sources as shown in Figure 2.



**Fig.2** Bilge pump

Source(s): <http://www.solarproduct.com>

3.Submersible pump. The pump is used for pumping water in vertical depths as shown in Figure 3.



**Fig.3** Submersible pump

Source(s): <https://www.indiamart.com>

4. Canned specialized pump. The pump can prevent fluid leakage completely. Inside the pump is a impeller rotor used for water pressure. The power is generated from the motor as shown in Figure 4.



**Fig.4** Canned specialized pump

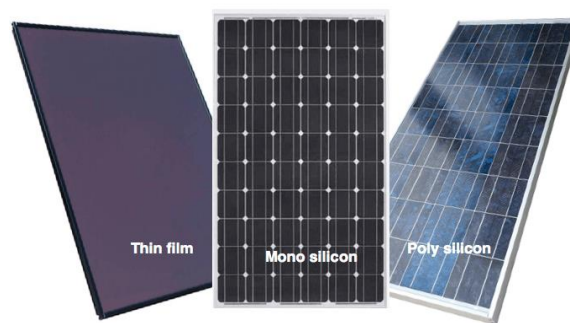
Solar cells are electronic devices that convert solar energy into electricity directly. Currently, solar cells can be classified into 2 types according to the type of semiconductor used in the production.

1. Silicon. The cheapest semiconductor as silicon is the most abundant element in the world. It is widely used in the electronics industry. These silicon solar cells can be divided into 2 types according to the crystalline forms of silicon.

1.1 Crystal. It can be divided into 2 types: Mono Crystalline Silicon Solar Cell and Poly Crystalline Silicon Solar Cell. Both are produced to use in work the most today. Its efficiency is about 12-15% and enough for the application of electricity produced from solar cells.

1.2 Amorphous or Amorphous Silicon Solar Cell. It is thin film, easy to produce, cheap, but the efficiency of energy conversion is about 5 - 10% so, it is suitable for use with less electricity such as calculators, wrist watches, etc.

2. Solar cells made from non-silicon compounds. They are the semiconductor such as GaAs : Gallium Arsenide, CdS: Cadmium Sulphide, CuInSe<sub>2</sub>: Copper Indium Diselenide, Copper Indium Diselenide, etc. They deliver high performance about 20- 25% and can used for high level of illuminance. However, they are more expensive than the silicon solar cells up to 50 times. They are used in space satellites, etc. [3]



**Fig.5** Types of solar cell panels

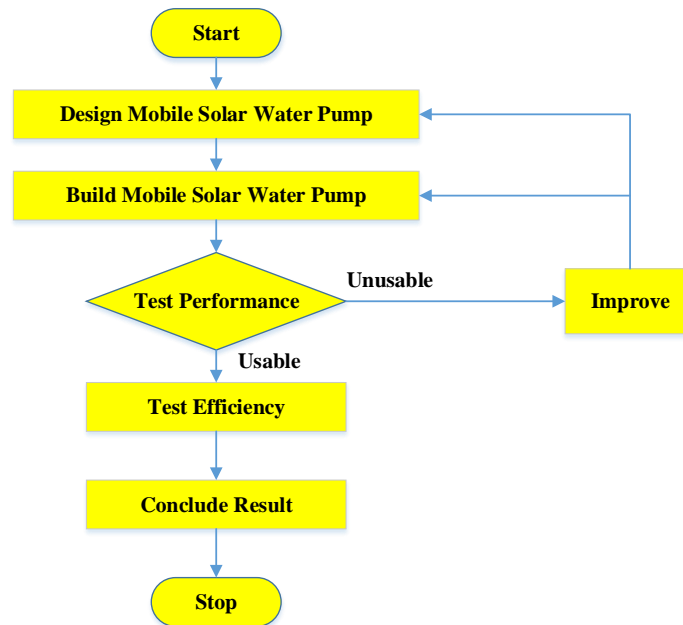
Source(s): <http://www.cleanenergyreviews.info/blog/pv-panel-technology>

## RESEARCH OBJECTIVE

To design and build mobile solar water pump.

## RESEARCH PROCESS

Designing and building mobile solar water pump. There was integration of teaching activities for undergraduate students from Electrical Technology Department in the course of Electrical Engineering Projects 2 and introduced knowledge to the academic service for the Muang Ngam Subdistrict administrative organization, Sao Hai district, Saraburi. Students were invited to participate in designing, constructing, testing, and training on the Mobile solar water pumps.

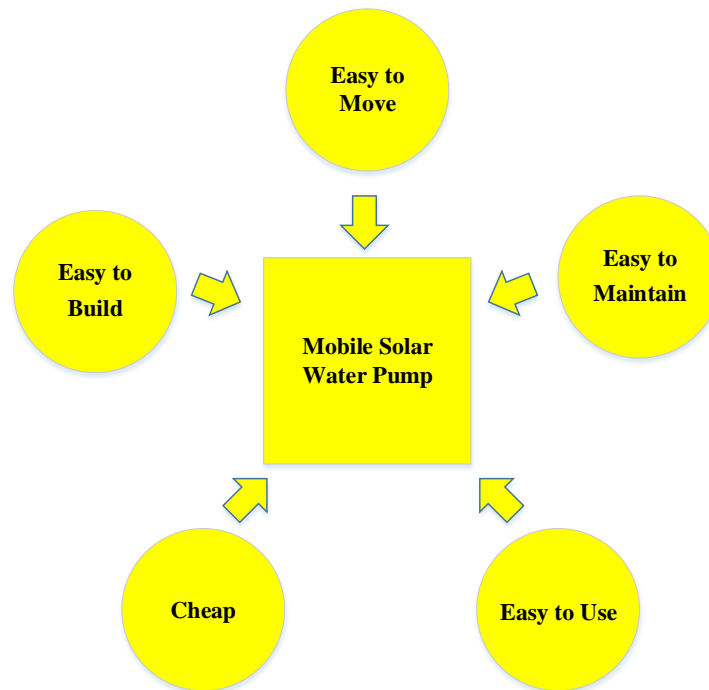


**Fig.6** Flowchart of Methodology

### Concept design

As the Muang Ngam Subdistrict Administrative Organization needed mobile solar water pump in order to service the people in several places such as pumping water from natural sources or the irrigation system into the agricultural areas for growing vegetables, fruits, flowers and rice, etc. and for household consumption. Water pumps have several types ranging from using diesel to gasoline power or using direct or alternating current to supply the water pump directly or supply the motor in order to generate mechanical energy to rotate the pump. Hence, the concept design of mobile solar water pump occurred. It has been found though the research that there are many designs and construction of mobile solar water pumps. For example, Jesada Wannasri, Wacharapan Inthamas, and Suravut Yanin [4] designed and build mobile solar water pump which can be moved by installing a pump on a four-wheel stroller. The pump has 1-inch pipeline and suction pipe and uses 24 VDC 350 Watt motor. The 350 Watt power supply which derived from 2 of 250 Watt 36 V 8.3 solar panels connected parallelly is used to power the pump. The charging system contained 2 of 12 V 80 Ah batteries that is connected to the serial to reserve electricity for usage. The department of Agricultural Engineering, the Faculty of Engineering Khon Kaen University [5] developed Solar Water Piston Pump by designing a 1-inch piston pump system with a 500W 12VDC motor and used solar energy to produce electricity from 295W 24V solar cells and put the pulleys with rotational speed up to 400 rpm around the water pump. Chonmapat Torasa and Nichanant Sermsri [6] designed solar water pump for agriculture using the 24 V 250 W direct current motor to rotate the shaft of a 1-inch piston pump with the pumping rate of 2,800 liters hour, which is powered by a 12 V 150 Watts solar panels connected parallelly in order to have electric power of 300 Watts. 12 Volt 100 Ah battery charging system is used to be an uninterruptible power supply when the pump is running without sunlight.

The design of the mobile solar water pump consists of two main parts: The power generation from solar energy with battery charging system and the canned specialized pump. The concept of design takes into account cheap cost of invention, easy to fabricate, easy to find and purchase materials and equipment, easy to move and maintenance in order to use the model of mobile solar water pump for transferring the knowledge of the water pump invention to the Muang Ngam Subdistrict Administrative Organization and people who interested in the invention of mobile solar water pump to be able to build it. The conceptual framework of invention is shown in Figure 7.



**Fig.7** The conceptual framework of design

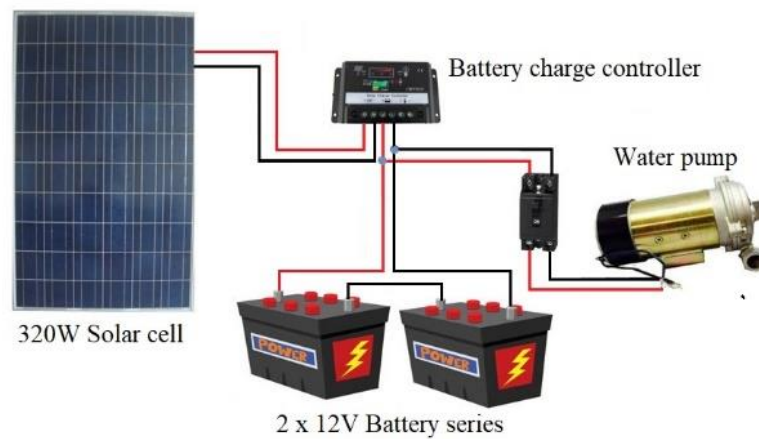
### Mobile solar water pump design

The design of the mobile solar water pump is divided into two parts: 1). Electric power generation from solar power with battery charging system for supplying electricity to the water pump and 2). Stroller for solar water pump.

1. Electric power generation from solar power with battery charging system for supplying electricity to the water pump. Canned specialized pump shown in Figure 8 is used as it is suitable for 24 VDC and convenient for electric system produced from solar cells. The water pump is small, easy to install and requires 180 watts of electric power. The flow rates of water supply pipe inlet and outlet with diameter of 3/4 inch are approximately 68 liters/minute and can lift water at vertical about 30 meters height. The power plant consists of 3 types of equipment: 1). Solar panel: Poly Crystalline Silicon size 24 V, 320 W which can supply electricity about 13 A, sufficient to run to the pump charge the battery. 2). 24 V 20 A Battery charger for supplying electricity to the battery and 3). 2 of 12 V 130 Ah deep cycle batteries connected in series to get the voltage of 24 V in order to continuously supply electricity to a water pump in case of low or no sunlight. A solar-powered system with a battery charging system for supplying electricity to a pump is shown in Figure 9.



**Fig.8** 24VDC Canned specialized pump



**Fig.9** A solar-powered system with a battery charging system

2. Stroller for solar water pump. A 3-wheel was designed to be able to tow by small car like a motorbike or by people for the convenience of moving to the agricultural area. The body of car built from steel of 1 m wide 1.5 m long and 0.9 m. The top installed with solar panels which their angles can be adjusted to detect the sunlight. The bottom installed with water pump, battery and charger for solar power systems.

3. Mobile solar water pump production. Building a mobile solar water pump was referred to the designed car structure as shown in Figure 10. The pump was installed at the bottom of the center of the towing structure. The batteries were installed at each side to hold in equipoise as shown in Figure 11. The top of the car structure installed with solar panels whose their angles can be adjusted properly. The model of mobile solar water pump is shown in Figure 12.



**Fig.10** The structure of stroller of mobile solar water pump



**Fig.11** The installation of water pump and solar system





**Fig.12** A mobile solar water pump

Solar water pumps evaluation. Solar water pumps testing was conducted to evaluate the performance of the pump in 2 areas: 1).The production of electricity from the solar energy for supplying electricity to the water pump. 2).The pumping and power consumption of the water pump. The test was done by bringing the stroller of solar water pump to the park with the solar panels turned to the south and adjusted the angle of the solar panel about 15 - 20 degrees from the earth's surface, then tested the voltage and current that solar cells produce at various period throughout the day and the electricity used to charge the battery and the pump performance such as the pumping rate and distance and the electricity supplied to the water pump.

### RESULT

The test results of production of electricity from 24 V320 W solar panels showed that it could generate electricity between 7:30 am - 5:00 pm, but the period that it could generate maximum power was between 11:00 - 14:00, which the voltage ranged about 26 - 30 V and 12-13 A electricity, which could supply electricity directly to the pump but sometimes when the sunlight was soft, the electricity solar would be reduced. The test also showed that the water pump consumed 7 - 8 A of electricity. The pump power was 168 - 190 W. The performance test showed that the water pump can pump water with rate of about 3,800-4,000 liters/hour and could pump at a level of about 50 to 80 meters. When using 24 V 130 A battery, the pump could work for about 8 to 10 hours without sunlight.

In addition to testing the performance of mobile solar water pump, the training for building and using the mobile solar water pump were also provided to Muang Ngam Subdistrict Administrative Organization and people in order that they could the solar pump for their own use and maintain the solar water pump properly.



**Fig.13** Solar water pumps utilization training



**Fig.14** Mobile solar pumps used to pump water for household consumption

### CONCLUSIONS and SUGGESTIONS

From the test of designed and built mobile solar water showed that it can be used for agriculture and in household. It is recommended to use a water pump during daylight and park the stroller in the open area without obstacle of sunlight which allow solar panel to directly produce electricity for the water pump. Water should be pumped into the agricultural area or kept in the container or large tanks located in high place and release water in the container or tank for using. It could help on water usage when no sunlight. Water pump can pump water from low to high ground level and can deliver water in plan level about 50-80 m. Therefore, farmers can pump water from river, natural water source or irrigation canal to agricultural areas conveniently which can help to save cost of production due to no oil purchase or electricity charge from pump usage. Mobile solar water pumps should not be used for a long period of time as it may cause the pump to heat up. The pump will be damaged if being used continuously for a long time.

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# FACTORS ASSOCIATED WITH KNOWLEDGE, AND PRACTICE TOWARD SAFETY BEHAVIORS AMONG WELDER STUDENTS IN VOCATIONAL TRAINING SCHOOL, URBAN, THAILAND

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## ABSTRACT

Unsafe action is carefully related to occupational accidents. Lack of knowledge skills is one of the main factors affecting students' safety behavior. The purpose of the current study was to find out the factors associated with safety behavior. Hypothesis of the study was the correlation between knowledge and practice was high. *Methods.* Using a self-administered questionnaire regarding to safety knowledge, and safety students' practice were measured. *Results.* Knowledge on basic welder skills was significantly associated to practice at p-value = 0.009\*, knowledge on extinguisher using was significantly associated to practice at p-value = 0.000\*, knowledge on the distance between the spark and gas station was significantly associated to practice at p-value = 0.000\*, knowledge on welder equipment preparation was significantly associated to practice at p-value = 0.009\*, knowledge on personal protection equipment using was significantly associated to practice at p-value = 0.047\*. It is determined to influence safety behavior directly. However, it negatively influenced other questions. Knowledge toward safety was the main factors mediating the effect of safety behavior. The correlation between knowledge among students' was significantly associated (p-value=.000\*) to practice on moderate level in positive way (Correlation Coefficient .401\*\*). *Conclusion.* The school should consider that in order to improve students' safety behavior, unsafe behavior should be reduced to a reasonable level, and concurrently a supportive environment, which ensures a positive result toward safety, should be provided. Duplication of the study is recommended.

**Keywords:** Welder students, Safety Knowledge, Vocational education, Safety Practice, Factor associated

## INTRODUCTION

Health and safety is applicable to all subdivisions of industry, it is mainly significant for the Construction industry. It has always been a key issue as it is considered the most visible sectors when it derives to occupational accidents. Safety behavior is the form of being protected from or not likely to cause hazard, risk, or damage.(Patel, Sharma, Yadav, & Rathod, 2018) Unfortunately, the increasing of lacking on safety knowledge skills also counterparts with high occupational accident and damage cases. (Ahmad, Rehan, Balkhyour, & Ismail, 2017; Al Abdullah, Zytoon, & Al Sayed, 2018; Balkhyour, Ahmad, & Rehan, 2018) Welder students in the vocational school are most likely to be trained before going to industrial business. So, there have been using the equipment for their career since they have been starting vocational year 1. According to the statistic on occupational accident had hit 100,392 people in 2014. (Department of Labour Protection and Welfare, 2016) Aforementioned research has revealed that knowledge skills has affected on behavior, and a lot of them mentioned on lack of knowledge skills can lead to unsafe practice.(Daman, 2018; Eknithiset & Somrongthong,

2017; Eknithiset, Somrongthong, & Kumar, 2018; Prabsangob, 2017; Rapat., 2009) Besides, unsafe practice will be definitely lead to injury at work. Hence, welder students should be studied on their safety knowledge and should improve their knowledge for improve their practice afterward. Nevertheless, welder students have never been studied on their safety knowledge skills before, so the researcher would like to study on them and improve their knowledge skills later on.

The purpose of the present study was to explore factors associated with safety knowledge, and safety practice toward welder work among welder students' in urban, Thailand

## METHODOLOGY

A cross-sectional study was conducted in vocational school in urban, Thailand. Seven vocational school in urban area was cluster selected which are organized by Capital of Thailand department, correspondingly. The 140 participants from 7 vocational schools were selected by random sampling. The number of 20 welder students per each school was recruited into research.

Entirely of the welder students who come across the inclusion criteria and used welder equipment at school from 17<sup>th</sup> June 2017 to 17<sup>th</sup> June 2018 were put questions to. Inclusion criteria contained within welder students age 16-23 years, both male and female, and had been studied as a welder students at least 6 month. The welder students who had communicable disorder, could not speak Thai language, or did not reach agreement to participate, were excluded. Prior to taking part in the study, the study objectives and data collection processes were fully explained to the subjects, who willingness to join the study. A structured questionnaire was used to measure 1) general characteristics, 2) knowledge toward welder behavior and equipment, 3) practice toward safety behavior and equipment. The structured questionnaire was validated by three experts in occupational health and safety, and an expert in research methodology. Another 30 welder students who were studying in the different school, but had the same environment, and demographic were put questions to. The Cronbach's Coefficient Alpha was divided into 2 parts; knowledge toward welder behavior and equipment 0.70, practice toward safety behavior and equipment 0.89. Regarding to data collection. Then, the interrogators conducted by one-on-one interviews using a structured questionnaire at vocational schools. Data was analyzed by SPSS statistical package version 24.0. The general characteristics, and knowledge were independent variables. The dependent variable was practice toward welder students' safety behavior. The total score of knowledge toward welder behavior and equipment was 15 points. The mean of knowledge toward welder behavior and equipment was used to categorize the score into good and poor knowledge. Good knowledge was defined as the score  $\geq$  mean. Poor knowledge was defined as the score  $<$  mean. In addition, descriptive statistics including frequency distribution, percentage, and mean and standard deviation were used to describe characteristics of welder students. A t-test, chi-square, and Spearman test were used to analyze the association between influencing factors between independent variables and dependent variables. All analyses used a 95% confidence interval (CI), and a statistically significant p-value less than 0.05.

## RESULTS

**Table 1: Baseline characteristics (N=140)**

Variables	(n=140)	
	n	(%)
Sex: male	133	(95.0)
Age:		
15-19	130	(92.9)
21-24	10	(92.9)
Education:		
Vocational certificate year 1	35	(25.0)
Vocational certificate year 2	35	(25.0)
High vocational certificate year 1	35	(25.0)
High vocational certificate year 2	35	(25.0)
Grade		
Less than 2.00	8	(5.7)
2.01-2.50	58	(41.4)
2.51-3.00	37	(26.4)
3.01-3.50	29	(20.7)
3.51-4.00	8	(5.7)
Status		
Single	25	(17.9)
In a relationship	115	(82.1)

Among the 140 welder students, baseline characteristics of 140 participants are shown in Table 1, most of participants were male at 95.0 % were in a relationship. Regarding education, all Vocational certificate year 1, Vocational certificate year 2, High vocational certificate year 1, and High vocational certificate year 2 had equally 25 percent. On the other hand, Vocational certificate year 3 was on their training period which was out of school. The most participants had grade range between 2.01-2.50 at 41.4 percent, 2.51-3.00 at 26.4, 3.01-3.50 at 20.7 percent, while less than 2.00 and 3.51-4.00 had equally percent at 5.7 respectively.

**Table 2: Knowledge and practice results (N=140)**

Variables	N=140	
	Mean	(SD)
Knowledge	12.70	(±1.857)
Practice	103.28	(±13.463)

In Table 2, the mean score of knowledge on safety skills at 12.70(±1.857), minimum score was 5, and maximum score was 15. Welder students at 62 person was considered as poor knowledge skills, while 78 person was considered as good knowledge skills. The average of practice on safety behavior skills at 103.28(±13.463), minimum score was 70, and maximum was 125 respectively. Besides, 65 welder students was considered as poor practice skills, while 75 person was considered as good practice skills.

**Table 3: The significant associated between independent and dependent variables (N=140)**

Independent variable	Dependent variable	p-value
School	Knowledge	0.000**
Class level	Knowledge	0.000**
Status	Knowledge	0.045*
School	Practice	0.000**
Class level	Practice	0.014*
Status	Practice	0.018*

\*. The mean difference is significant at the .05 level.

\*\*The mean difference is significant at the .001 level.

## DISCUSSION

The study was to study on Factors Associated with Knowledge, and Practice toward safety behavior among welder students' in urban, Thailand. However, the result reported there are significant association school and knowledge at p value< 0.001, class level and knowledge at p value< 0.001, and status and knowledge at p value< 0.05. Furthermore, the significant association in school and practice at p value< 0.001, class level and knowledge at p value< 0.05, and status and knowledge at p value< 0.05. The association between school and knowledge variables and practice variables might have been due to the fact that different school might have the different level of safety behavior concern, so they might concentrate something else more than providing some safety knowledge information for students. Welder students who comes from a better quality school might have been teaching about safety knowledge more than some school that a little bit smaller size. Furthermore, it might be the consequences from the large proportion between teacher and students that affect the time for teaching. Plus, the significant association between class level and knowledge variable and practice variable might be the coincidence from the time that students had gained their safety knowledge from their teacher and their own practice. The more they study, the more knowledge and practice they gain. Welder students who study longer they will have a better access to receive knowledge about how to take safety knowledge for themselves. Last, the

association between status and knowledge variables as well as practice variables might be the result from the reason following; such as who are in a relationship tend to take concern about themselves because they have to take a good care of their girlfriends or boyfriends too.

## CONCLUSION

The majority of welder students' knowledge, and practice in safety behavior was poor. The results had shown the significant associated between knowledge with school (at p-value<0.001), class level (at p-value<0.001), and status (at p-value<0.05), besides the significant associated between practice with school (at p-value<0.001), class level (at p-value<0.05), and status (at p-value<0.05) respectively. They should have a good intervention for helping them to control their proper safety practice level and also giving them knowledge about safety knowledge on their welder practice.

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# POSITIVE EFFECTS OF MATHEMATICS CAMP ON MATHEMATICS ANXIETY AND MATHEMATICAL RESILIENCE

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## ABSTRACT

The purpose of this comparative research was to study whether students' mathematics anxiety can be positively changed through a one-day mathematics camp and whether the mathematical resilience can be developed after the participation. The objectives of the camp are to gaining the confidence of the first year students and also reducing students' anxiety in studying mathematics. The group activities brought the students discussed creatively with critical thinking. This research was carried out using the quantitative and qualitative research methods. We administered the Mathematics Anxiety Scale and Mathematical Resilience Scale to 150 first-year students of Kasetsart University, Sriracha campus, of the faculty of Management Sciences of the academic year 2017.

The data has been collected before and after the participants attended the one-day mathematics camp. The statistics used to analyse the data descriptively were frequency, percentage, mean, standard deviation and T-independent statistics. We also conducted an individual interview with 1 lecturer and a focus group interview with ten students to supplement the quantitative measures. The study results revealed that: 1) the mathematics anxiety of the students were reduced and 2) the students built up the mathematical resilience after they participated in the mathematics camp with a statistical significance at 0.05. Moreover, the results indicated that the students realised why mathematics is vital and they learnt that they could also be fun when solving mathematics problems with their group members.

**Keywords:** Mathematics Camp, Mathematical Resilience, Anxiety

## INTRODUCTION

In higher education, mathematics is one of the most crucial subjects for the creation of knowledge in different disciplines. However, the abstract of this subject makes the students are learning anxiously. Moreover, there are some negative beliefs about learning mathematics which damage their learning. Some students believe that their mathematical ability is not changeable [4]. Some students believe that their mathematical ability is determined at birth.

The anxiety and damaging myths affect the open mind in studying mathematics and also lead the students to avoid mathematics lessons [2]. It has been over 45 years since Richardson, and Suinn [15] have stated the meaning of Mathematics Anxiety as "feelings of tension and anxiety that interfere with the manipulation of mathematical problems in a wide variety of ordinary life and academic situations" [11]. In 2010, Johnston-Wilder and Lee neologized the term "Mathematical Resilience" as a remedy to counteract the effect of mathematics anxiety. Teachers should develop mathematical resilience in the teaching process because it can help the student to be flexible, adaptable and tolerate ambiguity. One of the reasons why mathematical resilience is essential is the resilience learners will have positive self-esteem that makes them learn from the experience. They will try to find the solutions creatively.

Lee and Johnston-Wilder [10] said that to develop the mathematical resilience in the classroom, the instructors should teach less and give the students a chance to talk more. Besides, the students should be working in group collaboratively to support each other. In fact, there are several collaborative teaching methods which can improve students' academic learning achievement in the classroom, for example, Peer Instruction [16], ACE (Activity, Classroom discussion and Exercises) [17], TGT (Team-Game-Tournament), etc. The teaching methods that have been mentioned above might be working for a small group classroom, however, the faculty of management science wants to improve the students' mindset in learning the mathematics of a large group. The more suitable intervention that would benefit all of the students is conducting mathematics camp activities.

This mathematics camp is conducted for 150 students in the faculty of management science of Kasetsart University, Thailand. The camp was designed to be a one-day camp, which was held two weeks before the first

day of the second academic year. The rationale for choosing this choice of time was to build up the students' confidence in learning mathematics in the first semester. The objective of the camp program is to develop mathematical resilience and reduce the mathematics anxiety of the students by promoting the fun way to learn meaningful mathematics and also giving them some situation to realise how vital of mathematics in everyday life.

In order to achieve the camp's goals, the mission of the camp include the following values: 1) For students, by students: Instructors are undergraduate students studying in the mathematics major, the faculty of education, Suan Sunandha Rajabhat University. The instructor facilitates the conversation and provides positive role models; 2) Child centred: Every activity is hands-on, discovery-based approach to learning and create positive environments that encourage risk-taking and creativity; and 3) Connecting mathematics to the real world situations.

The purpose of this study is to study the change in students' mathematics anxiety and mathematical resilience before and after participating in a one-day mathematics camp.

## MATERIALS AND METHODS

### *Participants*

Participants were 150 Kasetsart University, Sriracha campus first-year students of the faculty of Management Science. The sample consisted of 38 males and 112 females. The mean age for the participants was 18.75, with ages ranging from 18 to 21 years.

### *Methodology*

The survey tool was a multi-part questionnaire. The first part asked five contextual questions about the students. The second part asked ten questions to measure mathematics anxiety using Mathematics Anxiety Scale (MAS) [3]. The first five questions are positively worded, and question 6 to 10 are negatively worded. The mathematics anxiety scores of each participant are the sum of the response. This indicates in the table as "Betz score". The third part asked 23 questions of Mathematical Resilience Scale (MRS) to measure the students' attitude and belief in learning mathematics. There are three subscales: Value, Struggle and Growth. The Mathematical Resilience Score range from 23 to 115.

We collect the data in two phase:

Phase 1: We conducted before the one-day mathematics camp started. We started with interviewing the lecturer who responsible in teaching Mathematics for the first year students in the second semester to receive some information about what the students are going to learn next semester, and this was very helpful to set the activities for the students. Also, we asked the students to fill in the paper form of Mathematics Anxiety Scale and Mathematical Resilience Scale.

Phase 2: We conducted after the one-day mathematics camp finished. We asked the students again to fill in the paper form of Mathematics Anxiety Scale and Mathematical Resilience Scale. Moreover, we interviewed the same lecturer about the students' participation. We also conducted a focus group interview with 10 students to supplement the quantitative measures and examine what they feel and see how is mathematics so essential and relate to the students.

## RESULTS AND DISCUSSION

**Table 1.** The normality test of the Betz Score and Mathematical Resilience Score for pre- and post-camp.

	Kolmogorov-Smirnov		
	Statistic	df	Sig.
Betz Score Pre-camp	.071	150	.065
Betz Score Post-camp	.062	150	.200*
Mathematical Resilience Score Pre-camp	.063	150	.200*
Mathematical Resilience Score Post-camp	.064	150	.200*

Table 1 displays the result from the normality test of the Betz Score and Mathematical Resilience Score. We found that both Betz Score and Mathematical Resilience Score of pre-camp and post-camp are significantly normal.

In the next step, let  $\mu_{\text{Betz1}}, \mu_{\text{Betz2}}$  be the mean of the Betz score of pre-camp and post-camp. We want to test if  $H_0 : \mu_{\text{Betz1}} = \mu_{\text{Betz2}}$  and  $H_1 : \mu_{\text{Betz1}} > \mu_{\text{Betz2}}$  at a significant level of  $\alpha = 0.05$ .

**Table 2.** The statistical Pair T-Test analysis of pre- and post-camp Betz Score.

Betz Score	Pair Differences					t	Sig. (2-tailed)
	Mean	Std. Deviation	df	95% Confidence Interval of the Difference			
				Lower	Upper		
Pre-camp	6.18	4.02	149	5.53	6.83	18.84	0.00
Post-camp							

Table 2 shows that a pair sample T-test was conducted to compare the Betz score between pre-camp and post-camp. There was a significant difference in the Betz score between pre-camp and post-camp. Mainly, the Betz score of the pre-camp is significantly more than the Betz score of the post-camp.

In order to test the hypothesis, we let  $\mu_{\text{MRS1}}, \mu_{\text{MRS2}}$  be the mean of the Mathematical resilience Score of pre-camp and post-camp. We want to test if  $H_0 : \mu_{\text{MRS1}} = \mu_{\text{MRS2}}$  and  $H_1 : \mu_{\text{MRS1}} < \mu_{\text{MRS2}}$  at a significant level of  $\alpha = 0.05$ .

**Table 3.** The basic statistics of Betz Score and Mathematical Resilience Score for pre- and post-camp.

Mathematical Resilience Score	Pair Differences					t	Sig. (2-tailed)
	Mean	Std. Deviation	df	95% Confidence Interval of the Difference			
				Lower	Upper		
Pre-camp	-5.77	6.81	149	-6.87	-4.67	-10.38	0.00
Post-camp							

Table 3 shows that a pair sample T-test was conducted to compare the Mathematical Resilience Score between pre-camp and post-camp. There was a significant difference in the score between pre-camp and post-camp. Notably, the Mathematical resilience Score of the pre-camp is significantly less than the Mathematical Resilience Score of the post-camp.

The qualitative data that have been collected from the focus group interviews reveal the happiness of the camp participants. Besides, some students feel better about learning mathematics because it is meaningful to them. To illustrate, S3, (male, 18 years old) stated that:

...I have never thought that learning mathematics can be this fun. I can share my experience and there is no right or wrong. This camp makes me realized how important of mathematics to my subject area and, of course, for the future career also.

Some students have their harmful myths which turn them to be a “fixed mindset” person. After joining the camp, they are enabled to develop a love for mathematics by themselves. They feel more comfortable to ask their friends. To illustrate, S7, (female, 19 years old) stated that:

... I always believe that mathematics is not my cup of tea and I also do believe that nobody can improve their innate mathematical ability at all. That makes me feel lonely and dare not to talk to my friends or even ask the teacher because I do not want them to know that I am not good at maths. Now, after the staffs lead me so many activities, I feel like I can learn better when I talk to my friends so they can explain me so clearly. I dare to ask more because I realised that I could learn more.



## CONCLUSION

At the end of mathematics camp, we found that the students' anxiety was reduced significantly and, from the conversation in the focus group interviews, the student could develop the mathematical resilience. We can notice from the interview that there is a big change in each student's mind. The interviews are the evidence to support the decreasing of the Betz Score and the increasing of the Mathematical resilience Score after the students attend the camp. Although a one-day camp was quite short to build up the permanent confidence or mathematical resilience, from the interview, the students are ready to learn in the mathematics class with a positive mindset which is quite a good start for the new era of learning university mathematics.

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# **GUIDELINE FOR SAFETY INSTRUCTION FOR NATURAL TOURISM CASE STUDY TUM LUANG-KHUN NAAM NAANG NORN FOREST PARK, MAE SAI, CHIANG RAI THAILAND**

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## **ABSTRACT**

**Abstract—** This paper aims to focus on the safety instruction for natural tourism in Thailand inspired by the two hottest recent world news, first “12 missing youth soccer players feared trapped in Thai cave in Tum Luang-Khun Naam Naang Norn Forest Park , Mae Sai, Chiang Rai in the northern part, and second the tourist boat trip crisis in Phuket in the southern part of Thailand . Natural Tourism are the one of favorite tourist destination for both domestic and foreigner tourists. According to the both of accidents all the authorities who have responsibility on tourist safety must strongly concern about this matter as the first priority. And they should turn the crisis to the opportunity and create sustainable tourism for the natural tourist attractions.

**Keywords** — Natural tourism, safety instruction, sustainable tourism

## **INTRODUCTION**

Tourism is a major economic factor in the Kingdom of Thailand. Estimates of tourism receipts directly contributing to the Thai GDP of 12 trillion baht range from nine percent (1 trillion baht) (2013) to 16 percent.[1] When including indirect travel and tourism receipts, the 2014 total is estimated to account for 19.3 percent (2.3 trillion baht) of Thailand's GDP.

### **What is Nature Tourism?**

Nature tourism – responsible travel to natural areas, which conserves the environment and improves the welfare of local people. It is tourism based on the natural attractions of an area. Examples include birdwatching, photography, stargazing, camping, hiking, hunting, fishing, and visiting parks. These experiential tourists are interested in a diversity of natural and cultural resources. They want what is real, and they want to be immersed in a rich natural, cultural, or historical experience. Couple camping, one of the many activities that can be enjoyed as a nature tourist.

From the standpoint of conservation, nature-based tourism provides incentives for local communities and landowners to conserve wildlife habitats upon which the industry depends – it promotes conservation by placing an increased value on remaining natural areas. As nature tourism becomes more important to the local economy, communities have additional incentive to conserve their remaining natural areas for both wildlife and wildlife enthusiasts.

The nature-based tourism efforts in Thailand will continue to focus on achieving habitat conservation by providing information and assistance to private landowners, communities, businesses, and local community leaders expecting to make nature-based tourism an integral part of their business and community. By empowering people at the local level, we hope to build and provide guidance to a growing industry that holds great promise for sustainable economic development and conservation of wildlife habitat.

### **International rankings**

In 2013, Thailand was the 10th "top tourist destination" in the world tourism rankings with 26.5 million international arrivals.[22]:6

### **Mae Sai, Chiang Rai ,Thailand**

Mae Sai, Chiang Rai Province, is a popular small town in the Northern Thai border. It is not only popular for its tremendous natural beauty, but this is the place where you can enter Burma and visit the border town of Tachileik. Tourists also prefer to visit Mae Sai for its unique markets, where you can buy all sorts of merchandise in very cheap price. Let's start with some of the best tourist destinations in Mae Sai.

### **How to reach Mae Sai**

Reaching Mae Sai is not a difficult task. You can hire a car from Chiang Rai and drive along highway 110. It won't take much time to cover the 60 to 61 kilometers (37.3 to 37.9 miles). Mae Sai is a one-street town and can be explored easily on foot. Or you can hire scooters to visit the numerous places we have suggested

### **Tham Luang – Khun Nam Nang Norn**

Tham Luang – Khun Nam Nang Norn is located in the sub-district of Poangpa, in Mae Sai district. On October 1, 1986, Tham Luang – Khun Nam Nang Norn was officially announced as a protected area of Thailand. It covers an approximate area of 8 square kilometers (3.1 miles) and is located at an altitude of 780 meters (2,559.1 feet).

The larger hills at Tham Luang – Khun Nam Nang Norn makes the tropical forest looks so breathtaking and the panoramic views here will open a door for you to rejuvenate your talents as a wildlife photographer. Don't forget to capture the shot of leopards, elephants, wild pigs, deer and other wild animals that can be found here. There are strict protection laws in the park for the safeguarding and protection of the forest's fauna.

Tham Luang – Khun Nam Nang Norn Forest Park

Address: 8 km (~5 miles) from Mae Sai

### **More interesting places in Chiang Rai**

1. Mae Sai Market – an important place for shopaholics.

Wat Phra That Doi Wao is also popularly called the Scorpion Temple. The word “wao” comes from the Lanna language and means scorpion. The temple is ideal for panoramic views and here you can see the hill in Thailand that serves as a border of Myanmar. If you climb the hill, you can capture a wonderful view over Mae Sai and Myanmar. The temple is situated just 100 meters (328.1 feet) before reaching the Mae Sai border.

2. Wat Phra That Doi Wao is a popular scorpion temple

Wat Phra That Doi Wao is also popularly called the Scorpion Temple. The word “wao” comes from the Lanna language and means scorpion. The temple has an amazing panorama view and from here you can see the hill in Thailand that serves as a border of Myanmar. If you climb up the hill, you will be able to capture a wonderful scenery over Mae Sai and Myanmar. The temple is situated just 100 meters (328.1 feet) before reaching the Mae Sai border.

3. Doi Wao & Wat Thamphajoen mesmerizes everyone with natural scenery Closer to the previous Wat Phra That Doi Wao, Doi Wao & Wat Thamphajoen are known for their famous monuments and statues. You will find a large scorpion here, black in color, on a decorated podium at the outer edges of the temple. The beauty of this sky-colored temple is best captured at night, when it gets a different look due to its lighting. At the backside of the temple, you will see hills filled with green trees. In simple words, this is absolutely a wonderful place to refresh your mind.

4. The Wat Phra That Doi Tung is situated on top of Doi Tung Mountain, the highest mountain in Chiang Rai province with an elevation of approximately 2,000 meters, about 50 kilometers south of Mae Sai town which is near the Myanmar border. The temple can be reached via a 40-kilometer mountain road which meanders along the mountainside. The journey is worthwhile as the panoramic views into Laos and Myanmar at the peak are spectacular.

5. The Golden Triangle about 9km north of Chiang Saen Town, usually refers to the vast area of three countries – Laos, Myanmar and Thailand – where opium has been grown and processed to be heroin then smuggled out.

6. The Kok River is one of the most scenic attractions in Chiang Rai. It runs from Thathon in northern Chiang Mai to Chiang Rai city and then flows on to meet the Maekhong River at Chiang Khong. From Baan Thathon boats, rafts and treks leave daily venturing into the surrounding mountains where the jungle dips into the river's cool water. A long-tailed boat can be hired to ferry visitors up and down the river. Stops can be selected at Akha or Iko, Lisu and Karen hill tribe villages. Alternatively stops can be selected at the Buddha cave, a temple within a cavern; an elephant camp, for trekking; a hot spring; and a riverside Lahu village.



fig.1:Boating along Kok River

### Lost boys in Thailand cave found

Twelve boys and their soccer coach found alive after ten days inside a flooded cave will have to bear their ordeal for longer while rescuers work out how to bring them safely out, the provincial governor said on Tuesday.

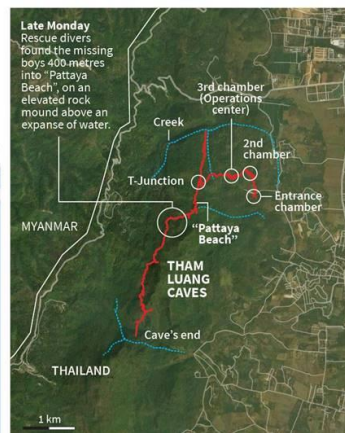
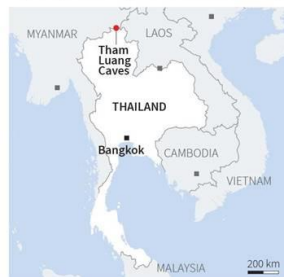


fig.2: Chaing Rai Location Map.

### The world's news "Search on for missing footballers trapped in cave"

25 Jun 2018 at 04:30

Eleven football players and a coach were believed to be trapped in Tham Luang Nang Non cave in Mae Sai district of Chiang Rai as a search and rescue effort attempted to locate them on Sunday.

The group played football at a sports facility in tambon Pong Pha around noon on Saturday, he said, citing one of the parents. After training, they cycled together to the forest park for a trek to the cave

The group were apparently trapped when heavy rainstorm flooded a stream at the cave's entrance. Police Col. Komsan Saardluan said a part of the cave, which is an estimated 6-8 kilometers (4-5 miles) long, get flooded to a height of as much as 5 meters (16.5 feet) during the rainy season, which runs from June through October.



Fig3: The rescue team plan to bring out all of the trappers

### **The Rescue, All nations help.**

Thai officials launched a massive search and rescue operation in Khun Nam Nang Non Forest Park involving more than 1,000 people, including specialists drafted from various nations such as Australia, China, Japan, the United Kingdom and the United States. The search and rescue teams tried anything they could to locate the boys and their coach -- deploying ultrasonic sensors into the cave, drilling through the rock and dropping survival packages down holes found above ground in hopes the supplies would reach the group

### **Cave rescue hazards**

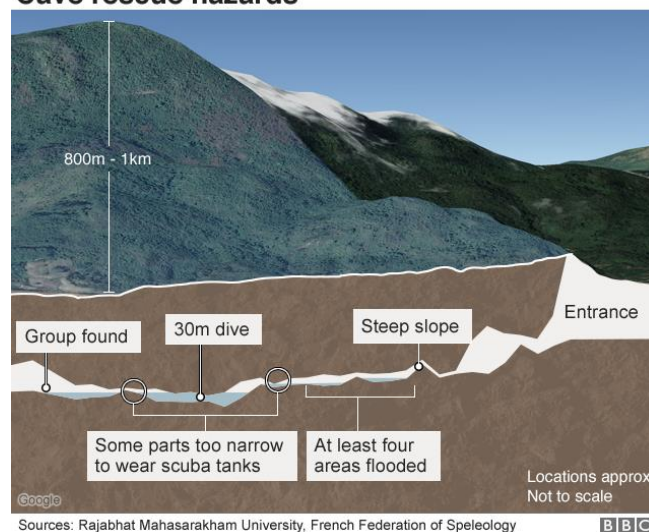


fig:4. The cross-section of the cave.

### **At last, the survivor got through, safely.**

It was a frightening moment in what had been a surprisingly smooth rescue of the soccer team, the Wild Boars, who had survived the murky darkness of Thailand's Tham Luang Cave, sometimes by licking water off the cold limestone walls.

Tham Luang Cave is a rare place where a person can become completely isolated. There is no GPS, no Wi-Fi, and no cellphone service. The last known survey was conducted in the 1980s by a French caving society, but many of its deepest recesses remain unmapped. Spelunkers consider the cave one of the most challenging in the world.



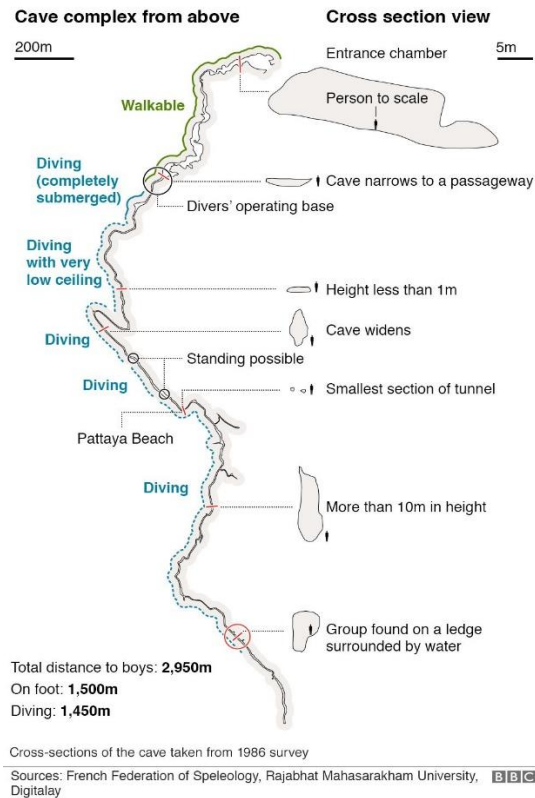


Fig5: Cross-sections of Cave taken from 1966 survey

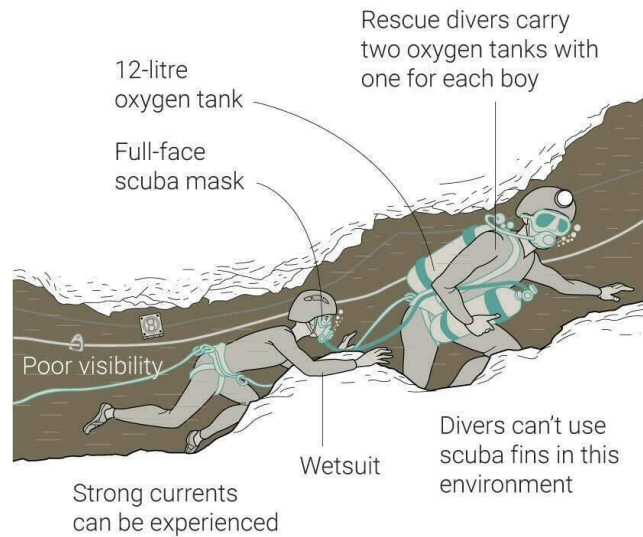


fig3: How the rescue drivers bring out all the trappers

### What is Caving?

Caving is the art of safely moving through a natural cave to a destination and returning to the surface without hurting yourself or the cave. In order to explore safely, you will need the right equipment and the right skills. The following sections will provide you basic information and links to help you get started exploring caves.

### **The Three Basic Rules of Cave Exploring**

- 1) Take Nothing but Pictures – leave everything the way you found it so others can appreciate the cave the same way you did.
- 2) Leave Nothing but Footprints - Minimize your impact to the cave; do not leave crumbs, trash, and paint in the cave. Even minimize the impacts of your footprints; stick to established trails and be careful to step where those before you have already stepped.
- 3) Kill Nothing but Time – You are the visitor to the cave so leave the natural inhabitants alone.

### **Rebranding Thailand in a dark cave**

You may not realize it, but Thailand just got rebranded in a dark cave by twelve boys and their young football coach.

And it's absolutely a wonderful thing.

Why “branding”? Because branding is simply bringing shared values to life. Rather than the usual fare of elephants, cultural festivals, tempting cuisine and pristine seas, the world has been treated to an epic drama of human fortitude and challenges overcome.

After two decades of campaigns by the Tourism Authority of Thailand, the “Amazing Thailand” slogan has finally been proven in the most heroic terms and will not be forgotten soon by the story of the lost boys, which gripped the emotions of people everywhere.

Set against images of torrential rains, muddy water and deepening darkness, determined Thai rescue workers and volunteers from around the world worked around the clock to beat the odds and win.



fig.6: Khun Nam Nang Non Forest Park , Mae Sai Chaing Rai



fig.7: Khun Nam Nang Non Forest Park entrance.



fig.8: The rescue team set up the rescues equipment.



fig.9: Inside Khun Nam Nang Non Cave.

### **Risk assessment in Caving**

Here, knowledge of local conditions is a major requirement when compiling a risk assessment which has to be carried out on location, taking the route to be used later when travelling with clients. The assessment must focus on the client and regard potential risks from his perspective. Among questions to be asked are the following:

- Is there are risk of rock falls in the cave?
- Is there a risk that participants might be separated from?  
The group or lose their way?
- Is there a need to warn against low cave ceilings?
- Is the ground surface hard to traverse?
- Is there ice on cave floors?
- Other?

### **Safety regulations**

Safety regulations are defined as mandatory requirements that aim to prevent or reduce injury. They include laws and regulations, such as prohibiting the sale of fireworks, and mandatory standards, such as specifying that children's nightwear be fire resistant.

### **Guideline for safety**

Rules on work procedures cover, among other things, aspects dealt with in the risk assessment; for example

- 1) Staff: participant ratios; whether staff members should occupy the first and last position in the group, and how participants are counted. The rules also contain requirements regarding the education and experience of staff.
- 2) Staff members must have completed a course in First Responder Aid and even some further courses of the specific criteria.
- 3) Equipment checklists for staff and participants are included in rules on work
- 4) Procedures. Measures must be taken to ensure that participants' equipment list reaches them before embarking on the excursion, for example by publishing it on a home page. Equipment lists must contain safety related items such as helmets, head and hand held torches, walking spikes and even specific clothing for crawling.



5) Contingency plan for cave rescue can be a difficult undertaking and therefore summoning assistance should be a priority item.

6) The safety of staff and participants must be ensured, for example by vacating the cave, or in another appropriate manner. Accident victims must be taken care of, paying particular attention to body temperature, since caves are generally colder than the surrounding atmosphere and sometimes also damp.

### Incident report

An incident report must be completed on every occasion of an incident, a mishap or “a near mishap”. Processing the report within the company may prevent an accident at a later date.



fig.10: Cloth for caving guideline.



fig.9: Gears for caving guideline.

### CONCLUSION

Travel and tourism are important drivers of Thailand economy, with high potential to support job creation across the nation. In a globalized economy, travel and tourism policies affect a broad range of business interests, including those beyond the travel and tourism industry.

Nature tourism has responsibility on travel to natural areas, which conserves the environment and improves the

welfare of local people.

It is tourism based on the natural attractions of an area. Examples include birdwatching, stargazing, camping, hiking, hunting, fishing, caving and visiting parks. These experiential tourists are interested in a diversity of natural and cultural resources. They want what is real, and they want to be immersed in a rich natural, cultural, or historical experience.

From the standpoint of conservation, nature-based tourism provides incentives for local communities and landowners to conserve wildlife habitats upon which the industry depends – it promotes conservation by placing an increased value on remaining natural areas. As nature tourism is becoming more important to the local economy, communities have additional incentive to conserve their remaining natural areas for wildlife and wildlife enthusiasts. Safety and security are vital to providing quality in tourism. More than any other economic activity, the success or failure of a tourism destination depends on being able to provide a safe and secure environment for visitors.

The safety regulation for natural tourism will help to assure the tourists to visit all the natural attraction safely.

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# A STUDY ON SERVICE QUALITY DIMENSIONS AND ITS IMPACT ON SATISFACTION OF DOMESTIC TOURISTS IN TAMIL NADU

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## ABSTRACT

Tourism is seen as an engine of development, catalyst to economic prosperity of a country. Tourism refreshes the mind, brings happiness, relaxation, enjoyment and gives new experience to the tourists. Tourism ensures an all round growth through economic multiplier effect which percolates to various stake-holding sectors like the airlines, railways, surface transport, cruises, hotels, telecommunication and so on. The explanatory factor analysis has identified the assurance, responsiveness, reliability; tangibility and responsibility which are the prominent service quality dimensions for domestic tourism. The regression analysis shows that the service quality dimensions of assurance, responsiveness, reliability and responsibility have the positive impact on satisfaction of domestic tourists. It is necessary to be a kind of co-operation between tourism departments and tourism private sector in the fields of tourism safety and tourism crisis management for improving TServQual in Tamil Nadu.

**Keywords:** Exploratory Factor Analysis, Regression, Service Quality, Tourists.

## INTRODUCTION

Tourism is seen as an engine of development, catalyst to economic prosperity of a country. Tourism refreshes the mind, brings happiness, relaxation, enjoyment and gives new experience to the tourists. Tourism ensures an all round growth through economic multiplier effect which percolates to various stake-holding sectors like the airlines, railways, surface transport, cruises, hotels, telecommunication and so on. Tourism is not only a growth engine but also an employment generator. The importance of tourism as a creator of job opportunities can be understood from the fact that in India every one million invested in tourism creates 47.50 jobs directly and around 85-90 jobs indirectly. Tourism is an important sector of Indian economy and contributes substantially in the country's Foreign Exchange Earnings. FEEs from tourism, in terms of rupees, during 2014 was Rs.94,673 crore, with a growth of 19.80 %. The domestic tourist visits during the year 2013 are 945 million, showing a growth of 13.86%.

From a service sector, tourism has emerged as a leading export industry like the Gems and Jewellery Industry, Information Technology and Engineering Products. Therefore, priority is accorded by both Central and State governments to give a major fillip to tourism sector. A new thrust is being given for providing tourist infrastructure of international standard and marketing of destinations. Tourism in the past was regarded as a religious or leisure activity. Now, the improved connectivity, quality roads and easy access to tourist attractions and e-booking have made travel easier. Monotony of work, stressful lifestyle, and desire to explore new places have necessitated travel and tourism. The free trade and open-sky aviation policies have also contributed to tourism growth. The pace of growth in recent times has left the infrastructural facilities and availability of human resources lagging behind, thereby leaving a challenge to match the growth and have futuristic and perspective plans in place.

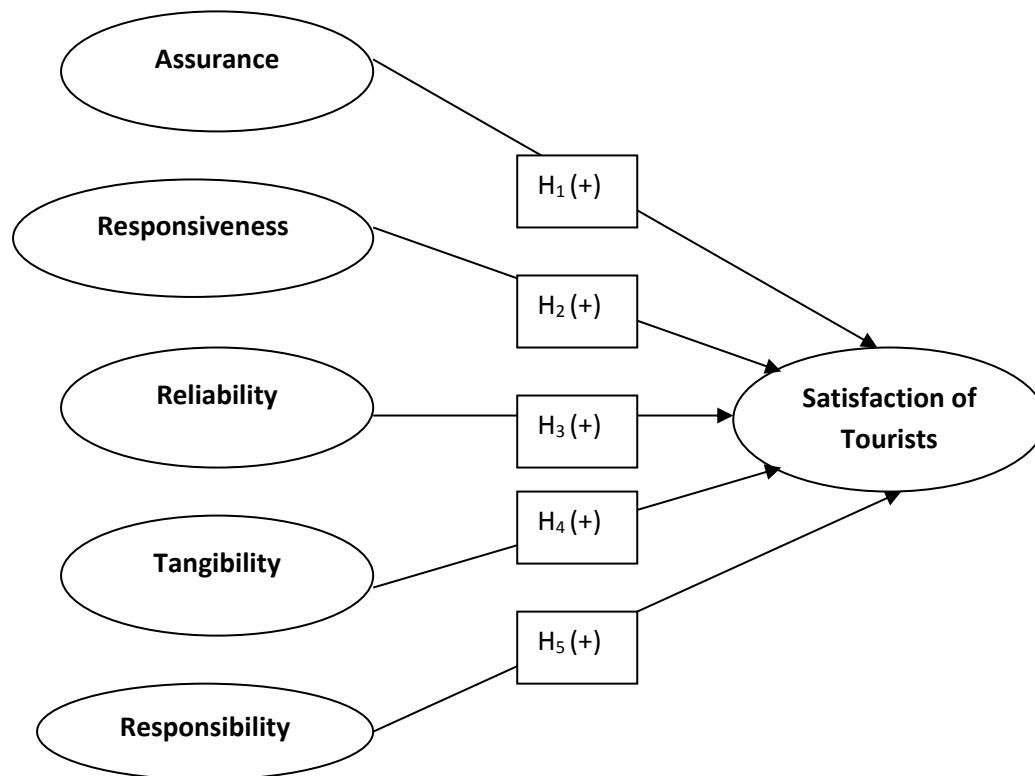
Tamil Nadu is a state in the south-eastern part of the Indian Peninsula. One of the four Dravidian states of India, it has had more than 4,000 years of continuous cultural history. Tamil Nadu has some of the most remarkable temple architecture in the country, and a living tradition of music, dance, folk arts and fine arts. Tamil Nadu is well renowned for its temple towns and heritage sites, hill stations, waterfalls, national parks, local cuisine and the fabulous wildlife and scenic beauty. The state boasts the second largest tourism industry in India with an annual growth rate of 18%. Tamil Nadu occupied the second slot in the country in terms of domestic as well as foreign arrivals. With this backdrop, the present study is attempted to identify the service quality dimensions and its impact on satisfaction of domestic tourists in Tamil Nadu.

## MODEL AND HYPOTHESIS

The model and hypothesis for the present study is as follows:

Figure 1

Research Model of Service Quality in Domestic Tourism



## RESEARCH METHODOLOGY

Among the different states in Indian tourism map, the Tamil Nadu state has been purposively selected for the present study. 300 domestic tourists have been selected by adopting random sampling technique and the data and information pertain to the year 2013-2014. In terms of measurement scale, service quality items for domestic tourism are measured in the form of five point Likert scale.

In order to understand the socio-economic status of domestic tourists, frequency and percentage analysis are carried out. In order to identify the service quality dimensions for domestic tourism, exploratory factor analysis has been employed. In order to examine the impact of service quality dimensions on satisfaction of domestic tourists, multiple linear regression model has been employed.

## RESULTS AND DISCUSSION

### Socio-Economic Stratus of Domestic Tourism

The socio-economic status of domestic tourists was analyzed and the results are presented in Table 1. The results show that about 67.33 per cent of the domestic tourists are males while the rest of 32.67 per cent of them are females. The results indicate that about 71.33 per cent of the domestic tourists are married and the rest of 28.67 per cent of them are unmarried.

It is observed that about 46.00 per cent of the domestic tourists belong to the age group of 31-40 years followed by 21-30 years (35.33 per cent), more than 40 years (11.67 per cent) and less than 20 years (7.00 per cent). It is clear that about 42.00 per cent of the domestic tourists are graduates followed by higher secondary education (28.00 per cent), post graduation (17.33 per cent) and secondary education (12.67 per cent).

It is apparent that about 40.67 per cent of domestic tourists are employed in Government sector followed by private sector (26.33 per cent), business (18.67 per cent) and MNCs (14.33 per cent). The results reveal that about 44.67 per cent of the domestic tourists belong to the monthly income group of Rs.15,001 – Rs.20,000 followed by below Rs.15,000 (26.33 per cent), Rs.20,001 – Rs.30,000 (16.00 per cent) and above Rs.30,000 (13.00 per cent).

Table 1  
Socio-Economic Status of Domestic Tourists

Personal Profile	Domestic Tourists (N = 300)		Personal Profile	Domestic Tourists (N = 300)	
	Frequency	Percent		Frequency	Percent
<b>Gender</b>			<b>Marital Status</b>		
Male	202	67.33	Married	214	71.33
Female	98	32.67	Unmarried	86	28.67
<b>Age Group</b>			<b>Educational Qualification</b>		
Below 20 years	21	7.00	Secondary	38	12.67
21 – 30 years	106	35.33	Higher Secondary	84	28.00
31 – 40 years	138	46.00	Graduation	126	42.00
Above 40 years	35	11.67	Post Graduation	52	17.33
<b>Occupation</b>			<b>Monthly Income</b>		
Business	56	18.67	Below Rs.15,000	79	26.33
Government	122	40.67	Rs.15,001 – Rs.20,000	134	44.67
Private	79	26.33	Rs.20,001 – Rs.30,000	48	16.00
MNCs	43	14.33	Above Rs.30,000	39	13.00

Source: Primary Data

### *Identification of Service Quality Dimensions for Domestic Tourism*

In order to identify the service quality dimensions for domestic tourism, exploratory factor analysis has been employed. The principal component method of factor analysis was carried out with Eigen values greater than one through Varimax Rotation and the results obtained through rotated component matrix are presented in Table 2. The results of Kaiser-Meyer-Olkin (KMO test) measure of sampling adequacy (KMO = 0.710) and Bartlett's test of Sphericity (Chi-square value = 0.0012; significance = 0.000) indicates that the factor analysis method is appropriate.

There are five independent groups which are extracted accounting for a total of 72.12 per cent of variations on 19 service quality items. Each of the five factors contributes to 19.87 per cent, 16.59 per cent, 13.94 per cent, 11.40 per cent and 10.32 per cent respectively.

Table 2  
Factors Affecting Service Quality in Domestic Tourism-Exploratory Factor Analysis

<b>Factor</b>	<b>Item</b>	<b>Rotated Factor Loadings</b>	<b>Eigen Value</b>	<b>% of Variation</b>	<b>Factor Name</b>
<b>I</b>	Being served by the appropriate personnel	0.80	1.96	19.87	<b>Assurance</b>
	Fluent and understandable communication with tourists	0.76			
	Experienced and competent tour and hotel escorts	-0.70			
	Reinforcement of tourists' confidence	0.80			
<b>II</b>	Prompt response to tourists' requests	0.76	1.84	16.59	<b>Responsiveness</b>
	Provision of information on local entertainment	-0.70			
	Willingness to help tourists; and advice on how to use free time	0.66			
	Provision of adequate information about the service delivered	0.59			
<b>III</b>	Meeting the tour schedule	0.72	1.62	13.94	<b>Reliability</b>
	Keeping promises	0.68			
	No sudden increase in tour cost	-0.64			
	Insisting on error-free service	0.82			
<b>IV</b>	Availability of information documents and notes	-0.74	1.25	11.40	<b>Tangibility</b>
	Physical appearance of tour and hotel escorts	0.62			
	Appealing accommodation facilities	-0.70			
	Modern and technologically relevant vehicles	0.68			
<b>V</b>	Pleasant, friendly personnel	0.63	1.14	10.32	<b>Responsibility</b>
	Understanding of specific needs	0.72			
	Cultivation of friendly relationship	0.62			
	<b>Cumulative % of Variation</b>			<b>72.12</b>	
	<b>Cronbach's Alpha</b>				<b>0.84</b>

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 10 iterations.

**Factor - I:** From the table, it is inferred that out of 19 service quality items, four variables have their high, relatively tightly grouped factor loadings on factor - I and it accounts for 19.87 per cent of the variance. This factor consists of:

- Being served by the appropriate personnel (0.80)
- Fluent and understandable communication with tourists (0.76)
- Experienced and competent tour and hotel escorts (0.70)
- Reinforcement of tourists' confidence (0.80)

Hence, this factor is named as “**ASSURANCE**”.

**Factor - II:** is formed with the following items and it contributes to 16.59 per cent of variance.

- Prompt response to tourists' requests (0.76)
- Provision of information on local entertainment (-0.70)
- Willingness to help tourists; and advice on how to use free time (0.66)
- Provision of adequate information about the service delivered (0.59)

These four variables are named as “**RESPONSIVENESS**”.

**Factor - III:** This factor includes the following variable and it accounts 13.94 per cent of variation.

- Meeting the tour schedule (0.72)
- Keeping promises (0.68)
- No sudden increase in tour cost (-0.64)
- Insisting on error-free service (0.82)

These four variables are named as “**RELIABILITY**”.

**Factor - IV:** This factor is formed with the following items and it contributes to 11.40 per cent of variation.

- Availability of information documents and notes (-0.74)
- Physical appearance of tour and hotel escorts (0.62)
- Appealing accommodation facilities (-0.70)
- Modern and technologically relevant vehicles (0.68)

These four variables are named as “**TANGIBILITY**”.

**Factor - V:** This factor includes the following variables and it accounts for 10.32 per cent of variation.

- Pleasant, friendly personnel (0.63)
- Understanding of specific needs (0.72)
- Cultivation of friendly relationship (0.62)

These three variables are named as “**RESPONSIBILITY**”.

It is inferred that assurance, responsiveness, reliability, tangibility and responsibility are the service quality dimensions for domestic tourism.

## IMPACT OF SERVICE QUALITY DIMENSIONS ON SATISFACTION OF DOMESTIC TOURISTS

In order to examine the impact of service quality dimensions on satisfaction of domestic tourists, the multiple linear regression model has been employed and the results are presented in Table 3. In this regression model, tourist satisfaction is considered as dependent variable and service quality dimensions are included as independent variables.

Table3  
Impact of Service Quality Dimensions on Tourist Satisfaction – Multiple Regression

Service Quality Dimensions	Regression Co-efficients	t - Value	Sig.
Constant	14.164**	6.960	.000
Assurance (X <sub>1</sub> )	3.124**	6.524	.000
Responsiveness (X <sub>2</sub> )	4.136**	6.312	.000
Reliability (X <sub>3</sub> )	4.260**	6.248	.000
Tangibility (X <sub>4</sub> )	1.924	1.126	.524
Responsibility (X <sub>5</sub> )	4.132**	6.454	.000
R <sup>2</sup>	0.69		
Adjusted R <sup>2</sup>	0.67		
F	16.327		0.00
N	300		

Note: \*\* Significance at one per cent level

It is apparent that there is a strong relationship between service quality dimensions and tourist satisfaction in domestic tourism. The adjusted R<sup>2</sup> is 0.67 indicating that the regression model is good fit and it indicates that about 67.00 per cent of the variance in the dependent variable of tourist satisfaction is explained by the independent variables of service quality dimensions. The regression model indicates a good fit (F value = 16.327 and p value = 0.00) between service quality dimensions and tourist satisfaction.

The results show that the service quality dimensions of assurance, responsiveness, reliability and responsibility have the positive impact on satisfaction of domestic tourists at one per cent level of significance. Hence, the null hypotheses of H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub> and H<sub>4</sub> are accepted but H<sub>5</sub> is rejected.

## CONCLUSION

The foregoing analysis shows that more than two-third of the domestic tourists are males. Most of the domestic tourists are married and the majority of them are middle-age groups. Most of the domestic tourists are graduates and are Government servants. Besides, the majority of the domestic tourists belong to the monthly income group of Rs.15,001 – Rs.20,000. The explanatory factor analysis identified the assurance, responsiveness, reliability; tangibility and responsibility are the service quality dimensions for domestic tourism. The regression analysis shows that the service quality dimensions of assurance, responsiveness, reliability and responsibility have the positive impact on satisfaction of domestic tourists.



Hence, the state tourism department and service providers of tourism should concentrate and improve the service quality dimensions of assurance, responsiveness, reliability and responsibility in order to attract more domestic tourists and in turn it would increase the both direct and indirect employment and revenue generation. It is apparent that state tourism sector needs to gain and maintain a competitive advantage if they are to survive in this highly competitive tourism sector in India. It is imperative to state tourism department should frequently assess their tourist's perceptions of service quality and develop appropriate policies to meet their tourists' needs. It is necessary to be a kind of co-operation between tourism departments and tourism private sector in the fields of tourism safety and tourism crisis management for improving TServQual in Tamil Nadu.

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# DEVELOPMENT OF A DECISION SUPPORT MODEL FOR OPTIMIZATION OF TOUR TIME TO VISIT TOURIST DESTINATION POINTS IN A CITY

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## ABSTRACT

Abstract-There may be a number of tourist destinations in a city; however, a tourist may have limited time that can be spent for tourism. The tourist may be interested to visit as many tourist destinations as possible in the limited time. In this situation, the tourist wants to optimize their travelling time and moments of leisure, taking the opportunity to visit the desired city attractions. This paper proposes a decision support model for optimization of tour time to visit tourist destination points in a city which deals with edge removal from a network and searching for alternate short routes to optimize the total tour time.

**Keywords-** *Optimization, network, tourist destination, tour time*

## INTRODUCTION

Mostly tourists visit a city for a few days. It is not possible to visit every tourist destination within a limited duration. Or, a tourist may not be interested to visit all the destinations. Tourists want to use their free time in an optimal way [1], [2]. Usually, the tourist has a preference list (wish list) of desired Points of Interest (POI). Generally, this personal selection is based on available information found on web sites, in articles in magazines or in guidebooks. Once the selection is made, the tourist has to decide on a route, to the POIs considering the available time.

Web based decision support applications can be very useful aids for tourists for tour planning. Based on the selection of POIs an optimal route between them can be identified [3]. Travelling Salesperson Problem (TSP) [4] can be used as a starting point to plan tour trips [5]. A mobile tourist guide [3] uses the Orienteering Problem (OP) [6] and its extensions to solve Tourist Trip Design Problems.

As the tourist is not visiting all the tourist destinations in the city network, the problem is not a TSP. A feasible solution of the TSP contains all the tourist destinations. However, the solution of this problem is a sub-tour in the original network of the city which contains POIs only; however, sub-tour is not a feasible solution in the TSP.

The OP is a combination of vertex selection and determining the shortest Hamiltonian path between the selected vertices. As a consequence, the OP can be seen as a combination between the Knapsack Problem and the TSP. The OP's goal is to maximise the total score collected, while the TSP tries to minimise the travel time or distance. Furthermore, not all vertices have to be visited in the OP. Determination of the shortest path between the selected vertices will be helpful to visit as many vertices as possible in the available time. The OP is the selective travelling salesperson problem [7], [8]. However, the tourist usually may start a tour from a nearby tourist attraction from the hotel where s/he stays and has to return back to the same location after completion of the tour. Furthermore, time spending at a vertex and the time to reach the vertex are independent and often contradictory to each other. This makes it difficult to select the vertices that will be part of the optimal solution. Therefore, heuristics may not efficiently explore the whole solution space. As the selected number of vertices in the network increases, the complexity of the problem and solution time increase rapidly [9]. In this context, solution of the problem as the TSP is less complicated rather than the solution as the OP.

This paper proposes a decision support model that optimizes tourist tour time based on the selected tourist destinations (POIs) by the tourist in the original network. The problem is proposed to be solved by reducing the tour problem from TSP in the original network to a reduced TSP in the reduced network. First, Section II presents modelling of the problem considering POIs. Next, Section III discusses the solution aspects of the problem. Section IV explains how the new model can be used to a tourist planning problem. Finally, Section V concludes the paper and points out some interesting research questions.

## MODELLING THE PROBLEM

A tourist TSP is a mathematical optimisation problem that consists of a set of locations. The pair wise travel times between the locations are known. The goal is to find a tour that minimises the total length during visiting the tourist destinations. The total tour time (in route and time spent at POIs) cannot exceed the maximum amount of time the tourist has available.

Each tourist destination can be visited at most once. Hence, the problem can be a TSP consisting of the POIs for optimization of travel time in the network and time to be spent at POIs can be added to find the total tour time.

The problem has a network with a set of  $N$  vertices in a graph  $G = (V, A)$  where  $V = \{v_1, \dots, v_N\}$  is the vertex set and  $A$  is the arc set. In this definition, the time to be spend  $T_i$  is associated with each vertex  $v_i \in V$  and the travel time  $t_{ij}$  is associated with each arc  $a_{ij} \in A$ . In this problem  $v_1$  coincides with  $v_N$ . Using the notation introduced above, the problem is formulated as an integer problem. The following decision variables are used:  $x_{ij} = 1$  if a visit to vertex  $i$  is followed by a visit to vertex  $j - 0$  otherwise defined only for  $i < j$ . For a symmetric TSP ( $t_{ij} = t_{ji}$ ), the problem can be formulated as follows [4]:

Minimise:

$$z = \sum_i^N \sum_{j>i}^N t_{ij} x_{ij} \quad (1)$$

Subject to:

$$\sum_{j>i}^N x_{ji} + \sum_{j>i}^N t_{ij} x_{ij} = 2 \quad \forall i \quad (2)$$

$$\sum_{i,j \in S} x_{ij} \leq |S| - 1 \quad \forall S \subset N \quad (3)$$

$$x_{ij} \in \{0,1\} \quad \forall i, j \quad (4)$$

The objective function (1) is to minimise travelling time in the network. Constraints (2) ensure the connectivity of the path and guarantee that every vertex is visited at most once. Constraints (3) are necessary to prevent sub-tours. Constraints (4) show the binary integrality. This formulation have a symmetric travel times between the vertices ( $t_{ij} = t_{ji}$ ). This corresponds to an undirected complete graph  $G$ .

Finally, the following equation (5) gives the total tour time which is minimum travel time plus time to be spent at each node  $i$ . This time is to be compared with time budget of the tourist ( $T < T_{max}$ ), maximum time available for tourism.

$$T = z + \sum_i^N T_i \quad \forall i \quad (5)$$

## SOLUTION APPROACH

A number of approaches offer solution of this type of problems. There are branch and bound and heuristic algorithms. Tour Planning in Mobile Tourism [10] uses a nearest neighbour approach, which iteratively adds the closest available visit to the tour. A dynamic tour guide search [11] uses a tree based search. Genetic algorithm can also be used to find near optimal solutions [12].

A city includes a number of tourist destinations connected by a transportation (road/rail) network. Considering the entire tourist destinations, we can form distance matrix in the transportation network. Commonly, shortest path algorithms such as Dijkstra [13] can be used to calculate distance between any two destinations in the network. Moreover, a short path matrix of the network can be found utilizing Floyd-Warshall algorithm [14] which gives the shortest distance to other destinations. We can mark POIs in the network. One way of planning a custom trip to a city is selecting hotel(s) and next filling the available time with POI visits in a nearest neighbour fashion, which may also indicate the nearby tourist destination as a starting destination of a tour.

From the short distance matrix, we can form a smaller network considering only POIs taking the edge as short distances between the POIs. In this way, the tour utilise the intermediate nodes and edges of the network through which it would be shorter to reach to desired destinations resulting to removal of some edges and nodes from the original network.

If the tourist visits all the tourist destination, the problem becomes a vertex weighted TSP. As the tourist usually have some POIs in the limited time budget, the network can be reduced to a smaller network. However, the entire network to be defined to minimize travelling distance between the POIs without considering the weight of non visiting nodes. Furthermore, the problem reduces to a smaller TSP which is a sub-tour within the original network. Then the problem can be solved as a TSP considering vertex weights using a standard algorithm such as Nearest Neighbour Algorithm. The complexity of the problem may be significantly reduced. The solution approach is implemented in the road network of Kathmandu city as a case study and presented in the following Section IV.

### APPLICATION OF THE MODEL IN KATHMANDU CITY NETWORK

Kathmandu, Nepal's capital is full of historical palaces and temples. Major POIs of tourist in Kathmandu city are Basantapur Durbar Square (with temples dating back to the 12th century), Boudhanath Stupa (a world heritage site), the Pashupatinath Temple (country's the most important Hindu temple, on the banks of the Bagmati river), the Royal Palace (the site of the infamous 2001 massacre of the Royal Family, and now converted into the Narayanhiti Palace Museum). The Swayambhunath Stupa (meaning the 'self-created' Stupa, aka the Monkey Temple on a hilltop to the west of Kathmandu), the Kopan Monastery (a gated community of Buddhist monks on a hilltop north of Boudhanath, the Royal Botanical Gardens (surrounded by an evergreen forest, are a site of outstanding beauty and the Garden of Dreams is a beautiful enclave in 5 minutes walking distance from the tourist centre of Thamel.

Kathmandu is also the gateway to the Bhaktapur Dubar Square and Patan Durbar Square. All the tourist destinations lie in the city road network as shown in Figure 1. Each destination is represented by a unique node number. This network shows only the 12 major tourist destinations in the city. The distance between the tourist destinations are estimated as time required in minutes to cover the distance based on the data provided by tour operators in Kathmandu city and these distances are presented in Table 1 in the form of distance matrix.

The short path matrix (Table 2) shows only the travelling time required in route. A minimum time is necessary at each tourist destinations. However, the spending time at a tourist destination depends on her/his interest at the tourist destination. For this test instance, time estimated in each tourist destination is shown in Table 3.

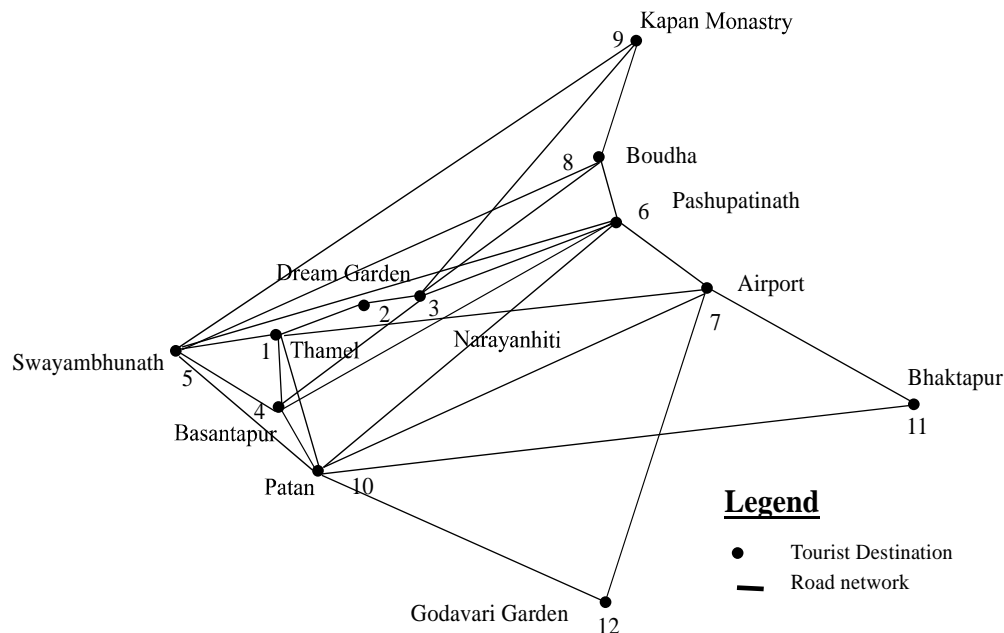


Figure 1: Major tourist destinations network in Kathmandu city

Table 1  
Distance Matrix (time in minutes)

Destination	node	1	2	3	4	5	6	7	8	9	10	11	12
Thamel	1	0	5	0	10	15	0	35	0	0	45	60	0
Dream Garden	2	5	0	5	0	0	0	0	0	0	0	0	0
Narayanhiti	3	0	5	0	10	0	30	0	40	45	0	0	0
Basantapur	4	10	0	10	0	15	30	0	0	0	45	0	0
Swayambhunath	5	15	0	0	15	0	45	0	50	55	55	0	0
Pashupatinath	6	0	0	30	30	45	0	5	10	0	15	0	0
Airport	7	35	0	0	0	0	5	0	0	0	25	20	60
Boudha	8	0	0	40	0	50	10	0	0	10	0	0	0
Kapan Monastery	9	0	0	45	0	55	0	0	10	0	0	0	0
Patan	10	45	0	0	45	55	15	25	0	0	0	40	45
Bhaktapur	11	60	0	0	0	0	0	20	0	0	40	0	0
Godavari Garden	12	0	0	0	0	0	0	60	0	0	45	0	0

A short path matrix is calculated using Floyd-Warshall algorithm and presented in Table 2.

Table 2  
Short Path Matrix (time in minutes)

Destination	node	1	2	3	4	5	6	7	8	9	10	11	12
Thamel	1	0	5	10	10	15	40	35	50	55	45	55	90
Dream Garden	2	5	0	5	15	20	35	40	45	50	50	60	95
Narayanhiti	3	10	5	0	10	25	30	35	40	45	45	55	90
Basantapur	4	10	15	10	0	15	30	35	40	50	45	55	90
Swayambhunath	5	15	20	25	15	0	45	50	50	55	55	70	100
Pashupatinath	6	40	35	30	30	45	0	5	10	20	15	25	60
Airport	7	35	40	35	35	50	5	0	15	25	20	20	60
Boudha	8	50	45	40	40	50	10	15	0	10	25	35	70
Kapan Monastery	9	55	50	45	50	55	20	25	10	0	35	45	80
Patan	10	45	50	45	45	55	15	20	25	35	0	40	45
Bhaktapur	11	55	60	55	55	70	25	20	35	45	40	0	80
Godavari Garden	12	90	95	90	90	100	60	60	70	80	45	80	0

Table 3  
Spending time at tourist destinations

Destination	Node	Minimum Time in minutes ( $T_i$ )	Range of spending time
Thamel	1	0	2-8 hours (1day)
Dream Garden	2	120	2-3 hours
Narayanhiti	3	120	
Basantapur	4	120	2-8 hours (1 day)
Swayambhunath	5	60	1-2 hours
Pashupatinath	6	120	2-8 hours (1 day)
Airport	7	-	
Boudha	8	60	1-2 hours
Kapan Monastery	9	120	2-8 hours (1 day)
Patan	10	120	2-8 hours (1 day)
Bhaktapur	11	120	2-8 hours (1 day)
Godavari Garden	12	180	3-8 hours (1 day)

For this test instance of the model developed, let us assume a tourist has only a day ( $T_{max} = 8$  hours) for tourism in Kathmandu city. Depending on her/his interest, s/he can design a trip in the city based on the information in Figure 1, Table 1, Table 2, and Table 3. For example, the tourist stays at Thamel and plans a tour her/his POIs are Basantapur, Swayambhunath, Pashupatinath, Patan and Boudha as shown in Figure 2, which is the reduced network from the original network (Figure 1) and time required for travelling is 95 minutes based on the solution of reduced TSP with nodes 1, 4, 5, 6, 8, and 10 and solution of this TSP is 1-8-6-10-4-5-1 (Figure 2(b)), using nearest neighbour algorithm. The time s/he has estimated to spend in the POIs is 480 minutes from Table 3. The total tour time is 575 minutes ( $T = 9$  hours 35 minutes) which exceeds  $T_{max}$ , hence, is not be feasible and s/he may drop one POI (e.g. Patan, node 10). The network is further reduced because of removal of node 10 and edges 6-10 and 10-4 in the previous reduced network as shown in Figure 3. Then solving for the network, total tour time required will be 435 (75 + 360) minutes ( $T = 7$  hours 15 minutes) with solution 1-8-6-4-5-1 (Figure 3(b)) which is a feasible solution in the time budget.

The network shown in Figure 2 is the reduced network from the original network which includes the POIs among the tourist destinations; however, the network inherits the properties of the original network. We can note that the distance between the POIs is the shortest distance from the original network. For example, distance from 1 to 6 in Figure 3(a) is 20 minutes which is sum of distance 1 to 2, 2 to 3, and 3 to 6 although node 2 and node 3 is not seen in the reduced network. In this way node 2 and node 3 and edges 1-2, 2-3 and 3-6 is removed and replaced by 1-6. The problem size is reduced. Then, we can use simply nearest neighbour algorithm to solve the problem as a TSP in which the tourist starts from POI 1, makes tour to all POIs and returns back to POI 1. For this, the solution is 1-8-6-4-5-1(Figure 3(b)). A tourist can hire a car or consult a tour operator and enjoy the trip with maximum utilization and optimization of precise time for leisure.

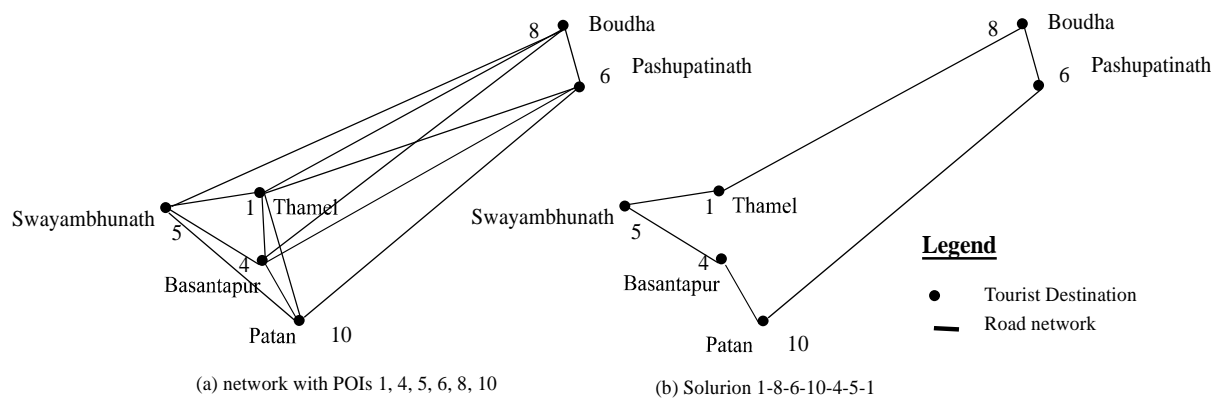


Figure 2: Reduced network with POIs 1, 4, 5, 6, 8, 10

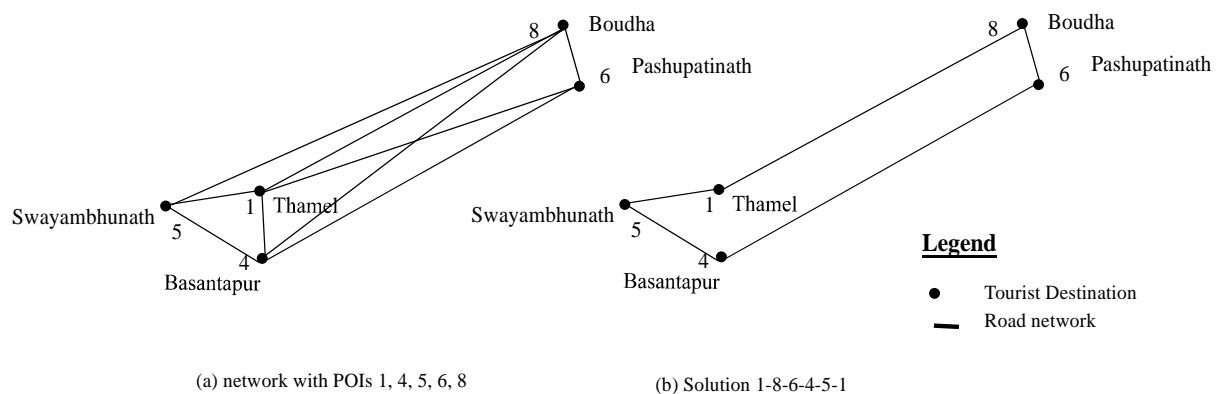


Figure 3: Reduced network with POIs 1, 4, 5, 6, 8

This implementation of model to Kathmandu city shows that the model developed in this paper is applicable to solve tourist trip panning in a city. Also this model is applicable to urgent delivery of goods at different locations such as fuel.

## CONCLUSIONS AND FUTURE WORKS

The proposed decision support model can integrate selection and routing of tourist destinations taking as a TSP. A big network can be reduced to a smaller network considering POIs which significantly reduces the complexity of the problem. Standard solution techniques such as nearest neighbour algorithm can be used as the removal of nodes and edges reduces the problem to a simple and handy. Hence, the model can be considered as a practical way of solution for tour time optimization in a city network.

Future work includes development of decision support model incorporating support for hotel selection and tour time optimization based on POIs in a city.

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# COMMUNITY AND TOURISM BENEFITS FROM BUILDING CONSERVATION WORKING WITH SOCIAL ENTERPRISE CASE STUDY: THE COMMUNITY MUSEUM BAAN LUANG RAJAMAITRI, CHANTHABOON COMMUNITY, CHANTHABURI PROVINCE

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## ABSTRACT

The conservation of heritage buildings can be accomplished by applying the idea of social enterprise in the real practice. Social enterprise is a business operation that utilize local products and services. It aims at developing and solving problems in local community or society by bringing profit from the investment. According to its philosophy, working approach of social enterprise will not depend on the subsidy from governments or donators from charities. A social enterprise can also work as local community learning center that people can gain their knowledge about local history, indigenous knowledge, tourism and community participation. Finally, the local community will be strengthened that it becomes a self – reliance community.

Chanthaboon Waterfront Community was once an old community of the Chinese and Vietnamese in the early settlement since the late Ayutthaya period up until the present time. With that reason, there are cultural diversities among the local Thai, Chinese and Vietnamese in the local community. Chanthaboon Waterfront Community has long been a prosperous port town before it is revitalized to be a commercial and tourism area. With the significant historic value, the community should be conserved as a learning community and promoted as cultural tourism site. Local architectural pattern in the community shares similar characteristics. They are traditional shophouses with beautiful carved wood ornaments on doors and windows since it was influenced from international trading in the old days. With the awareness about the significant values of outstanding architectural pattern, the local community has started the conservation and revitalization process. Finally, they come up with the conservation concept of “cultural leads economic growth”. The concept is expected to be able to conserve local architectural pattern as well as revitalize local community sustainably. It is believed that cultural tourism will protect and preserve traditional local way of life as well as socio – cultural dimension and economic. However, the development must not have negative impact to the local community or concern only the benefit from tourism.

The conservation practice of Baan Luang Rajamaitri Historic Inn, a high significant value historic building, came up with an idea of social enterprise for architectural conservation and revitalization of historic fabric. It was chosen to be renovated as community learning center and historic inn. The project is an example showing the motivation in conservation and community development works. Furthermore, the scheme also contributes to the participation among the local, who learn to rely on themselves by applying the concept of social enterprise in conserving historic building and revitalizing historic district. The project started from fundraising from local people, Chanthaburi people and interested people. There were over 500 people who had strong intension in conserving and developing Baan Luang Rajamaitri into learning center and historic inn. Part of the income will be used to developed local community in a long term. The researcher team had followed the turnover for 2 years since the grand opening date. The conservation project on Baan Luang Rajamaitri Historic Inn can make a great revenue to shareholders and society. It also gains a huge attention and interest from organizations, tourists and mass media. Moreover, it also got the Award of Merit from UNESCO Asia-Pacific, FuturArc Green Leadership Award 2015 from BCI Asia, and etc. With that reason, the project should be considered as a successful social enterprise that gain a lot of praise and appreciation in both domestic and international level.

**Keyword:** Tourism Benefits, Community Benefits, Social Enterprise, Building Conservation

## INTRODUCTION

Located on the east side of Chanthaburi River, Chanthaboon Waterfront Community is well-established oversea Chinese and Vietnamese people community. It was one of the significant economic centers in the Reign

of King Rama V. Most of the buildings are residential area and shops that are almost 100 years old. The shophouses are decorated with beautiful wood craft ornament. With an influence from trading with the Western, there are some gingerbread house in the community as well. The wooden craft of Chanthaburi people also shows their identity. With the stated reason, the community should be conserved as an outstanding historic district that needs to be preserved for the latter generation.

People in Chanthaboon Waterfront Community had selected a high significance value building in the community as to sustain the value and spirit of the place. The selected fabric was Luang Rajamaitri Historic Inn. According to record, Luang Rajamaitri was the first person who brought and started rubber plantation business in Chanthaburi. He was then widely known as “Father of rubber plantation in the East”. With that reason, people in the community had gathered together as to established an enterprise aiming at conserving and revitalizing the community. They finally came up with the idea of renovating the historic inn by applying the idea of Social Enterprise for Architecture Conservation and Revitalization Historic District and set up Self-reliance community center. The community center started from fund raising among local people, people in Chanthaburi province and interested people. Although they came from different background and section, they somehow shared the same idea of conserving and revitalizing Luang Rajamaitri Historic Inn as the community learning center as well as historic inn. Today, the historic inn can be divided into 2 sections; museum and resident zone. It’s the social enterprise that local people were parts of designing working policies and bring the profit back to the community. In other word, the revitalization process can bring about suited as sustainable development to the community.

## **LITERATURE REVIEW**

### **The management of nonprofit organization**

1. Social enterprise means businesses that mainly earn their income from selling or producing goods and/or services. The goal determining objectives of the enterprise must be clearly stated during the establishment time. The purpose of the enterprise should be for improving local people quality of life and solving problems in the community. However, the enterprise does not aim at earning maximum profit for the shareholders and owners. (Thai Social Enterprise Office, 2010)

2. Social enterprise aims at finding solution for social and environmental problems. It also utilizes good managing mechanism from business section together with knowledge and innovation. As a result, social enterprise is a sustainable economic system that its main income came from producing goods and/or services. Without depending on donation, social enterprise earns its own income and invest the money to create wider social impact. (SCG. Green Me, 2015) The exclusive attribute of social enterprise can be divided into 5 aspects; highlighting the important for social and environment, proceeding the sustainable financial system, becoming an environmental and social friendly, bringing back profit to the local community and having transparency management.

## **METHODOLOGY**

### **1. Qualitative Research applied 2 data collecting methods, which are;**

1.1 In depth interview aims at getting in-depth information about the management of the social enterprise. The in depth interviewees are project founder, project architects from Arsom Silp Institute of the Arts, managing director of Chanthaboon Rak Dee Co., Ltd. and office manager of Luang Rajamaitri Historic Inn Museum.

1.2 Group discussion aims at exchanging knowledge and opinion, searching for problems and obstacles as well as solving problems in all aspects. The researcher had participated and observed in local activities or meeting among local stakeholders.

### **2. Data gathering process**

The data gathering process and data type that applied in the data analyzing process are as followed; gathering data from related document, interviewing project manager as to check the business outcome and interviewing the manager of Luang Rajamaitri Historic Inn as to derive the information about participation among the locals.

### **3. Data analyzing and conclusion**

#### **3.1 Comparing business turnover with the target goal**

## RESULTS

Since 2009, Chanthaboon riverside community had cooperated with Chanthaburi Provincial Commercial Office, Arsom Silp Institute of the Arts and related agents. They had conserved and revitalized the waterfront community with the vision “commercial culture”. They expected that the architectural conservation and revitalization will be sustained and be able to retain local way of life in both socio cultural and economic that did not develop according to the current flow of tourism. Chanthaboon riverside community cooperated with Chanthaboon Rak Dee Co., Ltd., founded by Arsom Silp Institute of the Arts, had set themselves as an example of participation in conservation and self-reliance learning center that applied the idea of social enterprise for architectural conservation and historic district revitalization in the real practice. The project started from raising fund from the local, people in Chanthaburi and interested people, who shared the same intention in conserving Luang Rajamaitri Historic Inn as a local learning center and historic residency. The estimated budget was about 8.8 million Baht

### 1. The identification of significant value

#### 1.1 The identification of significant value of Luang Rajamaitri Historic Inn

According to the data collecting process from related document and oral literature, it was found out that Luang Rajamaitri Historic Inn has high historic value as below;

##### 1.1.1 Personal value

Luang Rajamaitri had done a lot for the benefit of Chanthaburi Province and waterfront community in both economic and social.

##### 1.1.2 Building value

The historic inn is an archaeological site that can be dated back over 120 years. It got architectural influence from Shino - Portugese architectural pattern.



(1)



(2)

Fig.1, (1) Before renovation, Luang Rajamaitri's house

(2) After renovation, Luang Rajamaitri historic inn

According to the data analysis, it showed that the conservation of the significant value of the site could not be separated. Since Luang Rajamaitri had lived his life in this historic inn, it was impossible for the idea of conservation must show his favor and goodness as well.

### 1.2 The identification of social and community value

The idea of conserving Luang Rajamaitri historic Inn was derived from the idea of social enterprise. It was a good example for driving the idea of conservation forward and developing Chanthaboon Waterfront Community. The real objective of the project did not operate for only business achievement. However, it was the tool to create local community participation that aimed at sustaining local way of life and

creating the sense of owner among local community. Moreover, the idea would lead to the renovation of private assets as learning centers. The community itself would directly get the benefit in terms of academic, social and economic from the conservation practice.

## 2. Local community and social participation

The concept of the project and the operation of social enterprise and environment by social and local community are as followed;

### 2.1 Project establishment

The social enterprise project on conserving and revitalizing the old community: Chanthaboon waterfront community came from the cooperation between local stakeholders and Arsom Silp Institute of the Arts. They had drawn objective, policy and working plan together. Furthermore, they also studied business possibility, financial, investment and social enterprise under the name of Chanthaboon Rak Dee Co., Ltd.,.

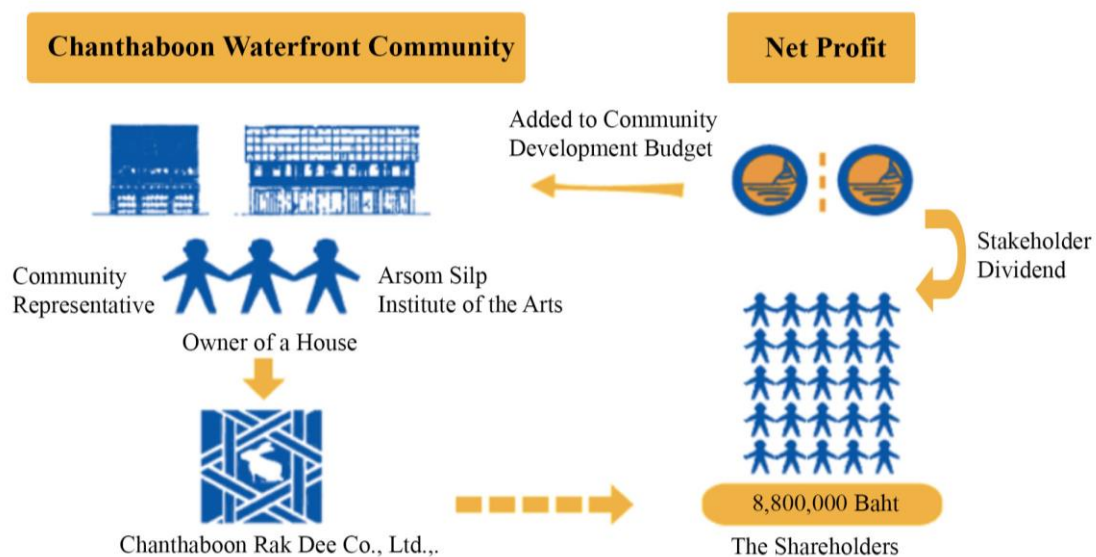


Fig.2 The operation of social enterprise of Luang Rajamaitri historic Inn

Source: Chanthaboon Rak Dee Co., Ltd.,

### 2.2 Fund raising and profit allocation

At the first place, the raised fund was used in renovate and decorate buildings in the community. With the budget of 8.8 million Baht, people in the community, Chanthaburi people as well as interested people could be a shareholder (1,000 Baht/share). Finally, profit after deducting expenses would be returned to the shareholders and added to community development budget.

### 2.3 Return of investment and privilege of shareholder

Referring to the hypothesis, it stated that if the average occupancy rate was 60% per year, the project would be able to get the payback by 10 years and dividend after the business gained profit. The issue can be changed referring to the resolution of the committee.

## CONCLUSION

Business turnover from the business performance reports during 2014 - 2016 was used in the analysis of the comparison between income statements. According to the business performance in Table 1, the researcher found out that the project got higher profit despite the increasing total expense. Because of the recent price adjustment of accommodation by 10 percent, the total revenue from the business went higher than the expenditure. The community as a result could bring the revenue to develop and improve the whole community.

**Table 1. Shows the comparison between income statement during 2014 - 2016**

<b>Account name</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Income			
Service revenue	1,007,339.30	3,515,037.09	3,915,126.49
Interest received	101,629.06	10,004.44	4,728.56
<b>Total Income</b>	<b>1,109,028.36</b>	<b>3,525,041.53</b>	<b>3,919,855.05</b>
Expense			
Cost of sales and services	875,527.76	2,818,555.05	2,782,908.21
Selling expense	-	165,851.30	296,652.28
Administrative expense	2,033,947.04	468,876.85	351,792.96
<b>Total Expense</b>	<b>2,909,475.04</b>	<b>3,287,431.90</b>	<b>3,431,353.45</b>
<b>Total Profit and Loss Statement</b>	<b>-1,800,446.68</b>	<b>237,609.63</b>	<b>488,501.60</b>

Source: Researcher comparison analysis from ordinary shareholder's meeting (2014 - 2016)

## 2. Overall achievement on conservation projects

After Luang Rajamaitri Historic Inn has opened for public since October 23<sup>rd</sup>, 2014, the historic inn itself has got a lot of praise and appreciation from people in both domestic and international level. This phenomenon brought pride and happiness to people in Chanthaboon Waterfront Community. The community got many awards as below;

2.1 Best architectural heritage conservation project on shophouses Award from the Association of Siamese Architects under Royal Patronage.

2.2 FuturArc Green Leadership Award 2015 from BCI Asia is the leader of documenting the details of construction projects together with FuturArc Magazine in development projects that affect to Social-Inclusive Development.

2.3 Award of Merit from UNESCO Asia-Pacific had praised the conservation project by saying that the project was an innovation of conserving the town's heritage. They had also raised investment fund from more than 500 shareholders.

2.4 It was ranked as the number one tourism site that had highest number of guests in Chanthaburi by getting 8.9 points out of 10 from www.Booking.com.

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# THE STUDY OF SMOKED FIRING TRADITIONAL WISDOM TO DEVELOP DECORATING TECHNIQUE IN CONTEMPORARY DESIGN

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## ABSTRACT

**Abstract**— This research is a study on the smoke carbon process that found from the traditional pottery, to apply the finding from the experiment discovery in contemporary pottery art creative. From the study of the history and methods of carbon-tapping techniques of Southeast, it can be found that the pattern of contemporary pottery work, which still plays important role for living of Southeast Asian society. From the study, the researcher has studied the various dimensions of the experiment and the factors that may be the cause of smoke carbon, both in the form of carbon that caused by the piling up of fuels and the flames. By controlling factors on the raw material or fuels, the deposition of ashes and air ventilator with the proportions and factors of kiln and demonstrate the control result by its application. The result products is a collection of pottery from the carbon-tapping process that inspired by the form of the wickerwork, which is the symbol expressing the effect of beauty caused by Southeast Asian people wisdom.

Based on the findings of the experiment that can be used to control carbon-tapping, it was found that the material factor affects the amount of carbon and the duration of temperatures occurring inside the kiln. The factors affecting the deposition of ash, that affects the carbon smoke on work pieces surface, according to the subsidence level of ash, and air ventilation factors affect the position of the carbon as the direction controlled by the operation of the kiln wall

**Keyword:** Carbon tapping, Smoking technique

## INTRODUCTION

The ancient technique of smoke-firing transforms raw clay into functional ceramics, while the porous and unglazed ceramic surface is imprinted with carbon, creating patterns around resist materials, or blackening the surface completely. Smoke-fired pottery is a unique record of collaboration between heat, chemistry, culture and creativity. The method has its roots in traditional pottery, but its technological simplicity lends itself to contemporary artistic experimentation. Looking to smoke-firing techniques of Southeast Asian ceramic craftsmen, I demonstrate how traditional kiln design and firing techniques can be developed to support a contemporary Southeast Asian ceramic expression. While clay quality, shape, and surface texture are most often referenced to critique works of ceramic art, this investigation asserts that smoke-firing techniques for carbon control are not only an important element in achieving desired aesthetic effects, but also an essential tool in understanding socio-environmental innovation and art-form.

Erstwhile, pottery symbolized man's civilization. It was not only reflected an idea of innovation, established understandings toward creativity and existence, but also underlined the significant difference in human's capability that distinguished us from all of the other species living and sharing in this same harmonious world. Furthermore, the knowledge of adapting and using natural materials, such as soil, which has already existed in the environment and noticeable the ability in shaping until delivered some fundamental technologies had made the process of creativity become touchable. Consequently, that knowledge of our ancestors has been descended from generation to generation until today. However, in the present day, the pattern of the earthen ware has been changed from the time of their origin influenced by these two factors. Widely know that the pre-historic human had created pottery in order to triturating the seeds to be ready for eating. It can also be noticed that even though, the technique and process in making those potteries to be permanent were austere conducted, and the products' value which

## RESEARCH OBJECTIVES

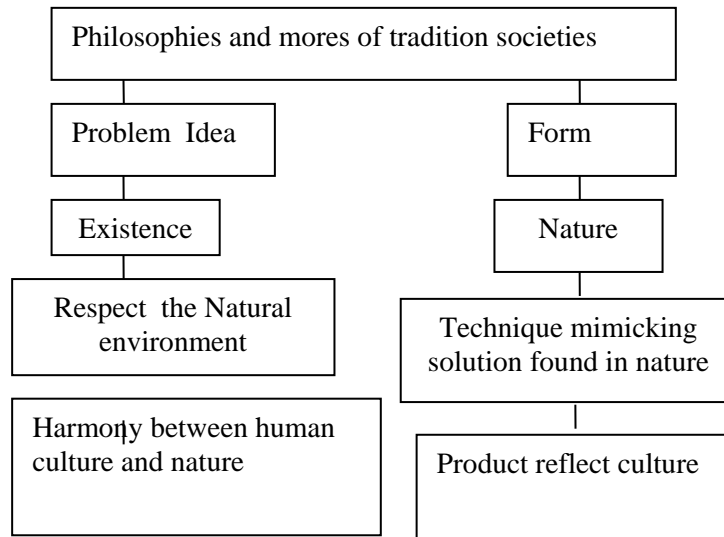
This research will

1. Investigate and evaluate particularly effective methods for smoke control with raw material fuel in various cultures, including traditional Thai cultures.
2. Demonstrate how these methods may be adapted and applied towards contemporary Thai artistic methods.

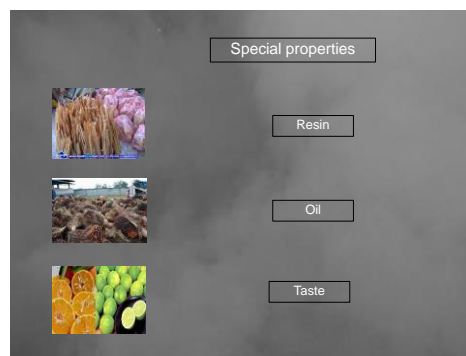
## RESEARCH SCOPE

This research will demonstrate how smoke can be controlled with the fuel in environment and applied to achieve desired aesthetic qualities in ceramic forms. While aesthetics. Those affect each region to have different forms. Any raw materials have different properties that depend on sizes, kinds and humidity. This research used the different properties material to fire that influence the temperature in the procedure and to express aesthetics.

## METHODOLOGY

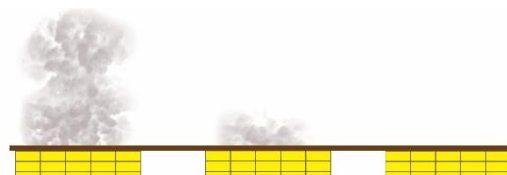


## RAW MATERIAL

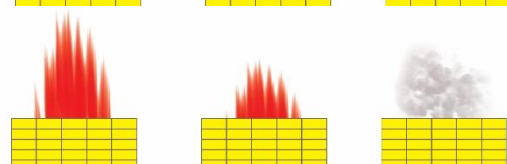


It is the experiment according to the hypothesis that the smoke is formed by the flame of various fuels. In accordance with the observation, the researcher sets many variables to compare the qualifications of flame of each fuels by noticing smoke, flame, heat, appearance and the depth of carbon.

Oxidation



Reduction

























3 = much    2 = moderate    1 = little    0 = nothing

Behaviour of flame in the Oxidation and Reduction atmosphere

## RESULTS

The observation of firing with each material in stoneware and earthenware environmental

Material	Stoneware	Earthenware
Branch		
Sprig		
Hardwood		
Paddy		
Dry leave		
Sugarcane		
Hyacinth		
Sedge		
Pine		
Straw		

The researchers found significant differences in the properties of the temperature of each type of material. Thus, the the researcher has constructed the parameter in order to observe the effects of carbon particles that are

caused by the fuel on the basic form (cylinder, size 10 cm) with a firing maximum of 100 liters, stoneware clay was used in the experiment since this type of clay can distinctly differentiate the weight of carbon on the pottery surface more than earthenware.

## CONCLUSION

The result of the experiment recommends to try to control smoke firing to be evident about many logical to make a smoke composition happen, some time it is by accident in the moment of fired it appear to beautiful marvelous on the pottery. Even then though the smoke is difficult to understand because it's a simple technique from natural. Some how from a past of test to understand some aspect is possible to control a smoke firing in a process. Factor main variable fuel Factor

1 Row materials	}	1 Humidity
2 Properties		2 Ventilator air
3 Densities		3 Oxidation / Reduction
		4 Temperatures

Now, knowledge about artistic education is most important factor to impart inspiration and understanding to get appropriate aesthetic development. It will add new styles of contemporary art and integrate with another kind of technique and from knowledge of different cultures it has the potential to complete the subject area of study, if used carefully. It is important to express about unity in local style to translate the meaning of spirit of the life. If preserved carefully, not only the knowledge will last long, but also make the Thai local cultures rise at the international arena and be remembered by the future generations.

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# EFFECTIVENESS OF DRAMA ANALYTICAL READING IN IMPROVING CRITICAL WRITING AND ATTITUDES TOWARDS WRITING

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## ABSTRACT

Critical reading and writing are considered the sophisticated skills to be learned and trained. As a reader, we need to evaluate the writer's arguments, whereas, we make sure our arguments are strong and justified when we become the writer. To train undergraduates to read and write critically, it is advised that the sources to be read must have healthy criticism. The purposes of the study were to 1) test the efficiency of drama analytical reading in improving critical writing with third-year English-major undergraduates after they analytically read two famous plays from British and American literature namely *Arms and the Man* by George Bernard Shaw and *Death of a Salesman* by Arthur Miller, and 2) to investigate their attitudes towards writing in English. Twenty-four third-year English-major students, Faculty of Education, Suan Sunandha Rajabhat University, were taught the techniques of critical and analytical reading. They were assigned to write critically about the two plays after reading through the stages of drama analytical reading. Then, they were assigned to write critically about the unseen topic including summary writing and creative writing. The experimental research lasted 8 weeks. The participants' pretest and posttest papers were read and scored by using ESL Composition Profile as a guide. It was found that the efficiency of drama analytical reading in improving critical writing was 81.46/81.67 for the formative tests and the posttest respectively, exceeding the expected criterion (80/80). The students' attitudes towards writing were shown positive through their self-assessment notes.

**Keywords:** analytical reading, critical writing, learning English through drama

## INTRODUCTION

Analytical reading or critical reading is the most deliberate kind of reading. It goes beyond literal and inferential comprehension. Critical reading means judging, evaluating, weighing the writer's words carefully, and applying your reasoning powers. It requires both an open mind and developing a healthy skepticism. [1] Therefore, it is very important for university students to learn how to read and write critically. Critical reading and writing, these sophisticated skills, thus, need to be learned and trained. As a reader, we need to evaluate the writer's arguments, whereas, we make sure our arguments are strong and justified when we become the writer.

At the research site, Faculty of Education, Suan Sunandha Rajabhat University, a critical reading and writing course is offered students opportunity to think, read and write carefully and critically. In the curriculum, English-major undergraduates have to study at least three reading and writing courses; namely, Reading and Writing for General Purposes, Critical Reading and Writing in English, and Reading and Writing for English Language Teachers. Normally, Critical Reading and Writing in English is placed the second, which requires Reading and Writing for General Purposes as a pre-requisite course. In Reading and Writing for General Purposes, students are trained the basic reading skills: finding word meanings from dictionary use, context clues including synonyms, antonyms, definition, restatement, cause-effect relationship, contrast meanings, and Greek and Latin roots, prefixes and suffixes; previewing, predicting, skimming and scanning; and finding topics and main ideas in paragraph(s). In Critical Reading and Writing in English, students continue practicing reading and writing with higher-order thinking skills. They study patterns of the text organization like sequencing the events, cause and effect, comparison and contrast; summarizing, making inferences, separating facts from opinions, finding the author's mood and tone of the text. Then, Reading and Writing for English Language Teachers will focus on reading and writing about English pedagogy.

To train undergraduates to read and write critically, it is advised that the sources to be read must have healthy criticism. Drama is one of the fruitful texts which allow students to think along so that they can practice reading and writing carefully. Drama is considered a genre or a style of literature. There are a multitude benefits to incorporate drama in English language teaching. [2] The written drama script is made of dialogue, the speeches of the characters; and stage directions, the descriptions of settings, characters and action. [3] Through reading and trying to understand these scripts, students involve with higher-order thinking skills, which are related to critical thinking. When learners are asked to write to express their opinions, they are thinking creatively. This type of text requires learners to be active. When a student is an active learner when s/he analyzes, evaluates, and creates. [4] In this research, two famous plays from British and American literature namely *Arms and the Man* by George Bernard Shaw and *Death of a Salesman* by Arthur Miller are selected as a tool for exercising critical reading and writing in English. The drama analytical reading process includes the following stages.

Stage 1: Introduce patterns of the text organization e.g. sequencing the events, cause and effect, comparison and contrast and how to summarize a text.

Stage 2: Introduce the written drama script which is made of dialogue, the speeches of the characters; and stage directions, the descriptions of settings, characters and action. Introduce the characters of the play and the settings. Then, take turns reading aloud the first scene of the play dialogues.

Stage 3: Divide into groups of four and discuss what happened. Write a summary of the first scene in 100 words as a group work.

Stage 4: Introduce how to make inferences; separate facts from opinions; find the author's mood and tone.

Stage 5: Read the whole play outside class.

Stage 6: In class in the same group, discuss what happened, how it happened and why it happened. How do we know? Which part in the play tells us about the qualities of each main character, both directly and indirectly? The group representative presents orally in front of the class about a main character; who s/he is, what happened with her/him, what s/he is like, what decision s/he made, and why the decision was made so.

Stage 7: In around 100 words, each student writes a new ending of the play freely.

## **METHODOLOGY**

The purposes of the study were to 1) test the efficiency of drama analytical reading in improving critical writing with third-year English-major undergraduates after they analytically read two famous plays from British and American literature namely *Arms and the Man* by George Bernard Shaw and *Death of a Salesman* by Arthur Miller, and 2) to investigate their attitudes towards writing in English. Twenty-four third-year English-major students, Faculty of Education, Suan Sunandha Rajabhat University, selected by purposive sampling technique, were taught the techniques of critical and analytical reading. They were assigned to read the two famous plays by using analytical reading techniques and write critically about the two plays after finishing reading them. Then, they were assigned to write critically about the unseen topic and expressed their attitudes towards writing. The experimental research lasted 8 weeks. The participants' final papers were read and scored by the same raters (two times in two-week gap) by using ESL Composition Profile as a guide.

### ***The timeline of the implementation of the process of the research***

**Table 1**

The timeline of the implementation process of the research

Week	Implementation	Instrument
1	Implementing pretest	Pretest (Writing a summary and free writing to create a new ending toward an unseen short play )
2-3	Implementing drama analytical reading and critical writing (according to stages 1-3) on “Arms and the Man” and taking a formative test 1	Lesson plan on “Arms and the Man” A formative test 1 on summary writing
4	Implementing drama analytical reading and critical writing (according to stages 4-7) on “Arms and the Man” and taking a formative test 2	Lesson plan on “Arms and the Man” A formative test 2 on free writing (critical and creative writing)
5-6	Implementing drama analytical reading and critical writing (according to stages 1-3) on “Death of a Salesman” and taking a formative test 3	Lesson plan on “Death of a Salesman” A formative test 3 on summary writing
7	Implementing drama analytical reading and critical writing (according to stages 4-7) on “Death of a Salesman” and taking a formative test 4	Lesson plan on “Death of a Salesman” A formative test 4 on free writing (critical and creative writing)
8	Implementing posttest	Posttest (Writing a summary and free writing to create a new ending toward an unseen short play )

#### ***The criteria for writing task scoring***

The criteria for writing task scoring in this research is the ESL composition Profile [5] considering 5 aspects of the written text; content (30%), organization (20%), vocabulary (20%), language use (25%), and mechanics (5%).

#### ***The students’ self-assessment notes***

After the students finished their posttest, they were asked to express their attitude towards writing in their self-assessment note freely without the limitation of the words. The following questions are used as a guide in their self-assessment note writing.

1. What was the goal of learning critical writing for you?
2. To what degree did you feel successful in achieving that goal?
3. Which areas of writing do you still need to work on?
4. Of all the writing tasks you have completed, which piece do you feel the best writing to be proud of and why?
5. Do you think you see your progress in writing in English?

## **RESULTS**

1. It was found that the efficiency of drama analytical reading in improving critical writing with third-year English-major undergraduates after they analytically read two famous plays was 81.46/81.67 percent for the practice tests and the posttest respectively, exceeding the expected criterion (80/80) as presented in Table 2.

**Table 2**

The results of the efficiency of the drama analytical reading in improving critical writing

Items	Practice Tests				Total	Posttest Score
	1	2	3	4		
Score of Practice Test	10	10	10	10	40	20
Number of Participants	24	24	24	24		
Total Score	168	192	200	216	776	392
Average Score	7.04	8.08	8.33	9.13	32.33	16.33
Percentage	70.42	80.83	83.33	91.25	81.46	81.67
<b>E1/E2</b>	<b>81.46</b>					<b>81.67</b>

E1/E2: E1 represents the percentage of the average of all scores the students earn from their activities or assignments as formative evaluation. In this research, they were called Formative Tests 1-4. E2 is the percentage of the average of all scores the students earn from their posttest, final examination. Thus, the E1/E2 is used to test the efficiency of the designed technique representing the process versus product ratio. [6]

2. The students' attitudes towards writing were shown positive. Their self-assessment notes revealed that they felt satisfied with their writing. They understood how to write a good summary much better than before. They felt relaxed when they are asked to write freely. However, most of them are still concerned about their grammar use. They are not confident in writing some sentences.

## CONCLUSION AND FUTURE WORK

In this research, two famous plays from British and American literature were selected as a tool for exercising critical reading and writing in English. The seven-stage analytical reading and writing were implemented including the pretest, 4 formative tests and posttest or the summative test.

The result revealed as follows.

1. The efficiency of drama analytical reading in improving critical writing with third-year English-major undergraduates after they analytically read two famous plays was 81.46/81.67 percent for the practice tests and the posttest respectively, exceeding the expected criterion (80/80). When examining the stages of applying drama in critical reading and writing, we can see that the students are asked to brainstorm, discuss in groups. The necessary vocabulary and language structures are also discussed in the meaningful way. These activities help build confidence and overcome vocabulary limitations. [7] The first writing task was also undertaken via group process. This allows some less confident students to feel safe that they still have their peers to help them along the writing process. From the last two stages, though students were asked to write individually, it was free-opinion writing, or creative writing. There would be no wrong answer in this writing. This task helps the students to enjoy creating new ideas without opinion judgment.

2. The students' attitudes towards writing were shown positive. Their self-assessment notes revealed that they felt satisfied with their writing. According to the self-assessment notes, the students first worried that they would not be able to write according to the given word number. However, along the group process, they were satisfied that they were not alone in the writing process. The assignment was not too difficult for them. Nevertheless, most of them are still concerned about their grammar use. This is normally the nature of the majority of Thai learners of foreign language. They still think that grammar is the most important part of foreign language learning. [8]

Results from the study have led to recommendations for pedagogical implications and recommendations for future research as follows.

1. According to the regular formative assessment during the implementation process, the learners are enthusiastic to pay attention to the result of each test. Their goal-oriented attitude towards writing becomes more positive. Thus, they pay much attention to the learning process.

2. As writing is the most challenging skill for Thai students, efforts should be devoted to the teaching of writing. The affective factors such as attitudes, confidence, and tension in doing writing tasks are very interesting to research. Further studies should be implemented on these affective factors in EFL writing.

### ACKNOWLEDGEMENTS

I would like to express my sincere thanks to Suan Sunandha Rajabhat University for invaluable help throughout this research.

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# THE SUPPLY MECHANISM OF PARKING MARKET AND ITS IMPLICATION FOR SUSTAINABLE TRANSPORT IN URBAN CHINA

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## ABSTRACT

Parking policy in China is characterized by “high regulation in supply and mispricing.” City governments rely on the “minimum parking requirement,” the conventional approach, to manage parking quantity, which shapes a unique phenomenon called the “developer-led supply pattern.” In this paper, we establish ordinary least square models to explore “spatial-mismatch” characteristics that result from the current parking policy and infer the latent mechanism of parking supply using geographical correlation analysis. In the case of Shenzhen, we found that few urban factors at the district level are involved in the decision making of developers regarding parking provision, which compromises the endeavor of creating sustainable transport and thus requires further policy intervention. Market force serves its role in strict planning regulations at the neighborhood level because of the dominant role of property developers. These models not only confirm the mismatch of parking supply with the objectives of sustainable urban transport but also reveal the willingness of developers as a driving force that interacts with the regulatory environment. Such willingness leads to a spatially inconsistent, inefficient parking supply pattern over the entire Shenzhen metropolis. Based on these findings, two suggestions are made for parking policy on district and neighborhood bases that address the situation of high-density urbanization in Chinese cities and similar circumstances.

**Keywords:** developer-led, parking supply, neighborhood-level, China.

## INTRUDUCTION

Parking policy in China remains regulation-dominant and embodies in its top-down urban planning system today. On one hand, governments set minimum parking requirements to regulate parking quantity, by which property developers are forced to provide the number of car-parks what are thought to be enough for future demands. On the other, strict policy intervention makes parking price too low to cover even the construction cost of parking facilities, which in turn makes parking business unprofitable for property developers and other private investors. Thus, highly regulated parking supply and strict pricing control together, define the basic characteristics of current parking policy in China. It leads to the market failure that pricing is deprived of its role in manipulating parking demand and supply. In this circumstance, severe parking issues are broadly emerging in major Chinese metropolises including parking deficits and the subsequent parking chaos. To manage these problems, the only response that municipalities are making is to raise the minimum parking standards continuously to advance the parking provision in newly-built areas. Yet it is, in fact, not an effective solution. First, facts show that parking shortage has become increasingly severe in the last decade with the enlarging gaps between the available parking spaces and vehicle volumes. Second, the raised minimum parking requirements over time only influence the quantity of parking provision periodically, but not the way in which those parking resources are allocated spatially. It results in the spatial disparity of parking distribution that renders over-saturation in old areas and surplus in newly-built-areas exist simultaneously. The ill-use of existing resources further exacerbate the parking issues in China.

Ironically, despite a lack of parking market under a highly regulated system, property developers are actually dominant in the parking supply. We name it as a “developer-led” pattern of parking supply, characterized with the feature that parking provision being built by developers and thereby designated for private use is in a dominant proportion of total resources. This phenomenon is explicitly revealed by Table 1, from which we see that parking spaces affiliated in premises of all kinds hold a leading proportion of over 90% in Chinese metropolises, such as 96.9% in Shenzhen and 94.1% in Shanghai,



whilst hold a less leading proportion in other cities for comparison, such as 67.8% in Hong Kong, 75.9% in Taipei and 69.4% in Paris. This implies that, albeit with a strict planning regulation, market in terms of parking supply is still functioning in its own way. Unfortunately, this is an overlooked point in China among existing literature where attentions are paid to devise a certain kind of regulation forcing developers to offer more on-site parking spaces.

In the remaining part of this paper, we shall first examine in detail the case of residential parking in Shenzhen, a metropolis that has the fastest urbanization and growth of car ownership in this country. Employing a range of contextual indicators, our case study will shed new lights on how some special features such as property development, the changing settings of local regulation and institutions, as well as the stakeholder's behavior affect the choice of parking arrangement and the controlling mechanisms from an integrated view of the land-use and transport at geographical level.

Table 1  
Comparison of parking spaces by public and private uses

Cities	Car Parking spaces			
	For public use		For private use only	Total
	On-street	Off-street	(proportion in total)	
Shenzhen (2009) <sup>a</sup>	16,000	12,000	891,000 (96.9%)	919,000
Shanghai (2003) <sup>b</sup>	6,576	22,040	457,184 (94.1)	485,800
Hong Kong (2011) <sup>c</sup>	18,000	203,000	428,000 (67.8%)	631,000
Paris (2007) <sup>d</sup>	161,700	73,150	534,700 (69.4%)	770,000
Taipei (2006) <sup>e</sup>	156,690	48,449	647,000 (75.9%)	852,139

Sources: a.URC of Shenzhen, 2011. Parking strategy and evaluation. 《深圳市停车策略研究及重点地区停车评估与对策》

## PARKING POLICY AND ITS EVOLUTION IN SHENZHEN, CHINA

The city government of Shenzhen has long employed “minimum parking requirements” as the basic instrument to management parking issues, which is the same as other Chinese cities have done. The earliest parking regulation can be traced back to the first version of “Urban Planning Standards and Guideline, in which parking requirements for dwelling units and apartments were only set to 0.02-0.12 parking space for every 100m<sup>2</sup> (of floor areas). In the following decades, minimum parking requirements have been advanced constantly in response to the rapid motorization (See Table 2 for the specifics). Up till 2013, city government raised minimum parking requirement by 1-1.5 spaces per dwelling unit for the condominiums with the floor areas more than 90m<sup>2</sup> in the latest UPSG Four, assuming that each household would own at least one car eventually.

Table 2 Minimum parking requirements for residential areas in UPSG during 1990-2013

		1990	1997	2004	2013
Residential areas		For every 100 m <sup>2</sup> (of floor area)			For every household
1	Dwelling units (Condominiums)/apartments (单元式住宅、单身宿舍)	0.02-0.12	0.5-0.6	0.6-1.0 • Lower bound for only small apartments	0.4-1.5 • 0.4-0.6 for those with floor area less than 60 m <sup>2</sup> • 0.6-1.0 for those with floor area between 60-90 m <sup>2</sup> • 1.0-1.2 for those with floor area between 90-144 m <sup>2</sup> • 1.2-1.5 for those with floor area more than 144 m <sup>2</sup>
2	One-family dwelling (villa)	≥1.0	0.5-0.6	≥1.0	≥2.0
3	Affordable housing	—	—	—	0.3-0.5

Source: UPSG (1990, 1997, 2004, 2013) and authors' compilation.

The policy adjustment outlined above is well demonstrative of what city planners have done in an attempt to eliminate parking shortage. However, the raised parking standards have virtually occurred parallel to the aggravation of parking deficits which is against policy expectation. As statistics shown, the gaps between parking supply and demand are enlarging from only 0.5 million in 2004 to 4 million in 2010 (See Figure 2). The spatial mismatch of parking resources also deserves attentions. The raised parking requirement results in parking surplus in newly-built neighborhoods where more parking spaces are offered than what they are needed. On the opposite, the parking chaos in old districts remains unsolved.

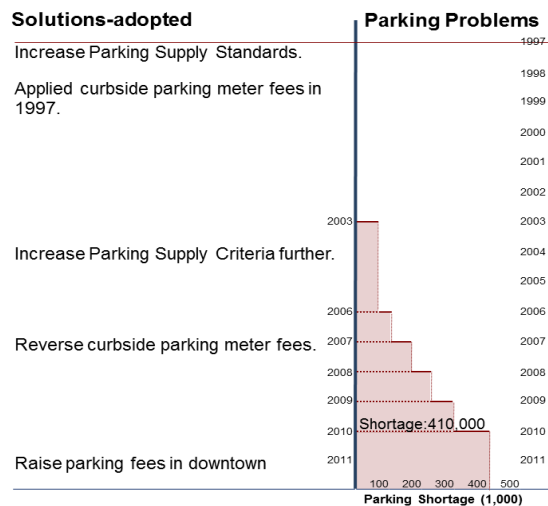


Figure1. Parking deficits accompanied with the adjustments of parking policy from 1997-2011 Drawn by authors based on the data issued by URC of Shenzhen

## METHODOLOGY

To verify our intuitive assumption that a logic outcome of changing parking policies and regulations in Shenzhen in the past two decades being a spatial mismatch of parking spaces, we constructed four OLS models to examine the relationship between parking provision and a series of urban factors from neighborhood dimension, and presented by ArcMap.

The spatial analysis focuses on each individual neighborhood in order to find out the generic rules in parking supply that may apply to any real estate developer. To better shed light on the latent parking supply mechanism, Model 1 and Model 2 take the relative and absolute parking provision, which is respectively defined by parking ratio (equals total parking spaces divided by the number of households) and total parking spaces, as the dependent variables and involve the roughly same explanatory variables for which details are given below.

Table 3 Descriptive statistics and parameters specification

For neighborhood-level model							
		Unit	Avg.	St.dev.	Min.	Max.	Specification
Dependents							
Model 1	Parking ratio (A_parking_ra)		.50	.44	.02	5.70	Parking spaces divide the number of households
Model 2	Total Residential parking spaces (TR_parking)		245.35	396.55	4	5,000	The available parking spaces within each neighborhood
Independents							
Land use characteristics	Building density (B_density)		.36	.15	.06	.92	
	Floor area ratio (FAR_C)		4.67	3.90	.05	29.36	
	Land area (Scale_C)	ha	2.07	3.52	.05	58.97	The scale of each individual neighborhood
	Number of households (N_household)		492.11	582.74	16	7405	
	Distance to city centers (Dist_C)	km	8.66	9.22	.09	52.15	All neighborhoods are allocated to three city centers by location. Their distances to the corresponding city center are calculated.
Others	Average flat size (Av_fl_si)	m <sup>2</sup>	127.13	65.09	32.38	600.00	

## RESULTS

The outcomes in neighborhood-level show that the quantity of parking spaces provided by property developers are statistically correlated with a set of its own attributes, including average flat size, operation year, building density, floor area ratio, property value, land area, distance to city center and number of households. The deeper analysis regarding each parameter reveals much empirical evidence helping us understand policy impacts, as well as the latent supply mechanism affected by property developers under highly regulated policy setting.

First, in both Model 1 and Model 2, the coefficients of operation year are positive and statistically significant at the level of 0.01, indicating parking supply has been steadily increasing over time which is coincident with policy adjustments. Further comparison is conducted to identify policy impacts. As shown in Table 5, for those neighborhoods constructed in 1991-1997, the average parking ratio (0.329) in samples is approaching three times of the upper bound of the standard set at that time. During 1998-2004 this ratio (0.53) was just above the lowest requirement by regulation. The recently-built neighborhoods tend to offer an average parking ratio of 0.75 which is quite close to the mean value of the range of legislative requirements. The fact is self-evident that property developers are much sensitive to market demands and cost concerns. The de facto parking provisions by developers not always follow the adjustment of regulations, but vary more in accordance with demand variation. Developers would actively balance parking supply to a certain extent not depreciating their property value, and simultaneously, fitting to their targeted market niche.

Second, an increase of both average flat size and property value, which somehow reflect the quality or market niche of a given neighborhood, leads to a growth of parking quantities. Their coefficients in Model 1 are 0.003 and 0.011 respectively, suggesting that when average flat size increases by 100 m<sup>2</sup>, parking ratio raises by 0.3 and when property value has an increase of RMB 10000, parking ratio raises by 0.11. Statistics indicate that each household can access at least one parking space in those neighborhoods with the average flat area above 200 m<sup>2</sup>. Conversely, no matter new-built or old neighborhoods, the parking ratio could merely achieve 0.21 for those with average flat size of less than 50 m<sup>2</sup>.

Third, an increase in the number of households and land area both results in a statistically significant increase in total parking provision. The number of households is a well demonstrator representing the de-facto parking demand in each neighborhood, while land area somehow representing the potentially economic possibility for developers to provide more parking spaces. In Model 2, the absolute parking spaces are positively correlated with both total households' number and neighborhood scale (land area) at the significant level of 0.01. While in Model 1, the relative parking ratio is statistically significant with land area merely at the level of 0.05, suggesting that it has a (positive) influence on parking ratio but not as strong as other explanatory variables. Theoretically, when land area increases by 1 hectare, onsite parking ratio would get a slight rise of 0.009. It provides another evidence that even for large neighborhoods which could accommodate more car-park spaces, developers still would not like to afford the cost of extra parking spaces more than what they need. In a word, the developer, as a rational individual in market, would balance concerns of cost and profit to determine how many parking spaces to provide.

Fourth, in Model 1, coefficients for density and FAR are -0.191 and -0.006 respectively, indicating onsite parking ratio would decrease with the increase of development intensity. In other words, developers are less likely to offer sufficient parking spaces in high-density neighborhood, not only for cost concerns but also for capacity concerns. The sufficient parking spaces here are referred to as at least one space for per household. The critical values are calculated among newly-built neighborhoods (after 2004), concluding that average parking ratio can only achieve 0.39 when household density exceed 600 per hectare, even with the lowest legislative requirement of 0.5 during that period.

Finally, it is worthwhile to note that neighborhoods' distances to city center show a statistical significance to onsite parking ratio with a coefficient of 0.004 in Model 1. It presents parking ratio provided by developers would have a slender increase of 0.0036 when the property being located per kilometer away from city center. However, distances to city center which represents locality is statistically insignificant with total parking spaces in Model 2.

**Table 4 Results of Model 1 and Model 2**

Parameter	Model 1(parking ratio)			Model 2(total residential parking spaces)		
	Coefficient	Std. Error	Significance	Coefficient	Std. Error	Significance
(Intercept)	-35.421	2.317	***	-23118.850	1615.647	***
Av_fl_size	0.003	0.001	***	0.489	0.074	***
O_year	0.018	0.001	***	11.507	0.810	***
B_density	-0.191	0.051	***	-50.680	35.687	
FAR_C	-0.006	0.002	***	0.052	1.130	
P_value	0.011	0.001	***	3.171	0.491	***
Scale_C	0.009	0.002	**	23.246	1.727	***
Dist_C	0.004	0.001	***	0.538	1.317	
N_household				0.404	40.870	***

**Table 5 Comparison of average parking ratio by operation year**

operation year	samples(N)	Average parking ratio in empirical cases	The required ratio by regulation
prior to 1990	243	0.243	--
1991-1997	683	0.329	0.02-0.12 (UPSG One)
1998-2004	1408	0.53	0.5-0.6 (UPSG Two)

Briefly speaking, our results in neighborhood level suggest that profit maximization is the primary principle which developers would obey to make a decision on how many parking spaces be provided. It is still the case even under the condition of parking regulation. Few urban characteristics as opposed to more characteristics of gated neighborhood per se would affect the quantity of parking spaces in neighborhood-level. Therefore, the objective of sustainable development is hardly achievable under the condition of developer-led parking supply.

### CONCLUSION AND POLICY IMPLICATION

The current parking policy in China still attaches the conventional parking approach characterized with “highly regulated supply and authoritative mispricing”, which is calling for a dramatic change so as to tackling the existing parking issues.

There is a dearth of research evidence disclosing underlying mechanism of parking supply. The spatial analysis in this study finds a way to understand the latent mechanism of parking supply and offers empirical evidence to

demonstrate the roles of market under highly-regulated parking policy. Generally it is considered that developers would actively reduce parking provisions in some Western contexts (Shoup, 1997). We conclude that the situation is somehow different in China where market power plays its role within strict planning regulations. In fact, developers in Chinese cities would actively balance cost and profit concerns when deciding parking provision instead of minimizing them. In a circumstance with poor management, official quantity regulation and market power play their role together. In other words, when the parking quantity developers would like to provide is in conformity with planning regulations, they would actively seek ways to offer what they think is needed as opposed to what is required by parking regulations. Profit maximization is usually the primary principal they obey. Two spatial-analysis outcomes support these conclusions. One is the de facto parking provisions in neighborhoods built in different periods do not exactly follow the adjustment of minimum parking regulations over time, but vary more in accordance with demand variation at that time. Another outcome that parking provisions in each neighborhood is determined by its own attributes provides detailed evidence that how developers decide parking provisions.

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# RELATIONSHIP QUALITY, VALUE CREATION PRACTICES AND BRAND LOYALTY IN VIRTUAL COMMUNITIES: EVIDENCE FROM FACEBOOK COMMUNITIES

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## ABSTRACT

Social media based brand communities are communities that are developed around a brand. In the highly globalized world of today, Facebook is undoubtedly being regarded as a has been widely recognized as a trendy and well-accepted medium of marketing. By means of a facebook fanpage organizationz can effectually create, enhance, and sustain customer-brand relationship. In this article, we explore whether brand communities based on social media (a special type of online brand communities) have positive effects on the main community elements and value creation practices in the communities as well as on brand trust and brand loyalty. A survey was conducted 201 valid response were used for analysis. The result of structural equation modeling show that brand communities established on social media have positive effects on value creation practices. Brand use, impression management practices and brand identification has an impact on brand trust and this brand trust then further leads to brand loyalty.

## INTRODUCTION

Marketers share become more and more interested in different streams about, organizing, and managing virtual communities on internet (Bagozzi&Dholakia, 2002; Balasubramanian&Mahajan, 2001). Virtual communities are based on non geographic communities ,develop to facilitate customer by considering consumer interest and brand. On the other hand brand communities has the ability to influence members' choices, and can change their perceptions regarding new products (e.g., Dholakia&Bagozzi, 2001), but also gives different opportunities to connect and enhance customer relationships in such forums.

Now a days frequent use of internet helps user to get information , this also creates awareness among people. Through this channel, communication increases as compare to other forums. The. Due to the characteristics of the Internet, such as no time and geographical constraints, multi-party communication and high information transparency, online brand communities follow a different pattern to real world ones (Sicilia & Palazon, 2008). In case of online brand communities, members can easily share experiences regarding brand and communicate with each other, thus can influence the brand choices of other community members (Casaló, Flavián, & Guinalfú, 2010; Laroche, Habibi, & Richard, 2013).

GAP: According to Fournier & Avery (2011) social media plays role in connecting people not brand. On the other hand, the dramatic fame and range of advantages, low cost, high communication efficiency of social media are appealing different companies to involve in such social media based brand communities (Kaplan & Haenlein, 2010). Building brand loyalty through networking, conversation and community building, becomes easy through social media (McKee, 2010). Here we are able to link brand community with relationship marketing, as Community is questionably the fundamental social relationship, which is related to familial relationship often used to define relationship marketing. Thus, it provides a guideline to superimpose the relationship between the company/ brand and consumer.

Significance of Study:

Despite the significance of branding and the high acceptance of social media, very few specific, empirical studies (e.g., Hsu&Tsou, 2011) have deal with these issues. We will explore few points in it

- Less information about what motivations stimulate people to be involved in a virtual community, considering co-creation perspective
- To find out the consequences of virtual community, background and consequences of building relationship among community members must be considered
- To study brand loyalty between brand based virtual community and community member.

## **LITERATURE REVIEW**

### **2.1 Social Media:**

Social media (SM) and its marketing applications proliferate by developing different strategies to attract and engage users on each platform continuously. Safko and Brake (2009, s.6) define social media as activities, practices and conduct among communities of people who online interact with each other to share information, knowledge, and experiences using informal medium". Social media are the mediums used for communication that results in participatory, interactive, information sharing and user-empowerment. Due to less consumption of time and resources, social media marketing give company's a platform to communicate with the consumers and help them to build brand loyalty instead of traditional methods (Jackson, 2011; Akhtar, 2011).

Additionally, social media enables consumers to share knowledge with their peers about the product and service brands (Stileman, 2009; Mangold and Foulds, 2009). The academic literature related to social media is still in its early stage, and offers marketing managers very little supervision for the usage of social media in their communications strategies (Mangold and Faulds, 2009). Some researchers have suggested ways that marketing managers can influence social media by determining user discussions (Kaplan and Haenlein, 2010; Mangold and Faulds, 2009), and some others have offered strategies to measure the success of social media marketing campaigns (Hoffman and Fodor, 2010).

### **2.2 Brand Community**

Muniz and O'Guinn (2001, p. 412) defined a brand community as "a specialized, non-geographically bound community, based on set of social relationships among admirers or followers of a brand." A brand community consist of three main components, including consciousness of kind, rituals and traditions, and moral responsibility (Muniz & O'Guinn, 2001). Consciousness of kind basically represents the central connection among the members of brand community, and the collective sense of difference from others, not part of the community. This factor is redefined as social identity by Bagozzi and Dholakia (2006). Common rituals and traditions refer to brand culture, history and perception. Sharing and duplicating brand stories allows members to modify the community culture, brace its value, and increase member common perceptions. And moral responsibility refers to the commitment of members to the community as a whole, as well as to other individual members. This shared sense of moral responsibility influence members to react every time to problems faced by other members or in daily practices try to help other through discussing problems, sharing experiences, giving advice, and providing mutual assistance.

Numerous studies have pointed out that brand communities are in fact reasonable forms of community, which form on the basis of a shared brand. A brand community is defined as structured set of people that have a common interest in a specific brand and form a social universe life with its own traditions, values, rituals, vocabulary and hierarchy (Cova and Pace, 2006).

A community is likely to form around brands with a strong image, with a rich and lengthy background, and tough competition. Traditionally, only brands that operated in niche markets and required consumers to invest their time or money (i.e. Mercedes, Harley Davidson, etc.) had a manifest brand community. However, recent research (Cova and Pace, 2006; McWilliam, 2000) has shown that brand community management is not necessary for brands mainly offering expediency products such as soap, tools, toys or soft drinks (as for example Coca-Cola). The appearance of the internet may be the reason to avoid the traditional rules, followed for the creation and development of brand communities.

### **2.3 Virtual Community**

A virtual community is a specialized, geographically isolated community based on a structured and vibrant network of relationships among participants having a common focus (Dholakia et al., 2004). The community is



constructed around a common interest, knowledge, or task that members have, and guided by both explicit and implicit codes of conduct (Hagel & Armstrong, 1997). Members of such communities relate to each other in a structured, vibrant, and relatively isolated manner and define the community as a location. Community members can have discussion about brands but they can also share opinions about any other topic of interest, hence topic of discussion is not limited or restricted. Consumer interaction within the community may be inspired by the company offering different contents or topics around which the relationships between members are developed. Brand-based online communities can benefit of dialogue flowing between consumers. Virtual community basically develops consumer-consumer and brand loop in which consumers are more powerful. Unlike traditional media where individuals consume content inertly, here content is created by community members through discussion and sharing experiences in social media based brand communities. This active creation of content builds the character of the community and also determines the influences of users on each other (Bagozzi&Dholakia, 2002; Werry, 1999).

### **3. Theoretical Framework**

#### **3.1 Value Creation:**

A new study in marketing literature focused on creation of product's value, where customer are not act only as user of product or service but also as a co-creator of value. Brand communities based on social media play an important role in this value creation process (Laroch et al., 2012), in which consumer share their experience which overall effect brands this is the reason for creation of virtual communities and consumers join these communities for their own incentives. Schau, Muniz and Arnould (2009) in their study revealed for components of value creation, which includes brand identification for value creation.

##### **3.1.1 Social Networking Practices:**

Social networking practices are base on creating, enhancing, and continue relationship with brand community members (Schau et al., 2009). Welcoming, empathizing, and governing are the techniques which enhance homogeneity among brand communities and fulfill behavioral expectation from one another. This idea is consistence with Muniz and O'Guinn (2001) for supporting social networking practices.

H1: There is a positive association between brand community and social networking

##### **3.1.2 Community engagement practices:**

Community engagement practices are those that reinforce increment of members' involvement with the brand community (Schau et al., 2009). These include staking and documenting. These practices basically boost the view of heterogeneity, for example if we view staking in which community member of specific brand just a participants of that community for few other brand mention within it and evolves personal brand identities and documenting occur when brand community members construct a description of their brand experience.

H2: There is a positive association between brand community and community engagement practices

##### **3.1.3 Impression management practices:**

Impression management is basically motivation to participate actively in social networking (Barsness et al., 2005). They are "activities that have an external focus on building favorable impressions of the brand, brand enthusiasts and brand community in the social university beyond the brand community" (Schau et al., 2009). Impression management practices are adopted by community members to define themselves and brand share knowledge about them and their product or services or by other community members as a result consumers get more involve when they find something interesting and attractive for them. Consumers are then involved in managing impressions activities.

H3: There is a positive association between brand community and impression management practices

##### **3.1.4 Brand use practices:**

Brand use practices basically include tendency of member of community to communicate with other member to customize the product for better applicability of their need. Grooming, customizing, and commoditizing are the practices adopted in order to improve or enhance usage of the focal brand. (Schau et al., 2009).

H4: There is a positive association between brand community and brand use practices

##### **3.1.5 Brand identification:**

There is a growing literature on the importance of social identification, in developing commitment to a community (e.g. Bagozzi&Dholakia, 2006).By considering the strength of the consumer's relationship with the brand community, which we characterize through "brand community identification," whereby the person consider himself or herself to be a member that is, as "belonging" to the brand community. Identification with a virtual community means that the consumer agrees with the community's norms, traditions, rituals, and objectives (Algesheimer et al., 2005). Therefore, this identification with virtual community increases relationship with customer and brand. We consider this identification in value creation as it helps the community to develop those norms and rituals which are acceptable for consumers.

Social media can foster these activities through fostering relationship among members and brand,facilitated their information and resource sharing as well as consumer consideration of identification with community enhance relationship with brand community based on social sites.

H5: There is a positive association between brand community and brand identification

### **3.2 Value creation practices on brand trust and brand loyalty**

Brand community researchers agree that one of the main functions, if not the main one, of a brand community is to make customers loyal to the brand through brand trust (McAlexander et al., 2002; Muniz &O'Guinn, 2001; Schau et al., 2009; Zhou et al., 2011). So we hypothesized that:

H6: There is a positive association between social networking practices and brand trust

H7: There is a positive association between impression management practices and brand trust

H8: There is a positive association between brand use practices and brand trust

H9: There is a positive association between community engagement practices and brand trust

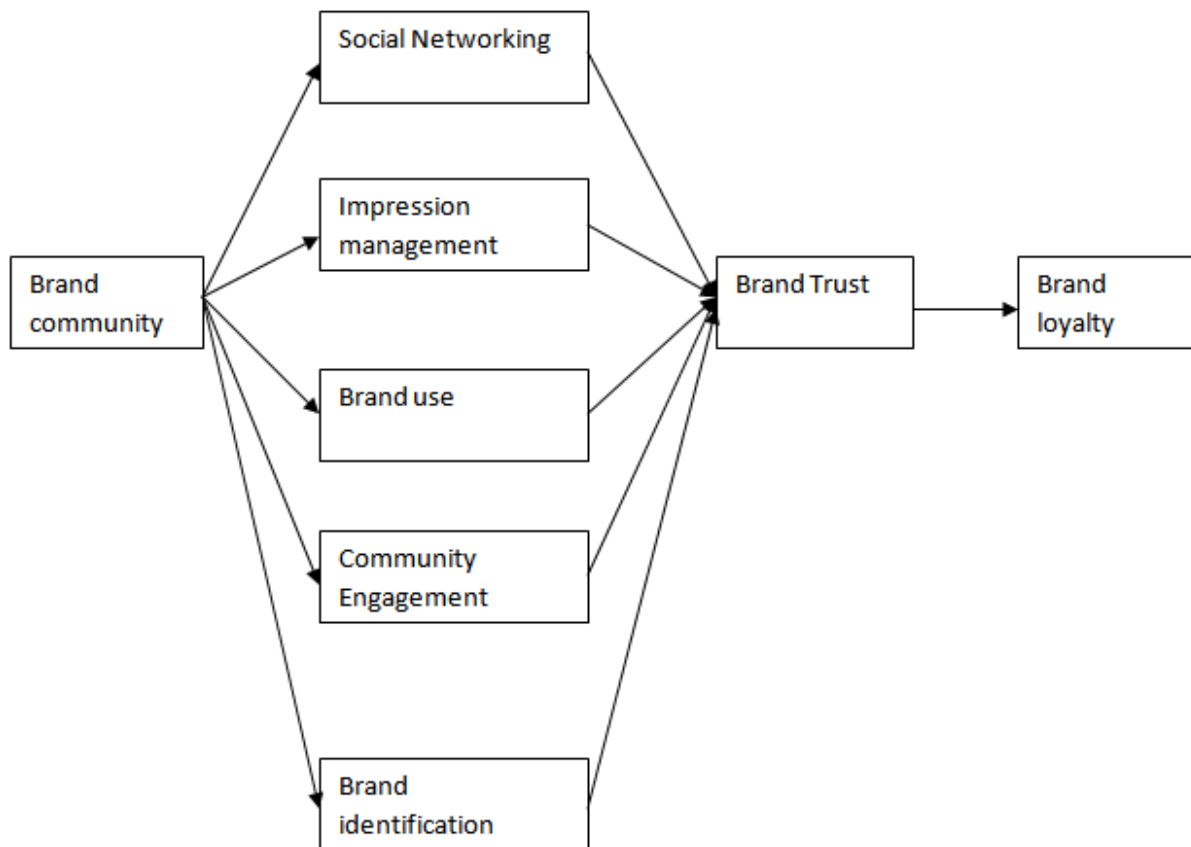
H10: There is a positive association between brand identification and brand trust

### **Brand Trust and Brand Loyalty**

Brand trust is one of the most important antecedents of brand loyalty; however in the brand community literature there is little emphasis on this relationship, also relationship between brand trust and brand loyalty is found in offline and online market (Chaudhuri& Holbrook, 2001; Chiu et al., 2010)

H11: There is positive association between brand trust and brand loyalty

### Research Model



## 4. Methodology

### 4.1 Subject and procedure

As we test our model on virtual brand community, the target population is all members of brand communities on social networking websites. For brand specification we use electronics company (i.e. Apple, Samsung and Sony). Respondents for this study are the target population of brand communities of above mentioned companies on social networking websites. This is important because the study aims to investigate the effects of such communities on members, regardless of a specific product, brand or social media. The questionnaires were distributed through social network websites Facebook. This method of data collection generated 201 valid responses, out of which 54% are females and age ranges from 18 and 57. Although a larger sample size would be desirable for the purpose of structural equation modeling, the number is still well above the sample sizes of other studies that have applied structural equation modeling.

### 4.2 Measures:

All constructs were measured with multiple item-scales. Some items were adopted from the related literature and modified to suit the study. The scales of each item range from (1) strongly disagree to (5) strongly agree. Four items of brand community taken from a study by Srinivasan, Anderson, & Ponnarolu (2002) were taken for this study. The Cronbach's alpha is 0.76. Eight items of social networking practices adapted from study by Hsieh, Chiu, & Chiang (2005). The scale has a reliability of 0.78. Four items of community engagement practices adapted from study by Algesheimer et al., (2005). The scale reliability is 0.82. Three items measured the degree to which a member of a community gets useful information about the brand's use given by Schau et al. (2009). The scale has a reliability of 0.76. Impression management scale consists of three items. The Cronbach's alpha of IM is 0.73. Brand identification scale consists of 3 items and reliability of construct is 0.81. Scale for brand trust adopted from study by Chaudhuri and Holbrook (2001), consists of three items. The

scale has a reliability of 0.83. Brand loyalty scale was derived from Delgado-Ballester, Manuera-Aleman, and Yague-Guillen (2003) consists of three items. The scale reliability is 0.76.

## RESULT

Structural equation modeling with the AMOS graphical software program was used to test the model and hypotheses shown in Fig. 1. The goodness-of-fit of the overall model was assessed with the chi-square test, the root mean square error of approximation (RMSEA), and the comparative fit index (CFI) (Marsh, Balla, & Hau, 1998). RMSEA value less than 0.08 and CFI values greater than or equal to 0.90.

### 5.1 Confirmatory factor analysis:

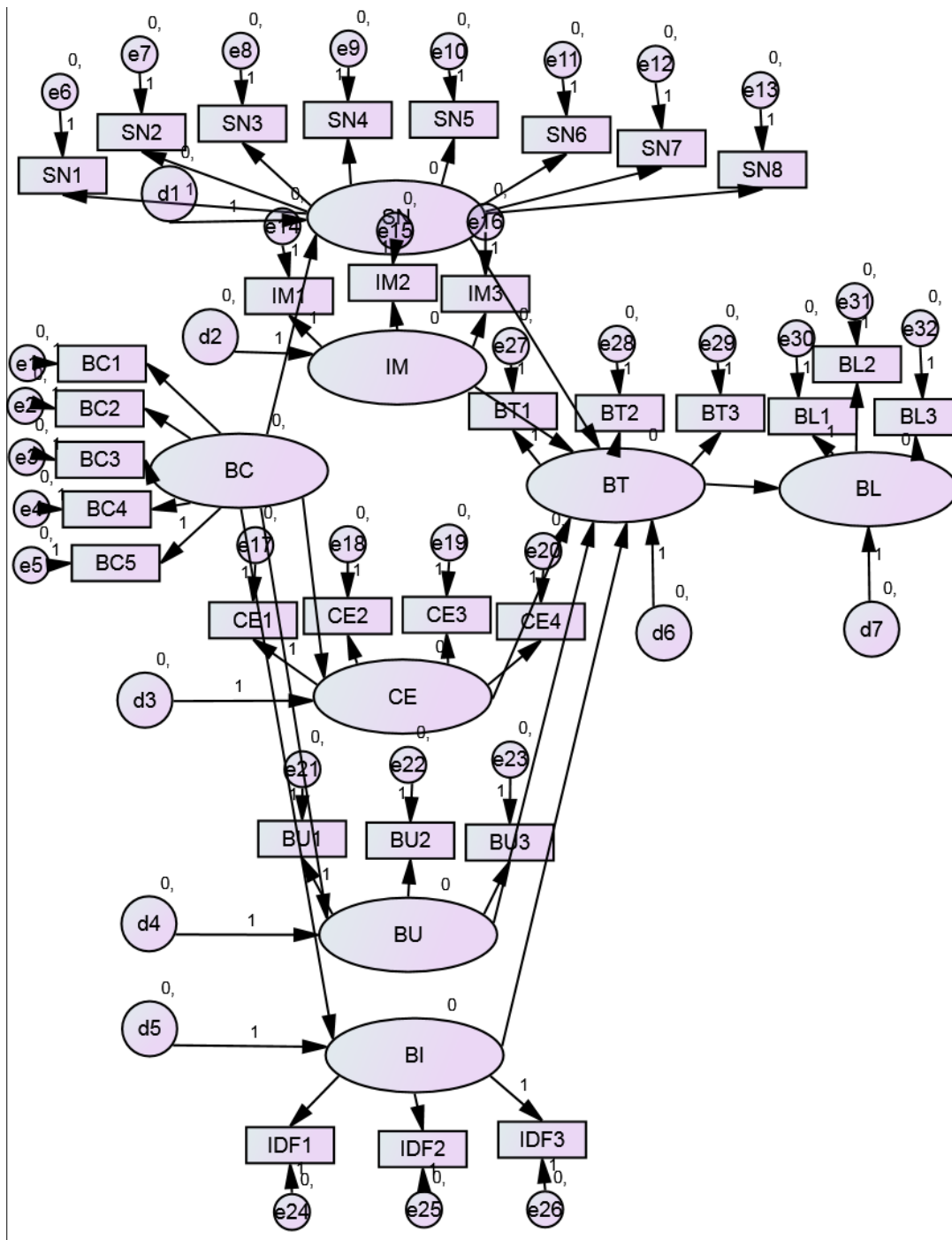
We conducted confirmatory factor analysis (CFA) and Table 1 indicates standardized regression weights which range from 0.783- 0.955. Factor loading should be greater than 0.35. Items of the entire constructs show factor loading greater than 0.35. Second, as evidence of convergent validity, the measurement factor loadings were all significant. We found good fit indices for the CFA model.

Table 1: CFA

Fit indices	Suggested values	Hypothesized Model
CMIN/df	<2, <3 and <5	3.242
GFI	0 (Poor fit or no fit) to 1 ( Perfect Fit or exact fit)	0.963
AGFI	0 (Poor fit or no fit) to 1 ( Perfect Fit or exact fit)	0.934
CFI	0 (Poor fit or no fit) to 1 ( Perfect Fit or exact fit)	0.971
NFI	0 (Poor fit or no fit) to 1 ( Perfect Fit or exact fit)	0.921
RMSEA	<0.05-0.10	0.070

### 5.2 Structure Equation Modeling:

Results of SEM indicates that model have  $\chi^2/df = 1.65$ ,  $p = 0.005$ . and the  $v^2/df$  is less than 2. All other statistics are within acceptable ranges including RMSEA = 0.068, CFI = .93, GFI = 0.91 and NFI = 0.95 (Bagozzi & Yi, 1988).



### 5.3 Hypothesis Testing:

Results of hypothesis testing are given in table 4.10.

Table: 2 Result of SEM

Hypothesized Path	Path coefficient
BC → SN	Insignificant
BC → CE	Insignificant
BC → BU	.341**
BC → IM	.266**
BC → BI	.353**
SN → BT	.427**
CE → BT	.348**
BU → BT	.186**
IM → BT	.291**
BI → BT	.321**
BT → BL	.426**

## CONCLUSION AND DISCUSSION

The analysis of virtual brand communities is especially relevant to marketing perspective. Therefore, deep study of the drivers and outcomes of consumer involvement in these communities should be a main concern for both academicians and marketers. Firstly considering the literature on brand community, we proposed a model of the effects of brand community on shared community members, value creation techniques and conversion of brand trust to brand loyalty. Using SEM we found support for the model and most of all for our hypothesis. We found that brand communities established on social media helps to enhance feelings of community members and contribute in value creation for both members and the company. Furthermore, the model shows the way brand loyalty increases in brand communities. The whole model shows that value creation techniques improvise loyalty through brand trust as a mediator.

Contrary to expectations, only three of the five value creation practices (brand use, impressions management and brand identification) contribute to brand trust. There is one possible explanation for this finding. As Schau et al. (2009, p. 37) argue, “Practices operate like apprenticeship,” which means that “their effects evolve over time as consumer engagement deepens and practices are integrated.” Thus, it is possible that the effects of practices in social media based brand communities may not have evolved enough to significantly affect brand loyalty. This makes sense because the concept and prevalence of social media is new and its effects are emerging as time goes on and more people engage in the activities of social media. This difference might be due to the difference in the nature of practices as well. For example the effects of brand use practices, which mainly are about better consumption of the focal brand, are more immediate than social networking practices that need more time to develop. We found that group cohesion and communication among the community members in order to favor consumer identification with the virtual community is created by value creation. The current research, we have studied the influence of a virtual brand community on consumer behavior. To be precise, we

have found a positive and significant effect of consumer participation in a virtual community on loyalty to the mutual interest around which the community is centered.

Our study contributes to existing brand community knowledge in several ways and has theoretical implications. First, we extended the concept of brand community to social media and created more insights on this important phenomenon. Recently, the uniqueness of social media has been acknowledged by researchers as a distinct research domain (e.g., Hu & Kettinger, 2008), so our study provides more insights into this domain. Second, we developed a network that shows how a community affects community markers, practices, brand trust and brand loyalty; then we tested it in the context of social media. Although, previous researchers showed qualitatively the existence of such effects in brand communities (McAlexander et al., 2002; Muniz & O'Guinn, 2001), we modeled these effects in online environments, and tested the model quantitatively. Our findings explicitly show how practices could affect brand loyalty as well as their relative weights. For example, we show that brand communities affect loyalty through brand use practices. However, in interpreting the results we should be cautious because of the apprenticeship effects of such practices.

Besides, an interesting route to extend this research would be to analyze other effects derived from consumer participation in virtual brand communities. To be precise, it would be very useful to analyze the link between consumer participation in a virtual brand community and other brand-related behaviors such as the intentions to recommend the products/services of the firm/brand around which the community is developed. This positive word-of-mouth would be especially relevant for brands and organizations since fellow consumers are considered more objective information sources (Kozinets, 2002) and therefore, peer recommendations in these communities may affect consumers' behavior.

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# FACTORS INFLUENCING MATHEMATICS EDUCATION STUDENT'S ANXIETY IN LEARNING

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## ABSTRACT

The purpose of this research was to study the level of mathematics education students' anxiety in learning, to compare anxiety in learning with different student's year and investigating the factors influencing student's anxiety in Learning. The samples were 146 mathematics education students who enrolled in the course during the semester of the academic year 2017 at Suan Sunandha Rajabhat University. The quota sampling techniques randomly selected these students. The instruments were the checklist and five-point rating scale questionnaires. The questionnaires had four factors to check anxiety in learning. The factors are teachers, the supporters systems on the study, student activities and the environment in the university. The data were analysed with the statistical package using t-test, F-test and Chi-Square.

The result showed that the student had a low level of anxiety in learning. The difference year of student significantly different anxiety results in studying at the .05 level. But the difference sex and the difference grade point average of student significantly not different anxiety result in studying at the .05 level.

The four factors had not affected anxiety were teachers, the supporters systems on the study, student activities and the environment in the university, but some of the variables on teachers which influenced anxiety in were consulting time and a personality of teachers. Teacher factors influencing anxiety in the study are only sub-factors that affect the instructor's anxiety. This is an opportunity for students to consult and the prototype personality of being a teacher. Students are expected to receive counselling and role models from teachers who are higher than their peers.

**Keywords:** Factors Influencing in Anxiety, Anxiety in Learning, Mathematics Education Student

## INTRODUCTION

**Background of the study:** Higher education is very different from high school education. The changes in both teaching styles and physical, emotional and social changes of students. Higher education emphasises self-responsibility. Learners are freer to choose subjects to study, free to attend classes, the high degree of systematic thinking. Students and their parents expect learning and career. If the student does not adjust, it is often anxiety. Psychological and emotional problems followed. Usually, anxiety is based on individual characteristics, and a few anxiety situations will help students adjust and solve problems consciously. However, if the students are too much will affect education. The anxiety also depends on other educational components, including the curriculum management, teaching and learning environment [7]. Students need to adjust to be ready for higher education and ready to learn at a higher level. This is the first step in laying the groundwork for learning to adjust from student life to student life [6]. Mathematics is a science that is very important for the development of thinking and reasoning [1]. However, because mathematics education in higher education is more abstract, mathematics students are stressed or anxious in mathematics. The study to find other factors that create anxiety in the classroom will help teachers find ways to reduce anxiety for students.

The study of theories and findings related to anxiety in learning. The research team concluded that Anxiety is an emotional component that influences academic achievement, so it is interesting to study the level of anxiety of mathematics students. Study the factors that influence anxiety in learning as a guide to reducing anxiety. The results of the research to improve teaching efficiency.

**Anxiety in learning** refers to the feeling that students are physically and mentally unwell. Physical and emotional changes. Affect the course. Students are not able to learn the full potential.

**Factors Influencing in Anxiety** are teachers, the supporters systems on study, student activities, and the environment in the university.

**Mathematics Education Student** are students in mathematics. Faculty of Education, 1-4 Years Suan Sunandha Rajabhat University. There were 229 registered students in the academic year 2017.

## MATERIALS AND METHODS

**Research Design:** The samples were 146 mathematics education students who enrolled in the course during the semester of the academic year 2017 at Suan Sunandha Rajabhat University. The quota sampling techniques randomly selected these students. The detail of the sample is shown in Table 1.

**Table 1** The samples are distribute of Year of Students

Year of Student	Population	Percentage	Sample size
1	42	18.34	26
2	58	25.33	37
3	78	34.06	50
4	51	22.27	33
Total	229	100.00	146

The result in table 1 showed that the highest percentage is year 3 mathematics student (34.06%) followed by year 2 mathematics student (25.33%), year 4 mathematics student (22.27%) and year 1 mathematics student (18.34%).

**Research Instruments:** The instruments were checklist and five-point rating scale questionnaires . The questionnaires was adapted from the origin anxiety test from The Department of Mental Health [4]. The questionnaires had four factors to check anxiety in learning. The factors are teachers, the supporters systems on study, student activities and the environment in the university.

The scores in the questionnaire were analyzed as follows.

Learning Anxiety Scale :

Scale	Descriptive Equivalent (The level of Learning Anxiety)
5	Very High
4	High
3	Moderate
2	Low
1	Very Low

The scores in the Interpretation Questionnaire on anxiety are as follows.

Learning Anxiety Range :

Range	Descriptive Equivalent (The level of Learning Anxiety)
4.51-5.00	Very High
3.51-4.50	High
2.51-3.50	Moderate
1.51-2.50	Low
1.00 -1.50	Very Low

**Data Analysis:** The data collected were coded and analysed using the Statistical Package for Social Science (SPSS) Version 16.0. The data were analyzed with the statistical package using t-test, F-test and Chi-Square.

## RESULTS AND DISCUSSION

**RESULTS :** The level of anxiety in learning classified by sex, the grade point average and year of the student as

1. The difference sex of student significantly not different anxiety result in studying at the .05 level.

As shown in Table 2.

**Table 2** Standard Deviation and t-test mean of data associated with learning anxiety of students genders

Sex	n	$\bar{x}$	S.D.	t	*Sig.
male	43	1.93	0.70	1.725	.087
female	103	2.17	0.77		

\*Significant level .05

2. The difference grade point average of student significantly not different anxiety result in studying at the .05 level. As shown in Table 3.

**Table 3** Standard Deviation and t-test mean of data associated with learning anxiety of student grade grade point average.

Grade Point Average	n	$\bar{x}$	S.D.	F	*Sig.
2.00-2.50	11	2.18	1.08	1.368	0.255
2.51-3.00	65	2.22	0.78		
3.00-3.50	56	2.00	0.63		
3.51-4.00	14	1.86	0.77		

\*Significant level .05

3. The difference year of student significantly different anxiety result in studying at the .05 level as shown in the table 4.

**Table 4** Standard Deviation and F-test mean of data associated with learning anxiety of student year

Year	n	$\bar{x}$	S.D.	F	*Sig.
1	26	2.12	0.71	.288	0.38
2	37	2.30	0.66		
3	50	2.14	0.93		
4	33	1.79	0.48		

\*Significant level .05

The result in table 4 showed that the student year 1-4 had a low level of anxiety in learning.

When testing the correlation of determinants with anxiety in learning using Pearson Square Relationship Analysis The results are shown in Table 3.

**Table 5** The Correlation coefficient of data associated with learning anxiety, with teachers, the supporters systems on study, student activities, and the environment in the university,

Factors	Pearson Chi-Square	df	Sig.
<b>1. Teacher</b>	4.924	6	0.554
1.1 Counselling	34.863*	12	0.000
1.2 Assignment / Homework	6.659	9	0.673
1.3 Accept The Opinion of Student	4.84	9	0.848
1.4 Teaching Style	5.191	9	0.817
1.5 Personality	31.86*	9	0.000
<b>2. The Supporters Systems on Study</b>	9.238	9	0.416
2.1 Sufficiency	7.086	9	0.628
2.2 efficiency	8.023	9	0.532
2.3 Library	14.397	9	0.109
2.4 The Modern Technology	11.596	9	0.237
2.5 Internet	12.196	12	0.430
<b>3. Student Activities</b>	1.939	9	0.992
3.1 Diversity	10.183	9	0.336
3.2 Participation	7.921	9	0.542
3.3 Make a Profit	14.138	9	0.118
3.4 The relation with the other	9.687	12	0.643
3.5 Time	6.356	9	0.704
<b>4. The Environment in The University</b>	3.381	9	0.947
4.1 Classroom (convenience / clean / )	2.512	9	0.981
4.2 Building	9.529	12	0.657
4.3 Shady	9.987	12	0.617
4.4 Safety	7.588	12	0.816
4.5 Information	7.827	12	0.799

As shown in table 5, the results of the hypothesis testing were as follows: The four factors had not affected anxiety were teachers, the supporters systems on the study, student activities and the environment in the

university. Teaching factor the overall picture was not related to anxiety. However, when considering the issue. Students are always available to consult with the instructor and have the appropriate personality as a model for students. Relationship with anxiety in learning. Significant. 05. Factors supporting learning. Student Activities Environment Both the overall and the individual were not associated with anxiety.

## CONCLUSION

The results of this study showed that on a low level of learning anxiety, each year students had different learning anxieties, but the difference sex and The difference grade point average of student significantly not different anxiety result in studying. The results of this research differ from the findings of Benja Nissaisook [2], research found that the difference sex of student significantly different anxiety result in studying. The factors that affect anxiety are the teacher factors. That is the subject of each class. Student activities will vary from year to year. Adaptation to the environment and the learning support is different each year. Factors influencing anxiety in the study are only sub-factors that affect the instructor's anxiety. This is an opportunity for students to consult and the prototype personality of being a teacher. Students are expected to receive counselling and role models from teachers who are higher than their peers. It can affect anxiety [5]. The results were consistent with the research of Pairat Wongsritrakul [7], research found that the factors that affect anxiety are the teacher factors. Overall, students are less concerned about their studies. There is an inability to learn [3] and result in a commitment to solving problems in learning and personal.

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# A STUDY ON MISCONCEPTIONS IN CALCULUS OF MATHEMATICS MAJOR STUDENTS OF SUAN SUNANDHA RAJABHAT UNIVERSITY

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## ABSTRACT

This descriptive research focused on studying of misconceptions in calculus among mathematics major students, faculty of education, Suan Sunandha Rajabhat University. The population were 40 students who studied in the first semester of the 2016 academic year. The research instruments were the tests of misconceptions in limit and continuity, differentiation and integration. The data were analyzed by using frequency, percentage, and content analysis.

The result has shown that 1. The misconceptions in calculus were limited conception, incomplete understanding about algebra, overgeneralizations and misinterpretations. 2. Limited conception was 2.1 comprehensions only some part of limit, differentiation and integration, 2.2 comprehensions only some part of the differentiation, not aware of the cases of the piecewise functions and 2.3 comprehensions only some part of differentiation and integration that were not enough to apply correctly. 3. One of the most often misconception in calculus was the error in language and symbols and also distorted theorem or definition. 4. The calculus mistakes were the error in operations and computations and misused data such as showing answers with the right concept but wrong information using and showing answers from miscalculation.

## INTRODUCTION

In university level, calculus is one of the compulsory subjects for the first-year students. This branch of mathematics is crucial in order to develop the applied mathematical understanding. The students' knowledge will be crystallised when they can use their calculus understanding to apply in many real world situations or solve more complicated problems in the many topics in various university mathematics courses.

At this stage students also get confused due to unnoticed misconception built upon their high school mathematics. This study aims to create informative resources for university instructors about common misconception exhibited by first-year mathematics major students. Since the students chose to study in mathematics major by themselves, they can learn the subject with the growth mindset and they can develop mathematical resilience gradually [1]. Therefore, studying on misconception in Calculus can give us the awareness of the common mistakes of the students. We can develop the course in the future from the information obtained from this research work.

Since mathematics is a complex and logical subject, concepts are essential for learning management. The students can improve their learning ability when they understand the mathematical concept clearly. On the other hand, if a learner has a misconception, then that student will struggle in learning advanced mathematics. Aumporn [5] mentioned that the mistake is one of the reasons why students can not solve the mathematical problems effectively. Moreover, this may affect the students' mathematical learning achievement as well. This can be implied that the first-year students need to understand the calculus concept correctly, unless they will be obstructed in learning advanced mathematics in the future course.

As Erdogan M. Ozkan and Hasan Unal [7] have said, the first year in college is a significant time in students' mathematical understanding and development in which they start to crystallize their understanding of mathematical concepts and to see engineering application of problems in various university mathematics courses starting from Calculus I.

In addition, Kakoma Luneta and Paul J. Makonye [4] also noted that errors and misconceptions in calculus were related to learners' over-dependence on procedural knowledge which had no conceptual basis. On the other hand, learners sometimes had sound conceptual knowledge for which they had not acquired allied

procedural knowledge needed to perform in particular questions. Implications of the study to the wider mathematics education community are highlighted.

## THEORETICAL FRAMEWORK

This research focused on studying of misconceptions in calculus of mathematics major students, faculty of education, Suan Sunandha Rajabhat University. The population were 40 students who studied in the first semester of the 2016 academic year. The research instruments were the tests of misconceptions in 1. limit and continuity of function, 2. differentiation and 3. integration.

In the research, we study the misconceptions as in Porntida Sukkrom and Aumporn Mekanong [6]. They studied on the misconception in 11<sup>th</sup> Grade mathematics, and they divided the misconceptions into 3 types as follow:

- 1) Limited conceptions and defective understanding about algebra
- 2) Error in language and symbols, and distorted theorem or definition
- 3) Error in operations and computations and misused data

The data were analyzed by using frequency, percentage, and content analysis.

## RESEARCH METHODOLOGY

In this research we explore errors, misconceptions and their causes in a Calculus course of mathematics major students, faculty of education, Suan Sunandha Rajabhat University. Tests will be used to collect data from mathematics major students registering Calculus 1. The test will cover all the main themes of Calculus 1 which are limits and continuity, differentiation and integration. In this research, the test was given after finishing the last lecture of Calculus 1. After the evaluation, we can show three misconceptions as follows:

Misconceptions	Percentages
Limited conceptions and defective understanding about algebra	77.10
Error in language and symbols, and distorted theorem or definition	17.56
Error in operations and computations and misused information	5.34

**Table 1.** Percentages of students' misconceptions for limit and continuity of functions

Misconceptions	Percentages
Limited conceptions and defective understanding about algebra	66.67
Error in language and symbols, and distorted theorem or definition	23.33
Error in operations and computations and misused information	9.17

**Table 2.** Percentages of students' misconceptions for differentiation

Misconceptions	Percentages
Limited conceptions and defective understanding about algebra	46.77
Error in language and symbols, and distorted theorem or definition	27.42
Error in operations and computations and misused information	25.81

**Table 3.** Percentages of students' misconceptions for integration

Misconceptions	Percentage
Limited conceptions and defective understanding about algebra	67.31
Error in language and symbols, and distorted theorem or definition	21.79
Error in operations and computations and misused information	10.90

**Table 4.** Percentages of students' misconceptions in Calculus (over all)

### ANALYSIS OF MISCONCEPTION

From Table 4, after descending frequency, the misconceptions are 1) limited conceptions and defective understanding about algebra, 2) error in language and symbols, and distorted theorem or definition and 3) error in operations and computations and misused information

Firstly, misconceptions for limited conceptions and poor understanding of algebra were 67.31%. For example, from Figure 1, some students' mistake on limit calculation was that  $\frac{1}{0} = 0$ .

Figure 1. An example of misconceptions for limited conceptions

Secondly, the misconceptions in language and symbols, and distorted theorem or definition were 21.79%. From Figure 2, we can notice that the student was not understanding well enough to apply the chain rule and write the solution accurately.

Figure 2. An example of misconceptions in language and symbols, and distorted theorem or definition

Finally, the least occurring misconceptions in operations, computations and misused information is 10.90% such as errors in computation and misunderstand about positive and negative sign (see Figure 3).



5. จงหาลิมิตของ  $\lim_{x \rightarrow \infty} (\sqrt{x^2 + x} - x)$

$$\lim_{x \rightarrow \infty} (\sqrt{x^2 + x} - x) = \frac{(\sqrt{x^2 + x} - x)(\sqrt{x^2 + x} + x)}{(\sqrt{x^2 + x} + x)} = \lim_{x \rightarrow \infty} \frac{(x^2 + x) - x^2}{(\sqrt{x^2 + x} + x)} = \lim_{x \rightarrow \infty} \frac{x}{(\sqrt{x^2 + x} + x)}$$

$$= \lim_{x \rightarrow \infty} \frac{x}{x(\sqrt{1 + \frac{1}{x}} + 1)} = \lim_{x \rightarrow \infty} \frac{1}{\sqrt{1 + \frac{1}{x}} + 1} = \frac{1}{\sqrt{1 + 0} + 1} = \frac{1}{2}$$

Handwritten work shows errors in the above steps, particularly in the rationalization and the final simplification.

Figure 3. An example of misconceptions in error in in operations, computations and misused information.

## CONCLUSION

In this paper, we analysed some errors and misconceptions made by students in a Calculus course of mathematics major students, faculty of education, Suan Sunandha Rajabhat University. Results from tests in Table 4 show that some learners had a weak background in mathematics. The misconceptions, defending frequency, were 1) limited conceptions and inadequate understanding about algebra, 2) Error in language and symbols, and distorted theorem or definition and 3) error in operations and computations and misused data. For some of these findings, certain analytic concepts should be developed early in a calculus course. Responses from all the questions showed that concept definition and concept image related to limit and continuity, differentiation and integration does exist in the minds of the majority of the students participated in the study. However, since the questions used specific theorem such as the squeeze theorem, it is quite a surprise to find that there exist some students who have no idea at all to express in words the meaning of limit. There is also a considerable number of students who have poor concept image and concept definition on differentiation and integration.

## ACKNOWLEDGEMENTS

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# THE EFFECTS OF USING ANIMATION MOVIES TO DEVELOP LISTENING AND SPEAKING SKILLS FOR GRADE 8 STUDENTS

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## ABSTRACT

The purposes of this research were to 1) develop and examine the English learning activities by using Animation Movies to meet the standard efficiency of 75/75 and to compare the students' English listening and speaking ability before and after learning. The samples, obtained by cluster random sampling, were 30 of Grade 8 students during the first semester of the academic year 2018 at the Demonstration School of Suan Sunandha Rajabhat University. The research instruments were English learning activities, listening and speaking ability test. The data were analyzed by means, standard deviation, and percentage. The research design was One Group Pre-test Post-test Design. The findings were as: 1) The efficiency of the developed English learning activities by using Animation Movie had a value at 89.12/91.60 which was higher than the set value of 75/75, and 2) After the learning, the students had higher mean score of listening and speaking abilities than that of before at the .5 level of significance.

**Keywords:** *English Learning Activity, Animation Movie, Listening and Speaking Skills*

## INTRODUCTION

English language is one of very important international language in the world because people in different countries use English language to communicate to each other. Communicative activities have an important role in creating opportunities for students to use the language for communicative purposes. One of six policies in English language learning and teaching reform according to the ministry of education of Thailand is an English proficiency development of Thai students based on variety of activities [5] English language is desirable in modern life and it is necessary tomorrow. According to Gilakjani and Ahmadi, 40-50% of language competence comes from listening, while only 25-30% comes from speaking, 11-16% from reading and 9% from writing [8]. However, listening and speaking skills in English play a vital role for nowadays [6]. Listening and speaking tend to be more important in human communication and daily life. As a fact, any language develops from listening and speaking. "Listening" is defined as an active, focusing process which allows for a quick and precise analysis of sounds that are heard [7]. Therefore it is imperative to specifically and purposely teach language listening and speaking skills for communication first. The government of Thailand tries to improve its population's English communication because of ASEAN communication. From the survey of English proficiency index from 72 countries across the world, it found that Thai students' English proficiency was 47.21% from 100%. It was at 6 of English language ranking which was very low in comparing to students' English proficiency in 10 countries of Association of Southeast Asian Nations [3]. For instance, the findings also revealed that in terms of ability to use proper English for communication, Thailand was ranked number 53 among the Asia countries which indicated that Thailand has a very low proficiency in English, on the other hand, the top ASEAN countries such as Singapore and Malaysia were ranked number 12 and 13 of the Asia countries [4]. The school and educators are one group of important people who can develop and solve communicative English skills for Thai people. The previous ideas are in line with Porcel ideas. She states that the students can benefit a lot from watching films in English. They can improve their listening and speaking skills, they can enlarge their vocabulary knowledge and they can make their pronunciation and intonation better. Furthermore, she says that using movies in English class has been one of the most rewarding experiences she has ever had. So this research was one of many studies could be applied and adapted for English language development across Thailand. The aims of this research were to develop and examine the English learning activities by using Animation Movies to meet the standard efficiency of 75/75, to compare the students' English listening and speaking ability before and after learning. The benefit of this research was an affective English activity for English listening and speaking skills development for Thai students in Thailand. The integrated use of English activities through Animation movies can yield positive results and lead to the improvement of communicative competence. Learning English through Animation movies can be able to adapt in education and traveling and working abroad encourages students to learn the language, develops their ability to speak English fluently, and helps them overcome the language barrier.

## MATERIALS AND METHODS

### Materials

The main purpose of this study was to develop and examine the English learning activities by using Animation Movies to meet the standard efficiency of 75/75. For choosing animation movies, the students chose five movies from ten movies because they are required to study for one semester. As the materials of the teaching, the researchers focused on the available pedagogical films applied in context of some important criteria:

- Vocabulary frequency and unfamiliarity
- Existence of the variety in movie's subjects
- Participants' proficiency levels
- The relatedness of the animation movies to the students' daily life in order to be well with them.

For Movies difficulty description, students have to learn about 1,000 to 1,500 basic vocabulary words and be accustomed to different kinds of English accents. They also need to have basic communication skills, being able to understand contexts by listening. These are minimum requirements for learners to be able to use animation movies efficiently. The movies are mostly animation and those with easy vocabularies, slow speaking speed, and a simple story. This way, students can follow or guess the content of characters' conversations without difficulty. Furthermore, these movies also teach moral lessons and values for learners to understand naturally. The five titles were selected by the students for one semester as follow in Table 1:

**Table 1:** The are ten Animation movies for choosing to watch only two movies in the classrooms.

Animation Movies			
1	Ice Age	4	How to Train Your Dragon
2	Alvin and the Chipmunks 2	5	Dolphin Tale
3	Kung Fu Panda		

The following are the packs of animation movies before selection as shown in Table2:

**Table 2:** The are ten Animation movies for choosing to watch only two movies in the classrooms.

Animation Movies			
1	Ice Age	6	Dolphin Tale
2	Alvin and the Chipmunks 2	7	Garfield I
3	Ramona and Beezus	8	Garfield II
4	The Ant Bully	9	Hachi
5	Legend of the Guardians: The Owls	10	Kung Fu Panda

*\*Note: Those movies were allowed to be used for this research because of purchasing.*

### Procedure

The samples of the study was 30 of Grade 8 students who were studying English at the Demonstration School of Suan Sunandha Rajabhat University. They were selected based on cluster random sampling. Then they took a pre-test of English listening and speaking before watching animation movies. After every lesson, they took a questionnaire for each animation movies. Then they took a post-test of English listening and speaking after finishing watching animation movies.

The treatment lasted three sessions, 25 minutes per one session in once a week. During the treatment, in each session, the teacher devoted the time to watching the movie, practicing new words, and talking about that part of the movie. Each movie was presented to the students for 25 minutes in every session. Then, the teacher worked on that part of the movie. Students were also suggested to used note taking, question and answer, discussion, and description to better understand movies. During watching movies, students took notes while they watched the film for reviewing it. After watching the movies, some questions were asked to find out learners' understanding of it and then they described it. Moreover, the learners discussed the movie and gave their opinion about the plot of the movie.

### Data Analysis

The present research intends to investigate the effects of using animation movies on the development of listening and speaking skills. Moreover, the research will probe whether gender can be an effect variable in

differing students' performances. After collecting data, a series of analysis were conducted to evaluate the possible effects:

- An efficiency of lesson plans with 75/75 standard criteria was analyzed by E1/E2. For explanation, E1 means Efficiency of Process, and E2 means Efficiency of Products.
- A quiz to check the possible effect of pedagogical movies on students' listening and speaking skills was analyzed by means, standard deviation, and percentage.
- A pre-test and post-test to check the possible differences before and after the study was analyzed by means.

The design of this research is One Group Pre-test Post-test Design as shown in Table 3:

**Table 3:** Research design was One Group Pre-test Post-test Design

Group	Pre-test	Study	Post-test
30 Students	T1	X	T2

## RESULTS AND DISCUSSION

After obtained the five animation movies for lesson plans, the researcher designed English activities for Grade 8 students, the following results as shown by the objectives of the research.

1. The efficiency of the developed English learning activities by using Animation Movie according to value of 75/75 as shown in Table 4:

**Table 4:** The efficiency of the developed English learning activities by using Animation Movie

Test	Total score	(X)	S.D.	Efficiency of Activities (percentage)
Quiz	15	12.20	1.63	89.12
Post-test	30	28.03	2.68	91.60

From Table 4, it found that the efficiency of the developed English learning activities by using animation movie showed the quiz during learning and post-test had a value at 89.12/91.60 which was higher than the set value of 75/75.

2. The students' English listening and speaking ability before and after learning by using animation movie as shown in Table 5.

**Table 5:** The efficiency of the developed English learning activities by using Animation Movie

Students' English Proficiency	N	$\bar{x}$	S.D.	t	Sig. (2-tailed)
Pre-test	30	13.77	1.55	41.09	1.001
Post-test	30	26.68	2.68		≤

$P < 0.5$

From Table 5, it found that the students' English listening and speaking average scores before learning by using animation movie was 13.77 and after learning was 26.68, the students had higher average scores of listening and speaking test than that of before at the .05 level of significance.

From the objectives of the research, it found that:

1) The efficiency of the developed English learning activities by using animation movie showed the quiz during learning and post-test had a value at 89.12/91.60 which was higher than the set value of 75/75.

The efficiency of the developed English learning activities by using animation movies regarding to this research after learning was higher than the set value of 75/75 standard. It can show that listening and speaking activities should not be passive. If students watch animation movies, but do not have any chance to speak out. It is not interactive learning. Communication requires receiver and sender, so English activities should be two way communication as well [1]. The listening activity discussed in this paper is asking students to watch the English animation movies provided in the computers. The teachers need to design activities to facilitate the practice of the listening skills, based on students' knowledge about the characteristics of the informal oral English language, in order to help students succeed in their learning. Thus watching movies could become an interesting activity of learning a foreign language especially listening skill since students like watching movies. The activities of watching movies are followed by making report that will be presented in the classroom in a small group and in person. Movies can be good authentic learning materials for listening skill, because they contain dialogues from highly proficient English speakers, which could contribute to an easier understanding of their pronunciation. A good idea is to choose scenes that are very visual. The more visual the video is, the easier it is to understand – as long as the pictures illustrate what is being said. Selected English TV series, movies, advertising, could increase student's motivations as claims that students listen to relevant and interesting things for them which keep their motivation and attention high. Furthermore he claims that movies provide real situation, intonation and real pronunciation and allows students to a real context [1].

In general teachers should try to avoid films that contain some of the following elements as these make exploitation for language learning more difficult such as: high verbal density (lots of speech and very little action), naturalism in speech (very body talking at the same time will make it difficult to understand the dialogue), period language found in adaptations of period dramas and historical films, as it can create comprehension difficulties, because the words may be too formal, use of technical language (slang or jargon belonging to a particular group), dialect and regional accents, as they are notorious for mispronunciations of sounds. Moreover he suggests the teacher to select the film that have: (1) unambiguous action and a close connection between speech and action, (2) Clear conventional story lines, with simple story plot lines, (3) only one character speaking at a time, (4) elements that slow the diction (dialogue with a child or a non-native speaker). Based on the explanation above, the teacher has to tell the students not to watch the title of the movie contains the above problems. Therefore animated or cartoon movies can be the choices. The reason is animated and cartoon movies will have little or maybe no influence toward students [2].

2) The students' English listening and speaking average scores before learning by using animation movie was 13.77 and after learning was 26.68, the students had higher average scores of listening and speaking test than that of before at the .05 level of significance.

The students' English listening and speaking average scores before learning by using animation movie was 13.77 and after learning was 26.68, the students had higher average scores of listening and speaking test than that of before at the .05 level of significance. It can define that English activities based on English animation movies focused on student's skills directly because they can learn by themselves and the movies are interesting and encouraged students to pay attention. The movies were not boring. It is easy to understand. The students can show their opinion in front of the class to present what they have learned from the animation movies. They could tell the situation and the characteristics of the characters in the movies. watching movie enables students to improve their listening skill because they become engaged in the storyline of the film, which offers both a visual and audio depiction of dialogue and story in a potential real-life situation, using real emotions, dictions, tone and slang which can sometimes be lost in a classroom environment [9]. Films and TV shows are an integral part of students' lives so it makes perfect sense to bring them into the language classroom. it provides a source of authentic and varied language. Film provides students with examples of English used in 'real' situations outside the classroom, particularly interactive language – the language of real-life conversation. Film exposes students to natural expressions and the natural flow of speech. If they are not living in an English-speaking environment, perhaps only film and television can provide learners with this real-life language input. Film can bring variety and flexibility to the language classroom by extending the range of teaching techniques and resources, helping students to develop all four communicative skills. a whole film or sequence can be used to practice listening and reading, and as a model for speaking and writing. Film can also act as a springboard for follow-up tasks such as discussions, debates on social issues, role plays, reconstructing a dialogue or summarizing. It is also possible to bring further variety to the language learning classroom by screening different types of film: feature-length films, short sequences of films, short films, and adverts [10]

## CONCLUSION

This research aimed to develop and examine the English learning activities by using Animation Movies to meet the standard efficiency of 75/75 and to compare the students' English listening and speaking ability before and after learning. It found that the efficiency of the developed English learning activities by using animation movie showed the quiz during learning and post-test had a value at 89.12/91.60 which was higher than the set value of 75/75 and the students' English listening and speaking average scores before learning by using animation movie was 13.77 and after learning was 26.68, the students had higher average scores of listening and speaking test than that of before at the .05 level of significance. The students have learned about 1,000 to 1,500 basic vocabulary words and be accustomed to different kinds of English accents. They also need to have basic communication skills, being able to understand contexts by listening. These are minimum requirements for learners to be able to use English Mate efficiently. The movies are mostly animation and those with easy vocabularies, slow speaking speed, and a simple story. This way, students can follow or guess the content of characters' conversations without difficulty. Furthermore, these movies also teach moral lessons and values for learners to understand naturally. The integrated use of English activities through Animation movies can yield positive results and lead to the improvement of communicative competence. Learning English through Animation movies can be able to adapt in education and traveling and working abroad encourages students to learn the language, develops their ability to speak English fluently, and helps them overcome the language barrier.

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# THE EFFECTS OF USING ENGLISH ACTIVITY BASED ON CEFR TO DEVELOP ENGLISH PROFICIENCY OF GRADE 10-12 STUDENTS

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## ABSTRACT

The aims of this research were to 1) investigate an English proficiency of grade 10-12 students of experimental group or English Program 2) compare the English proficiency of the experimental group or English Program grade 10-12 students to the English proficiency of the control group or Normal Program grade 10-12 students. The research instruments were English activities based on the Common European Framework of Reference or CEFR, Course Outlines, Suan Sunandha Rajabhat University Test of English Proficiency (SSRU-TEP). The sample was 400 of Grade 10-11-12 students from the Demonstration School of Suan Sunandha Rajabhat University. The data were analyzed by using percentage. The samples, obtained by purposive sampling, were during the first semester of the academic year 2018. The research findings were 1) Grade 10-12 students of English Program acquired English very high scores at 65.48% or on B2 level. 2) Grade 10-12 students' English proficiency of English Program students or experimental group was 65.48% higher than Normal Program students or control group's English proficiency which was 47.02%. In comparison, English Program students or experimental group acquired higher English scores than Normal Program students or control group at 18.46%. This research found that the English proficiency of grade 10-12 students of experiment group or English Program students was on B1 level (in between 61-70) of SSRU-TEP standard test, and the English proficiency of grade 10-12 of control group or Normal program students was on A1 level (in between 0-49) of SSRU-TEP standard test. The experimental group's English proficiency was higher than the control group's English proficiency.

**Keywords** *English test, English proficiency, CEFR, SSRU-TEP*

## INTRODUCTION

English language is one of very important international language in the world because people in different countries use English language to communicate to each other. One of six policies in English language learning and teaching reform according to the ministry of education of Thailand is an English proficiency development of Thai students based on variety of activities [4]. The ministry of education of Thailand specifies English Language Teaching based on The Common European Framework of References for Languages or CEFR [4]. The CEFR is a framework, published by the Council of Europe in 2001, which describes language learners' ability in terms of speaking, reading, listening and writing at six reference levels. Language teaching is most successful when it focuses on the useful outcomes of language learning. Linking teaching to the CEFR is a very effective way of achieving this [2].

From the survey of English proficiency index from 72 countries across the world, it found that Thai students' English proficiency was 47.21% from 100%. It was at 6 of English language ranking which was very low in comparing to students' English proficiency in 10 countries of Association of Southeast Asian Nations [1]. For instance, the findings also revealed that in terms of ability to use proper English for communication, Thailand was ranked number 53 among the Asia countries which indicated that Thailand has a very low proficiency in English, on the other hand, the top ASEAN countries such as Singapore and Malaysia were ranked number 12 and 13 of the Asia countries [3]. The government of Thailand tries to improve its population's English communication because of ASEAN communication. The school and educators are one group of important people who can develop and solve communicative English skills for Thai people. So this research was one of many studies could be applied and adapted for English language development across Thailand. The aims of this research was to investigate an English proficiency of grade 10-12 students of English Program through English activities based on CEFR and to compare the experimental group's English

proficiency of grade 10-12 students to the control group's English proficiency of grade 10-12 students. The use of the research was a method of English language development for Thai students in Thailand.

## MATERIALS AND METHODS

In this research we set three stages of developing English through activities based on CEFR for experimental students.

**Stage I:** Creating the Activities for four skills of English language. For this stage, researchers brainstormed and designed extra activities for listening, speaking, reading and writing. The Extra English activities were based on the Common European Framework of Reference (CEFR) from different abilities of students which were divided into four groups of A1, A2, B1, and B2. The experimental students were divided into four groups for each grade. Four groups of grade 10 students were A1 group, A2 group, B1 group, and B2 group. Grade 11 and Grade 12 were divided in four groups as well. Every student had to learn topics of the provided English activities except B1 and B2. But the control group of Grade 10-12 students usually learned English subjects with native speakers. The extra English activities for the experimental group were designed, but the English activities for the control group were not. It was depended on subject teachers' plans. The following were those activities for the experimental group as shown in Table 1:

**Table 1.** Extra English activities for the experimental group.

Topic for Activities	Periods of Learning
English at Public	16 hours
English Tour Guide	16 hours
English Through Movie	16 hours
English Breakfast	16 hours
English Discovery	16 hours

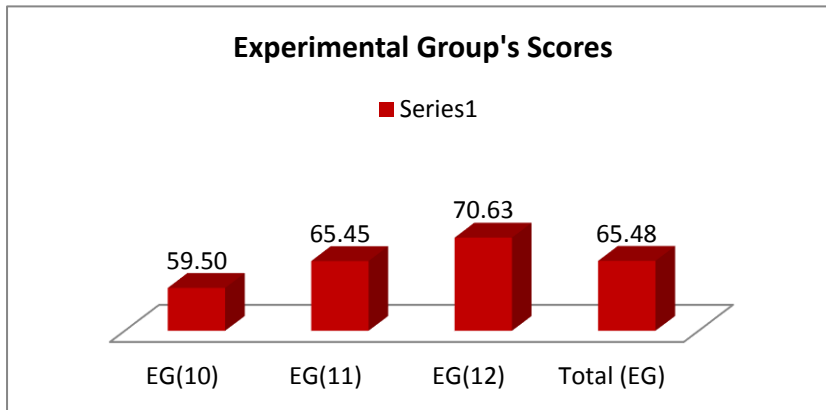
**Stage II:** Discussion and Using. Researchers brought the extra English activities with course outlines to discuss and train how to use those with native teachers of English subjects. They should learn how to use activities and course outlines which would be taught the experimental group of Grade 10-12 students.

**Stage III:** Assessment. The experimental students and the control students take the Suan Sunandha Rajabhat University Test of English Proficiency (SSRU-TEP) ([ssruplan.ssru.ac.th](http://ssruplan.ssru.ac.th) Online). This test was created for testing academic communication of the students and general people who want to know their English proficiency. It included concepts and core skills of listening, grammar, vocabulary, and writing. They are basic skills for daily life communication and for further studies. The test was designed and based on the Common European Framework of Reference for Languages (CEFR) which is a frame of English assessment for European countries, the ministry of education of Thailand used CEFR as a tool of English assessment. For SSRU-TEP, there were steps of difficulty index or easiness of the test from the easiest until the most difficult with six levels; A1 (scores 0-49), A2 (scores 50-60), B1 (scores 61-70), B2 (scores 71-80) C1 (scores 81-89), and C2 (scores 90-100). The ministry of Thailand prescribed Thai students in the university should get B2 level before graduation. Thai senior high students should get B1 level, and also junior high students should get A2 level. The SSRU-TEP test was one of the best English standard test for all [1].

## RESULTS AND DISCUSSION

After teaching English activities based on the Common European Framework of Reference for Languages or CEFR, the results of the test were reported by the SSRU-TEP officer as in Figure 1 to 3 as followed:

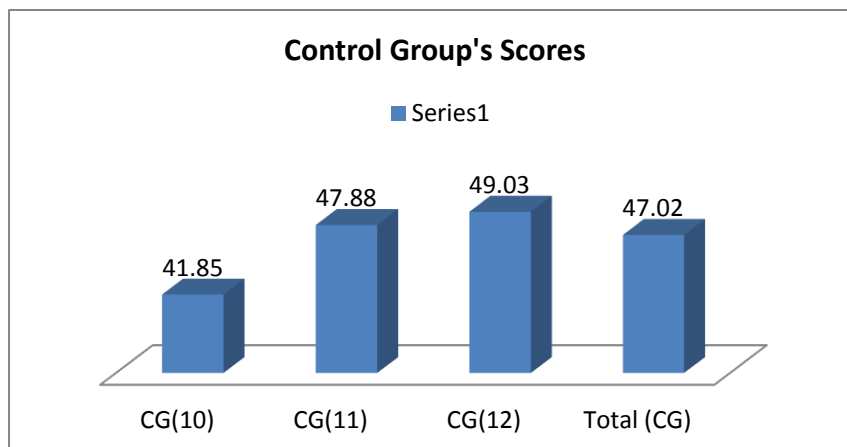




**Figure 1:** The graph showed the English Program students or experimental group's English scores of grade 10, grade 11, and grade 12.

*Source (s) : From the document of the result of English Proficiency test of the Demonstration School of Suan Sunandha Rajabhat University 2018.*

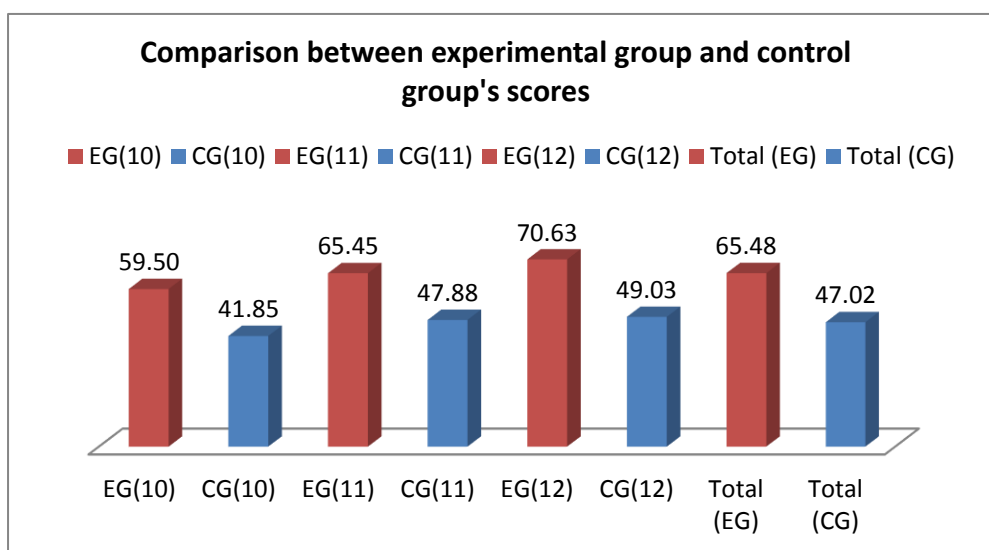
From Figure1, the graph showed the English Program students or experimental group's English scores of grade 10-12 increasingly at 59.50%, 65.45%, and 70.63%. The total of average was 65.48% which was on B1 level based on CEFR standard.



**Figure 2:** The graph showed the Normal Program students or control group's English scores of grade 10, grade 11, and grade 12.

*Source (s) : From the document of the result of English Proficiency test of the Demonstration School of Suan Sunandha Rajabhat University 2018.*

From Figure2, the graph showed the Normal Program students or control group's English scores of grade 10-12 increasingly at 41.85%, 47.88%, and 49.03%. The total of average was 47.02% which was on A1 level based on CEFR standard.



**Figure 3:** The graph showed a comparison between the experimental group and or control group's English scores of grade 10, grade 11, and grade 12.

*Source (s) : From the document of the result of English Proficiency test of the Demonstration School of Suan Sunandha Rajabhat University 2018.*

From Figure3, the graph showed the total of English Program students or experimental group's English scores was 65.48% higher than Normal Program students or control group's English scores was 47.02%. So the experimental group's English proficiency was higher than the control group's at 18.46% in comparison.

The research found that:

1) Grade 10-12 students of English Program acquired English very high scores at 65.48% or on B2 level. It can be defined that English activities based on CEFR were successful and appropriate to be taught in the classrooms. The students can learn English outdoor, and practiced English through different activities with native speakers. The activities chosen for teaching the students were active and communicative.

2) Grade 10-12 students' English proficiency of English Program students or experimental group was 65.48% higher than Normal Program students or control group's English proficiency which was 47.02%. In comparison, English Program students or experimental group acquired higher English scores than Normal Program students or control group at 18.46%. It can be defined that the English proficiency of grade 10-12 students of experiment group or English Program students was on B1 level (in between 61-70) of SSRU-SEP standard test, and the English proficiency of grade 10-12 of control group or Normal program students was on A1 level (in between 0-49) of SSRU-TEP standard test. The experimental group's English proficiency was higher than the control group's English proficiency.

## CONCLUSION

This research aimed to investigate an English proficiency of grade 10-12 students of experimental group or English Program students and to compare the English proficiency of the experimental group or English Program grade 10-12 students to the English proficiency of the control group or Normal Program grade 10-12 students. It found that the English proficiency of English Program grade 10-12 students was very high which was on B2 level, and it also was higher than the Normal Program grade 10-12 students at 18.46%. It discovered English activities based on CEFR were one of excellent teaching methods for English learning and teaching students in Thailand. English activities based on CEFR should be fun, encourageable, and challenging for the students to do English activities [7]. The Students need to practice English outdoor and also learn English through technology if it is possible because technology is more interesting than normal activities in the classrooms. A variety of different activities or lessons should be provided and rearranged before the lessons start. This would be helpful and successful for English learning and teaching. English activities based on CEFR because they were active and communicative languages teaching [6].

### ACKNOWLEDGEMENTS

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## TECHNOLOGY VENTURES PROGRAM AT UIC 2005-2018

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### ABSTRACT

As a professor of entrepreneurship and strategic management, my research has focused on high-growth, high-technology startups and how entrepreneurial teams recognize opportunities and effectively commercialize technologies. In 2005, I created an on-campus, applied, interdisciplinary technology ventures startup lab, which allowed me and teams of graduate students to immerse ourselves in and gain a thorough understanding of the processes of conceiving, funding, staffing and launching high-technology startups. This six-course program required partnerships with technology transfer offices of universities and national research labs, investors, and the business community. The program included a classroom component for graduate students, a variety of co-curricular activities, as well as extensive interaction with and mentoring from technology inventors, potential investors, legal advisors, and business leaders. Startups successfully launched by the technology ventures startup lab included:

- OrthoAccel Technologies was created to commercialize an orthodontic device that cuts in half the time needed to correct malocclusion using a device invented by a professor of dentistry. At the time the students began forming the company, animal studies were underway. Since then millions of dollars were raised, animal and human studies were successfully completed, FDA approval was secured in 2012 and their product, Acceladent, has been sold in dozens of countries. The company is growing rapidly and some executives left Invisalign to join OrthoAccel.
- HeartSounds was created to commercialize an auscultation-based heart monitor created by a professor of engineering. The heart monitor digitally records sounds of the heart then uses computerized sound-separation algorithms to parse various components of sound and provide highly sophisticated, noninvasive insights into heart health. The company was self-funded by the students and inventor and recently submitted for FDA approval.
- EverFile Systems was created to commercialize a patented approach to storing and retrieving big data that tests indicate is 80% more efficient and allows 1,000 times faster recovery from failure than current systems. The company secured more than \$4 million in venture capital.
- NuFortis was created to commercialize a technology that monitors in real time the structural health of bridges and other structures and forewarns of failure. The team is partnering with the US Department of Transportation, NASA and the US Air Force to test their technology in a variety of settings.
- Thermal Conservation Technologies was created to commercialize a highly efficient, novel insulation material created by a professor of engineering. Since founding, the company has raised more than \$1M in grants to continue developing market-ready products.
- BioRegenix was created to commercialize a technology invented by professors that stimulates in vivo creation of new tissue from stem cells. The company has raised several million dollars in grant funding. Recently one of the inventors resigned from the university to build the company full time. The company is currently being nurtured by a technology accelerator under the mentorship of an actively engaged venture capital company planning to provide series-A funding.
- RaDEant Technologies was created to commercialize a super-hydrophobic coating invented by researchers at Oak Ridge National Laboratories that prevents scaling and fouling in industrial equipment. The company has recently signed contracts with a major coatings manufacturer to produce and distribute their product and secured agreements with several large customers. They are currently in due diligence with two venture capital firms interested in investing in their rapid expansion.
- Pax Neuroscience was created to commercialize a blood test created by a professor of pharmacy that effectively determines whether or not depression medications are working. The company has won several major grants and continues to progress toward development of their product.

- SanoGene Therapeutics was created to commercialize an RNA-based therapy invented by a professor of medicine to treat several major forms of cancer. Over six years the company raised more than \$1M in venture capital, completed animal studies and was preparing to launch human clinical trials when IP conflicts with and legal threats from major pharmaceutical companies led the company to cease operations.

The technology ventures startup lab provided an opportunity for real-time, engaged research based on interacting with all aspects of these startups on a daily basis. This paper will provide a series of mini case studies that will focus on how each of these startups developed its unique business model over time. The focus will be on the iterative process of business model development based on secondary research and feedback from a variety of mentors and potential investors. It will also highlight how this hands-on program provided a world class education that transformed the lives of students.

# **CONSUMER ATTITUDES AND INVOLVEMENT TOWARDS HIGH-TECH PRODUCTS AS ANDROID AND MULTI-FUNCTIONAL CELL-PHONES: A FIELD STUDY CARRIED ON UNIVERSITY STUDENTS FROM ANKARA, TURKEY**

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**JEL classification code: M31**

## **ABSTRACT**

This study intends to find out the attitudes and the involvement of university students towards android and multi-functional cell-phones. A survey is applied to 648 respondents selected via stratified sampling of which 600 found eligible to be analyzed, from Ankara, the capital of Turkey with 4.5 million inhabitants. The respondents are required to answer 35 questions of which five are related to demographic characteristics of these respondents. The rest 30 are statements which are designed to reflect the customer involvement with high-tech products. The study consists of five parts. The first part is an introduction where the scope and the purpose of the study are concisely stated. The second part relates to the theoretical background of the subject matter and the prior researches carried out so far. The third part deals with research methodology, basic premises and hypotheses attached to these premises. Research model and analyses take place in this section. Theoretical framework is built and a variable name is assigned to each of the question asked or proposition forwarded to the respondents of this survey. 30 statements or propositions given to the respondents are placed on a five-point Likert scale where. The remaining five questions about demographic traits as age, gender, occupation, educational level and monthly income are placed either on a nominal or ratio scale with respect to the nature of the trait. Ten research hypotheses are formulated in this section. The fourth part mainly deals with the results of the hypothesis tests and a factor analysis is applied to the data on hand. Here exploratory factor analysis reduces 30 variables to four basic components. In this part Kaiser-Myer-Olkin (KMO) test and reliability analysis produced high scores as 0.920 and 0.937 respectively in addition non-parametric bivariate analysis in terms of Chi-Square and Mann-Whitney U-tests are applied to test the hypotheses formulated in this respect. The fifth part is the conclusion where findings of this survey is listed.

**Keywords:** Product and Brand Involvement, Family and Group Involvement, Nationality and Citizenship Involvement, Search for Prestige, Price Sensitivity.

# **THE ATTITUDES AND THE BEHAVIOR OF THE CONSUMERS TOWARDS THE ENVIRONMENT-FRIENDLY ACCOMODATION FACILITIES WITHIN THE SCOPE OF GREEN MARKETING: A FIELD STUDY FROM ESKISEHIR, TURKEY**

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## **ABSTRACT**

The aim of this research is to find out the opinions and the perceptions of the consumers about the environment-friendly accomodation facilities within the scope of green marketing. A survey is applied to 240 respondents, who were required to give an answer to 35 questions in Eskişehir which is a city in Turkey with 800.000 inhabitants and has three major universities. . Among these 35 questions five are of demographic type. The rest 30 are statements placed on a five-point Likert scale to reflect the attitudes of these people. This study consists of five parts. The first part is an introduction where the scope and the purpose of the study is put forth. The second part reflects the theoretical background and gives a summary of prior researches related to the subject matter. Research methodology is stated in the third part, where several research hypotheses are formulated. The fourth part gives results of the hypothesis tests and an exploratory factor analysis reduces 30 variables to eight basic components Cronbach's Alpha for scale reliability is quite high ( $\alpha = 0.834$ ) and so is the sample adequacy ratio ( $KMO = 0.810$ ) In addition non-parametric bivariate analysis in terms of Chi-Square is applied to test the hypotheses formulated in this respect. The fifth part is the conclusion where findings of this survey is listed.

**Keywords:** Green Image and Environment Protection, Price-Quality Relationship, Green Marketing and Product Differenciation, Health and Eco-System, Advertising Effect.

## **INTRODUCTION**

Marketing as a science has proved many advances in its specific areas as branding, retailing, services, product management, consumer behavior, international trade, marketing communications and so forth.. It is however perplexing to know that tourism and hospitality involvement in marketing and marketing research has been given less emphasis with respect to the above listed activities especially in Turkey. If we are able to go little bit further and add a new future as environmental concern to the subject matter the emphasis on hostality marketing dwindles more in this context. Tourism and hospitality is today a major economic activity owing to the fact that the needs of the human beings has evolved with an expectation of gaining more advantage of using peoples' free time on more satisfactory activies i.e more reproductive using of leisure. This style of thinking

encourages people to attribute a greater weight on tourism and hospitality. The concepts leisure and unavoidable effort is sometimes mixed in the minds of people although they are quite apart. This idea leads us to draw a line between leisure and free time. Free time is a product of illusion and does not necessarily mean that it is really "free". Illusory and rarely free; economic and social forces appropriate free time from the individual and sell it back to them as the commodity known as "leisure".

The concept of "green marketing" is the second component of this study. By the advent of the ecological problems, consumers are supposed to pay more attention on environmental protection and focused more on green lifestyle. Consequently, the industry is taking action to deal with ecological issues on behalf of community i.e. the prospective consumers. There is an increasing tendency for the firms to develop programs on green marketing and introducing green products to the consumers which is supposed to provide them competitive advantage over their competitors, and instills satisfaction on the part of consumers. In fact, this style of thinking will provide benefits and contribute to the brand image of the firms.

## **1. Literature Review and Prior Research**

Green Marketing is recently adapted as a most popular trend in hospitable marketing which introduced instilled the environment-friendly concept as far as individuals, animals and the other living things are concerned (Rajeshkumar, 2012). The climatic changes in terms of global warming, air pollution and increasing number of natural catastrophes forced the individuals to pay more concerns over these issues. Consequently firms and individuals focused their concern on eco-friendly products in their production and purchases. Caring for health is also a product of such concern. Many firms and establishments volunteered to take part in this world-wide campaign. Social consciousness and socially-oriented marketing responsibility lead the firms to add green marketing applications in their annual programs and send green messages to their clients and also to public (Nagaraju & Thejaswini, 2014).

As far as the tourism market is concerned, the values attached to nature and environment have important implications on tourism hospitality. Nature together with biological technological and social subsystems build up to what is called environment, when they interact to each other. For tourism industry the term environment has a specific meaning. Therefore the meaning of environment is particular for tourism industry in terms of natural ambience and resources (Gartner and Lime, 2000). The complex consequences of tourism activities in terms of mechanical impacts can be summoned under four broad categories as, the compression and hardening of soil, erosion and devastation of vegetation; intensive exploitation of land areas that brings about changes in landscape; pollution of air, soil and water; fuel burning, evaporation of solvents, leakage of chemicals, waste; disturbance factors like noise or stench.

### ***1.1 Tourism Hospitality and Post-modernism***

When we take the story from consumers' point of view, consumers exhibit quite a complex behavior and conducting research in this respect is considered as a pioneer in marketing research practice (Willeams 2006).

Contemporary tourism and hospitality suggests us the sophisticated term "postmodernism", term which is

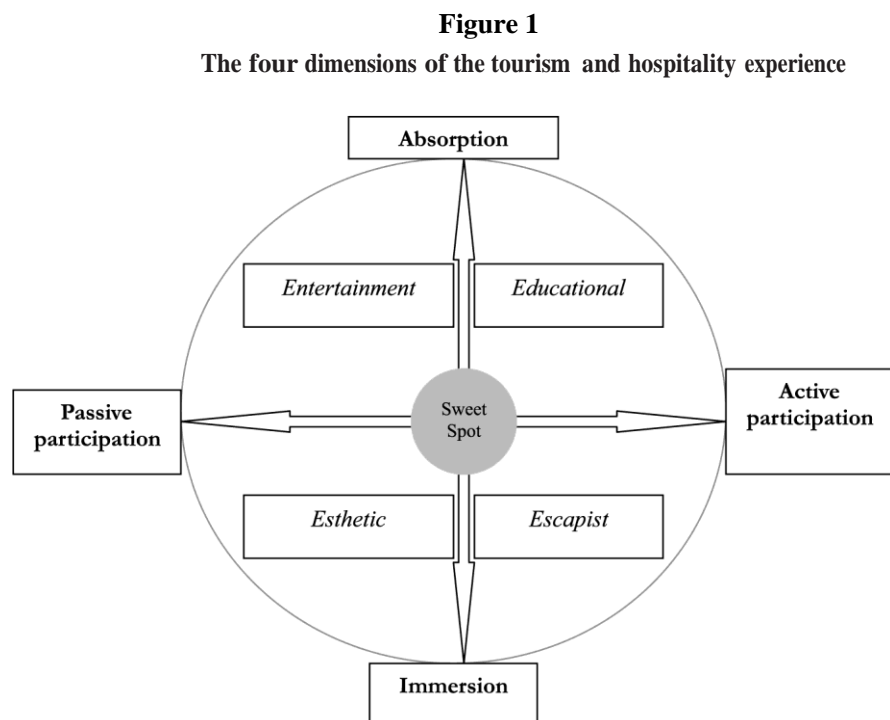


even not yet accepted by many researches and regarded as an "intellectual fad" (Williams A.J., 2000) . ").

"The term postmodernism refers to a break in thinking away from the modern, functional and rational, and during the last couple of decades it has spread across all domains of knowledge, including marketing. The key concepts of post-modern marketing are fragmentation, indeterminacy and distrust of universal discourse, but by eschewing modernism it introduces a radically new and different cultural movement which coalesces in a reconceptualisation of how we experience and explain our world. In terms of experiential marketing two aspects of the post-modern discourse are most relevant, hypereality and image" (Williams, 2016, p. 484)

### 1.2. The Four Dimensions of Tourism Hospitality

Tourism and hospitality experience can be depicted on a two-coonrinate scale as shown in Fig.1 below. In this figure, customer participation is ranged from passive to active and pmaced on horizontal scale, and connection from absorption to immersion on vertiical scale. For exaaple as far as participation is concerned, watching a movie in a cinema is a passive construct; whereas dining in a restaurant is an active construct. Similarly, watching a tourism event and enjoying it absorb the event without taking place in it; whereas a person participating directly or indirectly in the event is immersed in it (Pine and Gilmore (1998)).



**Source:** Adapted from Pine and Gilmore (1998)

The above figure suggests that experiences are grouped under four main componints as "education", "entertainment", "escapist", and "esthetic". For exampye going to a show imqlies that spectators are normally

participating passively in the show and they connect the activity in an absorptive manner rather than immersing into the activity.

### ***1.3. Ethical and Responsible Tourism***

The author of this paper believes that ecological considerations in tourism hospitality is one of the major considerations of ethical and responsible tourism. The expectations in terms of consumer needs and demands has changed and became much more sophisticated during the last decades; i.e. the consumers' expectations are much more than beach, sea and sun as in 1960s or seventies. Today holidaymakers are expecting a holiday which means more than two weeks on the beach under sunshine. Consumers disposition in terms of leisure consumption today is towards the purchase of more ethically traded products. An international organization "the Association of Independent Tour Operators" (AITO) put forward the following guidelines for responsible tourism (Goodwin, p.275):

"As members of AITO we recognise that in carrying out our work as tour operators we have a responsibility to respect other people's places and ways of life. We acknowledge that wherever a tour operator does business or sends clients it has a potential to do both good and harm, and we are aware that all too often in the past the harm has outweighed the good.

All tourism potentially has an environmental, social and economic impact on the destination involved. We accept, therefore, that we as tour operators should aim to be responsible in all our dealings on each of these three levels. To help us to do so we have proposed a set of guidelines intended to help companies, customers and local suppliers recognise their common responsibilities to:

- *protect the **environment**- its flora, fauna and landscapes*
- *respect local cultures — traditions, religions and built heritage*
- *benefit local communities both economically and socially*
- *conserve natural resources -**from** office to destination*
- *minimise pollution — through noise, waste disposal and congestion.*

We are an association of individual, independent companies, each with our own distinctive style and field of operation. As such, we each have our own ways of fulfilling the details of these responsibilities by:

- *establishing our own policies and involving our staff*
- *informing our clients about responsible tourism and, where appropriate,*
- *encouraging them to participate*
- *working with our suppliers and partners to achieve responsible goals and practices*
- *publicising good practice to encourage and spread responsible tourism.*

#### ***1.4. Environment and Social Responsibility in Tourism Industry***

Tourism industry regards environment specifically as a combination of natural ambience and resources. In other words, travelers generally care for destinations which promise a balance between human beings and nature (Gartner and Lime, 2000). Ecological hotels are environmentally friendly places, where the managers of these establishments develop programs so as to make savings in the use of water and energy as well as to reduce solid waste (Hayes, Ninemeier & Miller, 2011). The future operations of the tourism industry in terms of long-term strategy is integrated with the sustainable development of touristic establishments. The concept of Business Environmental and Social Responsibility (BESR) denotes the responsibility of tourism firms regardless of their sizes toward environmental and social issues (Azilah, 2006, p.2). Worldwide records reveal that by 2000 tourism industries' estimated budget totals up to 2 trillion USD and reflects at least 15 % of global employment (Faulkner et al., 2000). The accelerated growth in tourism industry brought forth some negative consequences in terms of environmental issues e.g. by intervening the physical environment and causing some negative impacts on it (Wahab & Pigram, 1997; Hassan, 2000). Negative tourism impacts are listed on the table below (Azilah, 2006, p. 4):

**Table 1**  
**Negative Tourism Impacts**

##### **ENVIRONMENTAL:**

1. Habitats loss to tourism-related developments particularly resort development in pristine areas.
2. Land erosion and water runoff during construction.
3. Increased demand on water supply.
4. Increased demand on energy supply.
5. Increased burden on solid waste management.
6. Pollution of water bodies.
7. Air pollution from various mode of transport.
8. Alteration of the natural environment—ocean floor, mangrove area, beaches.

##### **SOCIAL:**

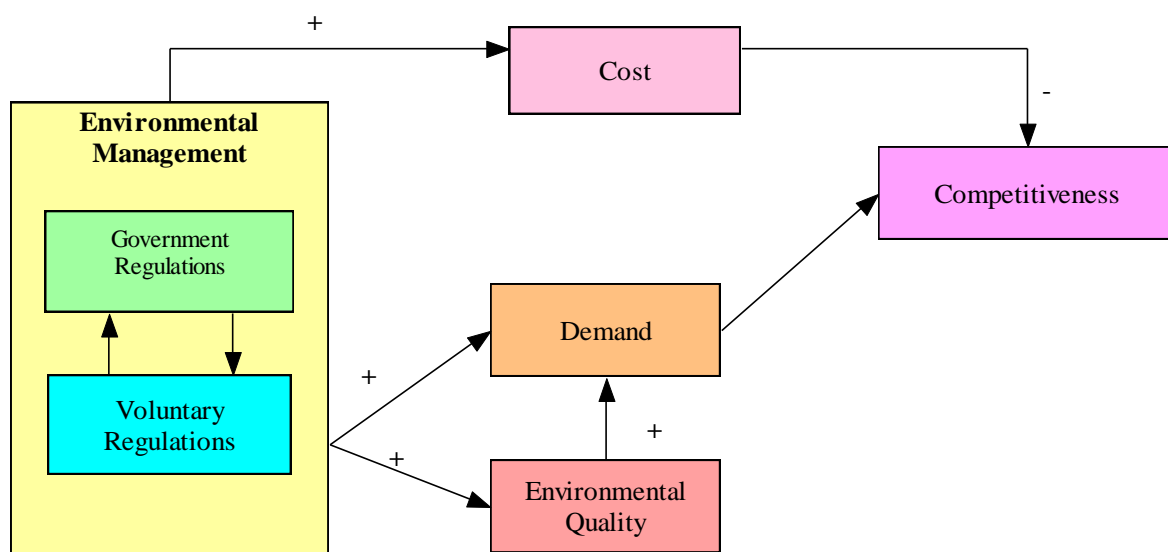
1. Transition of traditional lifestyle to modernism.
2. Value conflict or deterioration of local identity and value system from the meeting of different cultures.
3. Loss of traditional economies in favour of tourism-related economy.
4. Potential displacement of local people in favour of tourism development.
5. Loss of authenticity of local arts and crafts to commodification.
6. Standardisation of tourist facilities.
7. Increased crimes.
8. Low paying jobs.

Sources: Wahab and Pigram, 1997; Hong, 1985; Mowforth and Munt, 1998.

#### ***1.5 Environmental Management and Environmental Image***

Tourist attractions are an important part of successful tourism destination and can be used to reinforce, consolidate, and assist the promotion of the tourism industry (Walsh-Heron & Stevens, 1990: 12). The significance of tourist attractions to tourism has been proved in different ways. Primarily, tourist attractions are the principle parts for tourism sector. They can be called as the "lifeblood" for tourism industries (Gunn, 1997, Swarbrooke, 1998). Environmental management has mainly two components as public and private (Hu and Wall, 2008, p.622). Government regulations in terms of environmental measures is the first part of this story. On the other hand consumer demand is an important issue which is incorporated into the environmental measures as reactions to imposed government regulations. All these actions and reactions have positive impacts on demand, environmental quality and cost and finally demand positively affects competitiveness among the firms, whereas cost has reverse (negative) effects on it as shown on the flowchart below:

**Figure 2**  
**Environmental Management and the Competitiveness of a Nature-Based Tourism Destination**



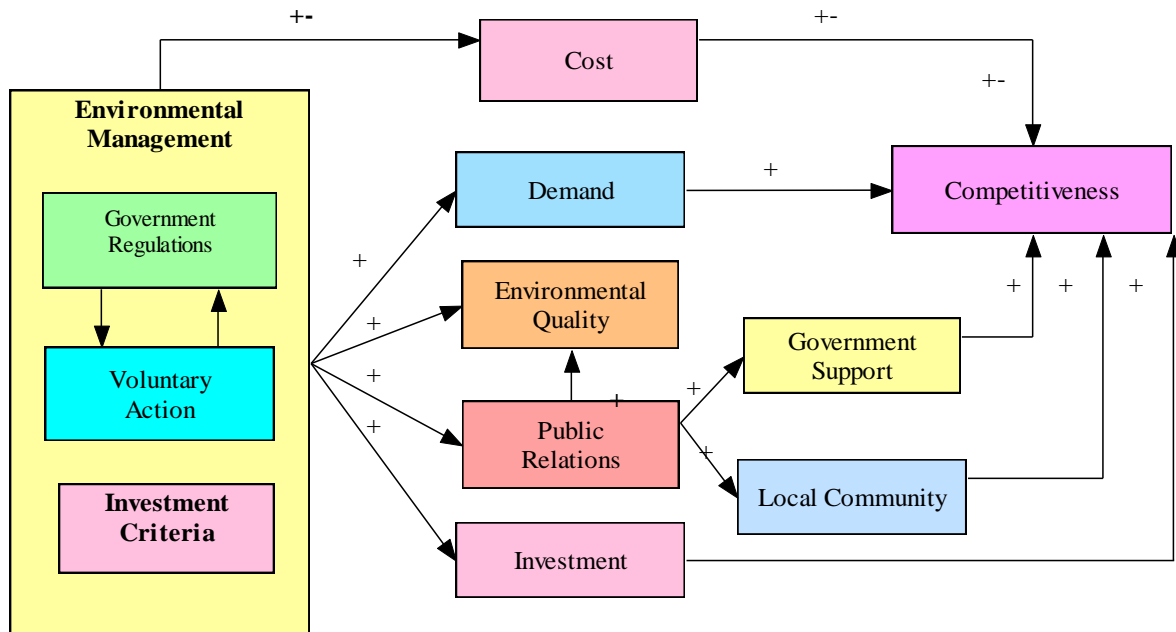
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urce: Huybers and Bennett, 2003

More elaboration of the above figure by adding more company efforts in terms of new investments and stressing on public relations have positive impacts on government support and local community which turn have more positive impacts of firms' competitiveness; however the negative impacts of increasing costs should also be regarded:

Figure 3

### Environmental Management and the Competitiveness of Tourist Attraction



Source: Modified from Huybers and Bennett 2003

## 2. Research Model and Hypotheses

This field research was conducted in April 2014 in Eskisehir, Turkey, a large city with 800,000 inhabitants and three universities. A survey on 240 respondents who are selected via stratified sampling. 104 senior students taking a “Tourist Marketing The respondents are required to answer 35 questions of which 30 of them on ordinal scale and the rest five are related to demographic characteristics of these respondents. 30 statements are designed to reflect the the opinions and the perceptions of the consumers about the environment-friendly accomodation facilities within the scope of green marketing and placed on a five-point Likert scale type ranging from “1= strongly disagree” to “5= strongly agree.” The remaining five questions about demographic traits as age, gender, occupation, educational level and monthly income are placed either on a nominal or ratio scale with respect to the nature of the trait.. Ten research hypotheses are formulated in this section.

### 2.1 Variables Grouped for Analysis

The variables used in the analyses and their explanations are as follows:

**Table 2.**  
**Variables and Their Explanations**

Variable	Explanation	Mean	SD
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*Part 1. Developing Green Image*

IMAGEBUSSP	The image of business partners, such as travel agencies, tour operators, wholesalers and airlines, should be consistent with the green image that a hotel wants to	4.19	0.861
TRYTOCONV	Hotel companies try to convince customers to be environmentally friendly during direct sales activities	3.51	0.985
COLLABOR	Hotel companies should collaborate with environmental groups to promote their green image more effectively	4.40	0.769
CUSTCONF	Some hotels have attempted to develop green certification programmes to gain green customer confidence	4.06	0.718
SIMPLECOMP	Hotel companies see simple compliance with environmental legislation as an opportunity to promote their green credentials	3.95	0.864
CREATEACT	Environmental labels create incentives for the hotel business to change the market	3.68	0.888
BUSSPART	The selection of business partners, such as travel agencies, tour operators, wholesalers and airlines, is influenced by environmental issues	3.71	0.890
COMMITMT	Green promotions and advertisements influence hotel guests and industrial buyers because they reflect the hotel's commitment to the environment	4.04	0.799
JOINASSOC	Joining commercial green marketing and central reservation associations that advertise and promote green hotels helps hotels to reach green t)	4.17	0.752

*Part 2 Price-Quality Relationship*

ECOFACILT	Hotel customers are willing to pay a higher price for eco-facilities	3.07	1.222
PAYHIGHP	Customers are willing to pay a higher price if part of the amount paid is donated to green activities	3.39	1.137
RECEPTIVE	Hotel customers who are more receptive to environmentally friendly products and services are more willing to pay extra for them	3.68	1.047
CHARMORE	Hotel companies should charge a premium for environmentally friendly products and services to recover the additional costs incurred in their	3.41	1.090
DESIREGR	Guests desire green hotel products and practices	3.35	1.020

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**Part 3 Product Differentiation and Innovation**

OPTPRDIF	Green hotel products and services may provide an opportunity for product differentiation	4.15	0.752
PNODSERV	Green hotel marketing should begin with green product and service design (e.g. room occupancy sensors that save energy in guest rooms)	4.35	0.814
INNOVATV	Hotels are seeking to bring innovative green products and services to the market	3.98	0.882
ELEVATE	Green hotels can elevate industry members' image and reputation to attract green tourists who demand green accommodation when traveling	4.04	0.948

**Part 4 Health and Eco-System**

SAVEWATR	Hotels are sincere in instituting programs that save water and energy, reduce solid waste, use resources economically and protect the planet's	2.49	1.175
DONOHARM	Hotels provide products and services that do no harm to human health	2.94	1.195
MARKETRSCH	Hotel companies are carrying out the extensive product-specific market research necessary to ensure green product and service success	3.32	1.063

**Part 5 Advertising Effect**

CLAIMINAD	Environmental claims in advertisements are often met with criticism from competitors and consumer organisations	3.40	1.112
SUSPICIOUS	Hotel customers are suspicious of environmental advertising and claims	3.28	1.113
REDUCOST	Green pricing works only when green products and services reduce hotel guests' costs	3.36	1.188

**Part 6 Distribution Channels**

EFFECTCHAN	The internet is an effective channel for marketing a hotel's green initiatives directly to customers	4.29	0.891
GREENIMG	A hotel should use environmentally friendly distribution channels to build a green image	4.35	0.734

**Part 7 Repeat Purchase and Promotion**

PERFORMN	Green hotel product and service performance plays a key role in influencing customers' revisit intention	3.58	1.071
PROMOTION	Environmental labels (e.g. ISO 14001) are an effective promotional tool in the hotel industry	4.02	0.851

**Part 8 Premium Pricing**

ECOLABEL	Hotel companies often use eco-labels on packaging, and display them on their corporate web sites	3.58	0.990
PREMPRIC	Green hotel products and services are almost always priced at a premium relative to conventional offerings	3.60	1.070

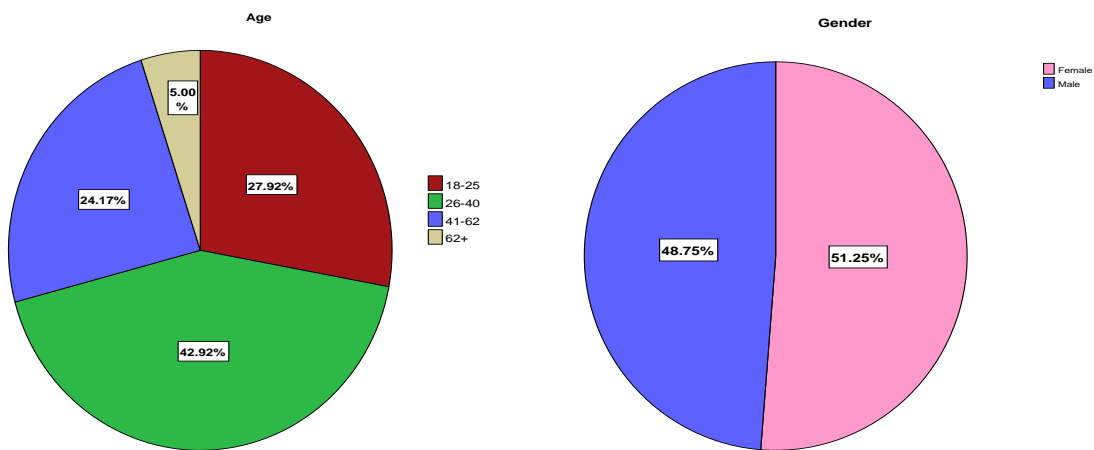
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### *Part 9 Consumer Demographics*

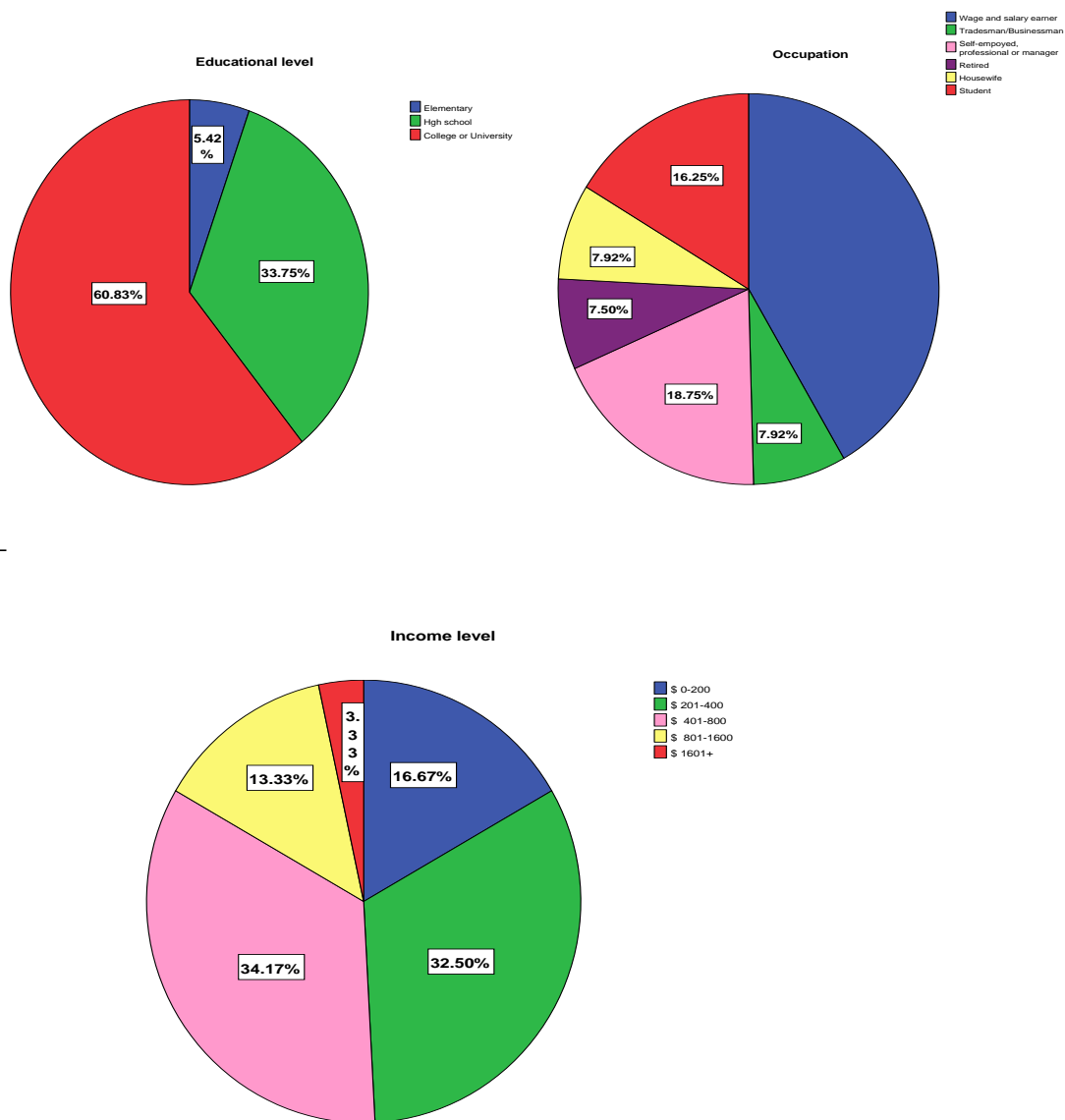
AGE	Age	2.06	0.848
GENDER	Gender	1.49	0.501
OCCUPATION	Occupation		
EDUCATION	Educational level	2.55	0.597
INCOMELV	Income level	2.54	1.026

#### *2.2. Distribution of Consumer Degographics*

Distribution of consumer demographics can be seen best from the pie-charts presented below:







### 2.3. Hypotheses Formulated for Analysis

The following hypotheses are formulated to be used for analysis:

H<sub>1</sub> : Willingness to pay more for environment-friendly eco-facilities differ significantly across consumer demographics.

H<sub>2</sub> : Developing Green Image for Hotel Industry has Significantly Different Impacts on Consumers.

H<sub>3</sub> : Environmental Advertising and Claims Often have Negative Impact on Hotel Customers.

H<sub>4</sub> : Hotel Customers are Sure That Hotel Companies Provide Product and Services which are Perfectly Harmless to Human Health.

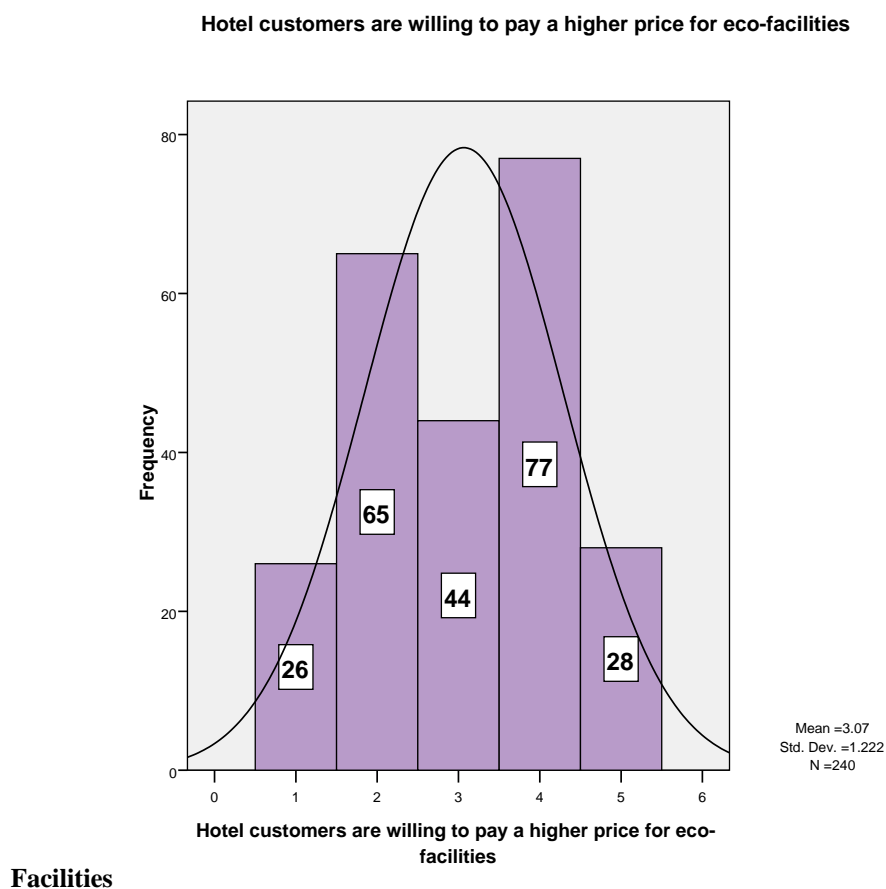
H<sub>5</sub> : Repeat Purchase Intentions are Positively Related with Green Hotel Product and Service Performance.

### 3. Analyses and Results

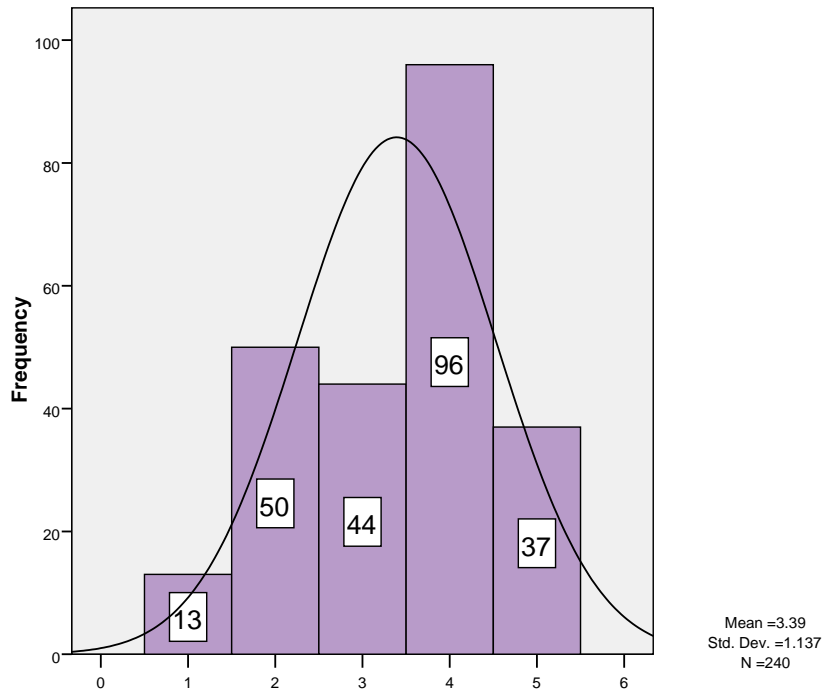
#### 3.1 Results of the Hypotheses Formulated

H<sub>1</sub> hypothesis is not supported at most levels of consumer demographics. The exception here is the income levels. On the overall sense 56.81 % of the respondents gave affirmative answer and asserted their willingness to pay more for eco-friendly products and facilities. On the other hand only 27.08 % declined this proposition and the rest 16.11 % stayed neutral. The distribution of the responses to the given statements are shown as histograms below:

**Figure 4 Distribution of Consumers who are Willing to Pay More for Eco-Friendly Tourism**

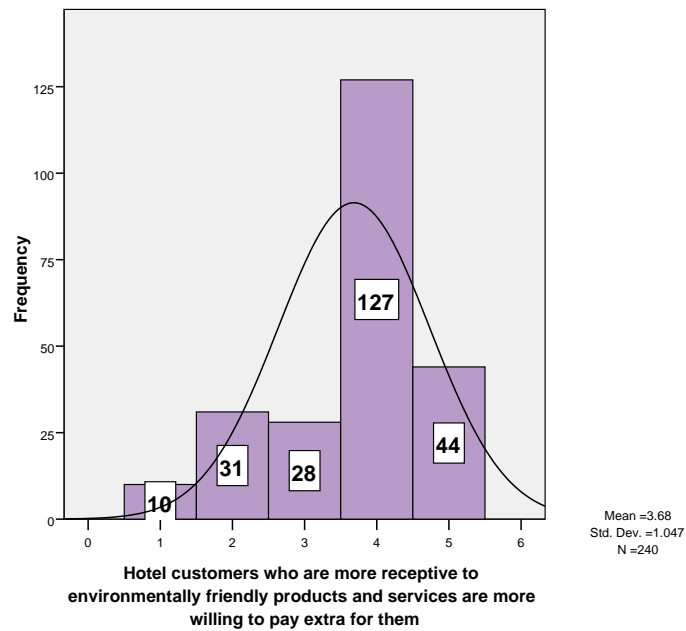


**Customers are willing to pay a higher price if part of the amount paid is donated to green activities**



**Customers are willing to pay a higher price if the amount paid is donated to green activities**

**Hotel customers who are more receptive to environmentally friendly products and services are more willing to pay extra for them**



The cross tabulation of the results in terms of contingency tables is shown below:

Table 3

**The Relationship Between "Willingness to Pay More for Eco-Friendly Facilities and Consumer Demographis**

	Age	Gender	Occupation	Education	Income
Hotel customers are willing to pay a higher price for eco-facilities	Rejected	Rejected	Rejected	Rejected	Rejected
Customers are willing to pay a higher price if part of the amount paid is donated to green activities	Rejected	Rejected	Rejected	Rejected	Accepted
Hotel customers who are more receptive to environmentally friendly products and services are more willing to pay extra for them	Rejected	Rejected	Rejected	Rejected	Rejected

Chi-Square Statistics Accepted at  $p < 0.01$  or  $p < 0.05$  significance levels; Rejected at  $p > 0.05$  significance level.

**Table 4 Willingness to Pay More for Eco-friendly Facilities if Part of the Amount Paid is Donated to Green Activities and Consumer Income Groups**

	INCOME LEVELS				
CONSUMER OPINION	\$ 0-200	\$ 201-400	\$ 401-800	\$ 801-1600	\$ 1601+
Strongly Disagree	15.0 %	5.1 %	1.2 %	3.1 %	12.5 %
Disagree	30.0 %	23.1 %	22.0 %	8.3 %	0.0 %
Neither Agree nor Disagree	7.5 %	21.5 %	22.0 %	21.9 %	0.0 %
Agree	37.5 %	38.5 %	39 %	50.0 %	37.5 %
Strongly Agree	10.0 %	12.8 %	15.9 %	18.8 %	50.0 %

Disagree : 26.2 %      Neutral: 18.3 %      Agree : 55.5%      Chi-Square test  $p = 0.22$

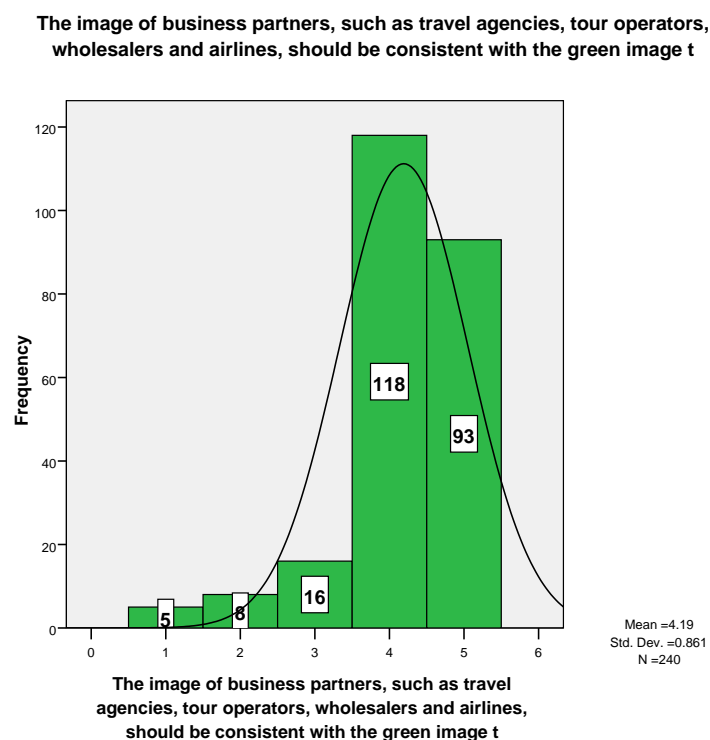
H<sub>1a</sub> is accepted at  $r < 0.05$  significance level

As could be seen from the table above, although on the overall sense there is a general approval of paying more for eco-friendly facilities (71.25 % vs. 17.08 %); lowest income group's denial rate is greater than highest income group's denial rate (45.0 % to 12.5 %). Similarly there is a greater approval for this idea in highest income group in contrast with the lowest income group (87.5 % to 47.5 %). Consequently we can say that there is a significant difference between highest and lowest income groups as far as willingness to pay more for eco-friendly facilities is concerned.

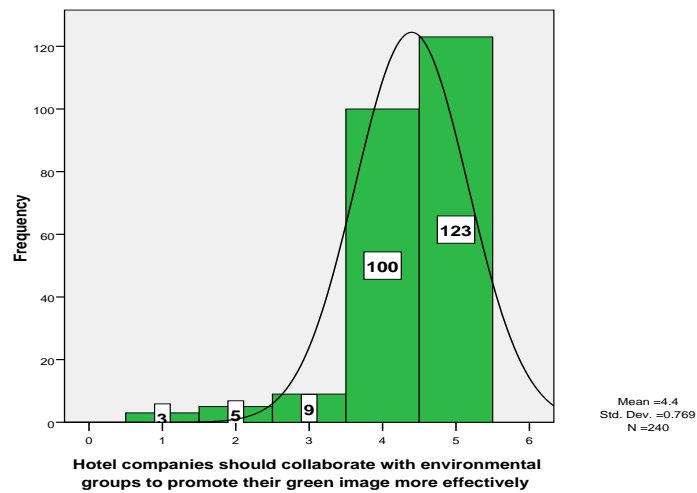
H<sub>2</sub> is declined at three levels of green image statements : i.e there is no significant difference across consumer demographics as far as development of green image is concerned. However on the overall sense a great majority of consumers approve companies' "green image development" programs:

**Figure 5**

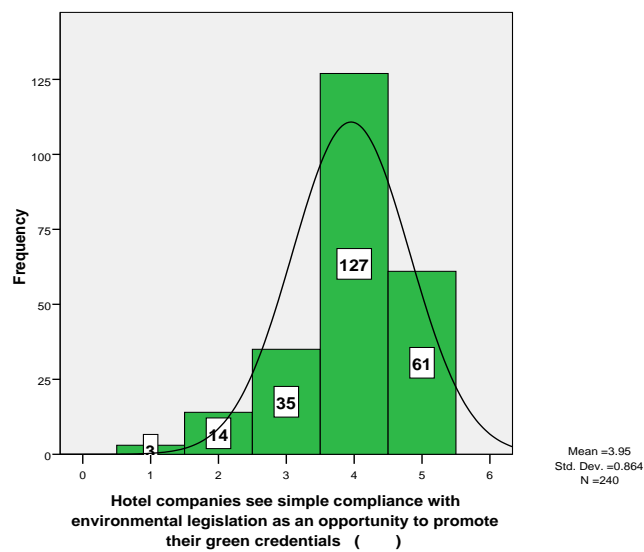
### **Consumers' Appraisal of Green Image Development Programs**



**Hotel companies should collaborate with environmental groups to promote their green image more effectively**



**Hotel companies see simple compliance with environmental legislation as an opportunity to promote their green credentials ( )**

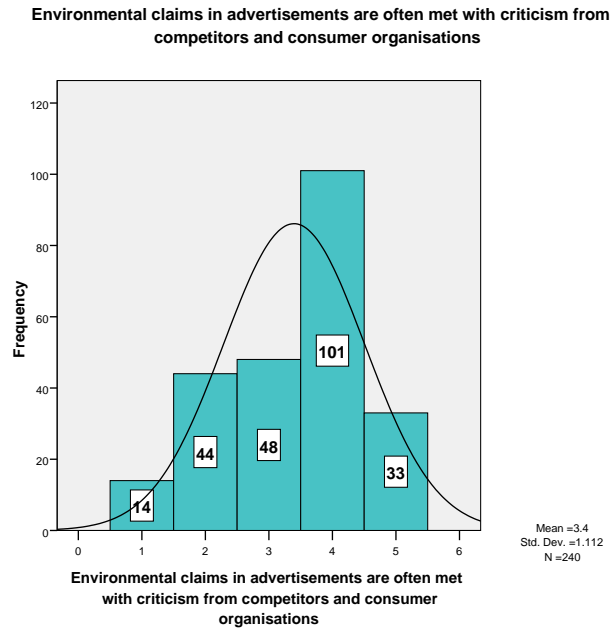


The charts above reveal that on the dverall sense, 86.39 % of the consumers support copnpanies' green image developing programs and only 5.27 % decline it. The rest 6.34 % stayed neutral.

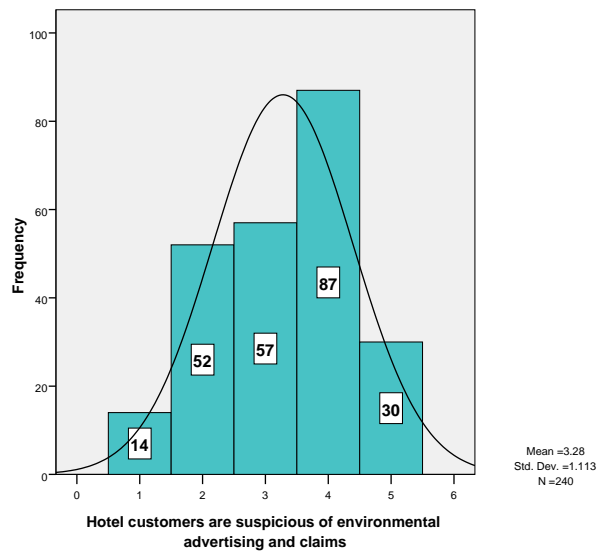
\_H<sub>3</sub> hypothesis is sustained at all levels of ecological advertising claims and the cautious approach of the consumers to advertising claims is revealed as shown below:

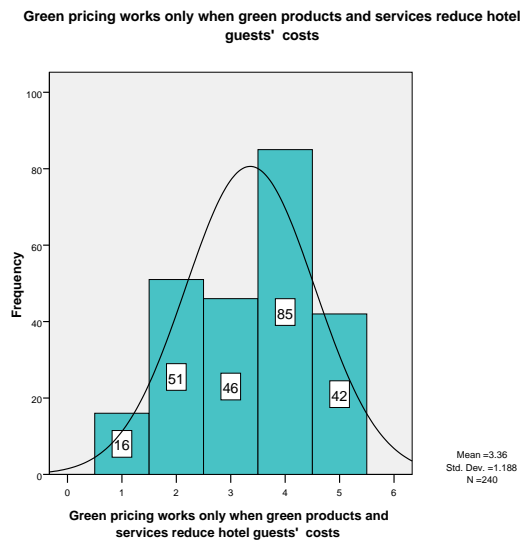
**Figure 5**

**Cautious Approach of Hotel Customers Towards Advertising Claims**



**Hotel customers are suspicious of environmental advertising and claims**



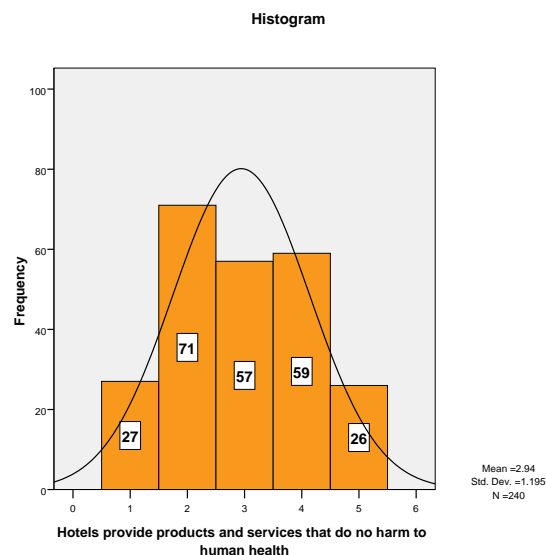


52.50 % of the total respondents raised a suspicion to ad claims for environmental protection and only 26.53 % confirmed it. The rest 20.97 % neither agreed nor disagreed.

H<sub>4</sub> is rejected at all levels of consumer demographics.

**Figure 6**

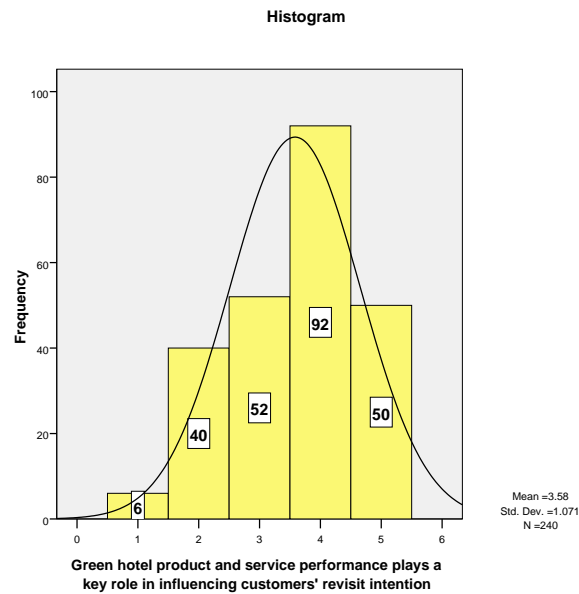
#### Relationship Between Human Health and the Products and Services Provided by Hotel Companies



The figure above reveals that 40.83 % of the respondents reject the idea that hotels provide products and services that do no harm to human health; and only 35.42 % of them agreed with this idea. The rest 23.75 % have no affirmative or negative predilection.



H<sub>5</sub> is supported at most levels of consumer demographics (except "gender"). on the overall sense 59.17 % of the consumers agree with this prdposition, whereas only 19.17 % rejects it. The rest 21.66 % has no idea.



This hþpothesis is rejected at only one level and it is the "gender" where females and males differ significantly in appraising "krepeat purchases". This is proven on the table below:

**Table 5**

**Consumer Gender Differences in Appraising Repeat Purchases of Hotel Products and Services**

Gender	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Female	2.4 %	11.4 %	28.5 %	35.8 %	22.0 %
Male	2.6 %	22.2%	14.5 %	41.0 %	19.7 %

It is evident from the above table that males are more reluctant to perform repeat purchases from the same hotels than females.

### 3.2 Factor Analysis

Factor analysis carried out in this study reduced 30 variables under eight basic components as follows:

Table 6

## Factor Analysis

## Rotated Component Matrix(a)

	Component							
	1	2	3	4	5	6	7	8
<b><i>Component 1 Developing Green Image</i></b>								
The image of business partners, such as travel agencies, tour operators, wholesalers and airlines, should be consistent with the green image t	.684	.089	.029	-.131	.058	.183	.087	.082
Hotel companies try to convince customers to be environmentally friendly during direct sales activities	.611	.330	.136	.301	-.088	.194	-.149	-.098
Hotel companies should collaborate with environmental groups to promote their green image more effectively	.610	.135	.141	-.215	-.053	.086	.306	.077
Some hotels have attempted to develop green certification programmes to gain green customer confidence	.604	.179	.101	.262	.126	.039	-.012	-.017
Hotel companies see simple compliance with environmental legislation as an opportunity to promote their green credentials ( )	.584	.043	.074	.205	-.159	.158	-.197	.083
Environmental labels create incentives for the hotel business to change the market	.515	.193	.063	-.144	.145	.027	.163	.222
The selection of business partners, such as travel agencies, tour operators, wholesalers and airlines, is influenced by environmental issues ( )	.505	.074	.144	.047	-.049	.353	.007	.323
Green promotions and advertisements influence hotel guests and industrial buyers because they reflect the hotel's commitment to the environment	.488	.241	.189	.042	-.032	.288	.089	-.252

Joining commercial green marketing and central reservation associations that advertise and promote green hotels helps hotels to reach green t)	.482	.302	.064	.043	-.191	.201	-.032	-.392
<b>Component 2 Price-Quality Relationship</b>								
Hotel customers are willing to pay a higher price for eco-facilities	.189	.756	-.038	.131	-.049	-.010	.002	.109
Customers are willing to pay a higher price if part of the amount paid is donated to green activities	.269	.745	.001	.049	.035	.058	.023	-.069
Hotel customers who are more receptive to environmentally friendly products and services are more willing to pay extra for them	.101	.683	.096	-.071	.036	.200	.244	.055
Hotel companies should charge a premium for environmentally friendly products and services to recover the additional costs incurred in their	.213	.566	.103	.059	.171	.108	-.211	-.004
Guests desire green hotel products and practices	.095	.522	.173	.326	-.055	.017	.204	.197
<b>Component 3 Product Differentiation and Innovation</b>								
Green hotel products and services may provide an opportunity for product differentiation	.006	.011	.810	-.063	-.012	-.028	.109	-.007
Green hotel marketing should begin with green product and service design (e.g. room occupancy sensors that save energy in guest rooms)	.083	.097	.775	.057	.047	.085	-.006	-.068
Hotels are seeking to bring innovative green products and services to the market	.258	.054	.675	-.034	-.069	.038	.013	.167

Green hotels can elevate industry members' image and reputation to attract green tourists who demand green accommodation when traveling	.198	.050	.539	-.002	.214	.424	.064	.039
<b>Component 4 Health and Eco-System</b>								
Hotels are sincere in instituting programs that save water and energy, reduce solid waste, use resources economically and protect the planet's	.024	.044	.037	.807	-.066	-.037	.156	-.069
Hotels provide products and services that do no harm to human health	-.026	.040	-.211	.728	.137	.120	.193	.039
Hotel companies are carrying out the extensive product-specific market research necessary to ensure green product and service success	.089	.140	.101	.624	-.070	.222	-.355	.159
<b>Component 5 Advertising Effect</b>								
Environmental claims in advertisements are often met with criticism from competitors and consumer organisations	-.035	.123	.028	.065	.789	.022	.022	-.044
Hotel customers are suspicious of environmental advertising and claims	.024	.053	.011	-.090	.757	-.101	.136	.086
Green pricing works only when green products and services reduce hotel guests' costs	-.019	-.453	.004	.054	.583	.201	-.082	-.077
<b>Component 6 Distribution Channels</b>								
The internet is an effective channel for marketing a hotel's green initiatives directly to customers	.248	.111	.080	.181	.032	.723	-.035	.032
A hotel should use environmentally friendly distribution channels to build a green image	.359	.266	.230	-.121	-.073	.369	.136	-.125

**Component 7 Repeat Purchase and Promotion**

Green hotel product and service performance plays a key role in influencing customers' revisit intention	.093	.075	.191	.221	.194	.015	.775	.037
Environmental labels (e.g. ISO 14001) are an effective promotional tool in the hotel industry	.169	.333	-.048	.192	-.246	.384	.403	.050

**Component 8 Premium Pricing**

Hotel companies often use eco-labels on packaging, and display them on their corporate web sites	.433	.149	.022	.283	-.053	-.066	-.014	.599
Green hotel products and services are almost always priced at a premium relative to conventional offerings	.017	.458	.117	-.113	-.006	.212	-.060	.523

**KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.810
Bartlett's Test of Sphericity	Approx. Chi-Square	2104.564
	df	435
	Sig.	.000

**Reliability Statistics**

Cronbach's Alpha	N of Items
.834	30

**CONCLUSION**

The following findings are derived from this study:

1. Majority of consumers are willing to pay more for eco-friendly products and services; the only exception happens to be on income levels. In other words there is a significant difference between highest and lowest income groups. Low income groups are reluctant to pay more in this respect.
2. Green image development programs are supported unanimously at all levels of consumer demographics.

3. Advertising claims are cautiously anticipated by the consumers; i.e. consumers pay little attention to green advertisements.
4. Hotel claims of providing products and services that do not harm individual health is not taken seriously by the respondents.
5. Majority of consumers agree to realize repeat purchases of green products and services; except "gender level of consumer demographics contradicts this majority. Males do not agree with this proposition.

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# THEORIES IN BI&A RESEARCH

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## ABSTRACT

Business intelligence and analytics (BI&A) has become commonly researched topic in the areas of business and management information systems and many qualitative literature reviews can be found to show the current body of knowledge. But no study exists that would show the state of the art from the perspective of theoretical paradigms used in BI&A studies, therefore this paper offers an insight into theoretical foundations of BI&A research based on relevant publications between 1990 and 2016 from Web of Science databases. A quantitative bibliographic method of bibliographic coupling is used to detect the relevant publications and the qualitative analysis is carried out to identify the theoretical paradigms in selected publications and to classify them into originating areas within BI&A research. After the results analysis, the conclusion and the boulevards for further research are given. Proposed study enables the researchers to better understand the current state of used theories in the BI&A research.

**Keywords:** Business information systems, Business intelligence and analytics, Scientometrics

## 1. INTRODUCTION

Business intelligence and analytics (BI&A) is becoming important topic in business and management information systems and many researchers tackles it within their studies and the field of BI&A has been widely researched during the past decades from the practical and theoretical points of view, the latter being mostly qualitatively supported. However, to the best of our knowledge, there is a lack of literature reviews that would show the current state of the art in the area in the terms of theoretical paradigms that have been employed by researches while studying the BI&A. To address this issue presented research first quantitatively extracts the relevant publications from the BI&A extant literature using bibliometric method of bibliographic coupling and then applies a structured qualitative approach to match the BI&A publications with theoretical paradigms enabling their classification into several originating areas.

The rest of the paper has four sections. The first section briefly describes existing literature and theory. The second section provides the methodology used and explains the data collection process as well as identification of the most relevant publications. The second section presents results in terms of theoretical foundations of BI&A research offering insights into each of identified originating area with respect to theories used. Conclusion with potentials for further research are given in the last section.

## 2. LITERATURE & THEORY

Since the first mention of the BI&A concept [1] many different definitions can be found in the literature while the most frequently used has been proposed by [2] describing BI&A as a set of various techniques and tools for critically analyzing the companies' data to assure better decision-making process. In the last 30 years the number of researches in BI&A filed constantly grows basing on several different theories and methodologies and many literature reviews have been published to reflect the different characteristics of the area [3,4,5,6].

In addition to traditional literature review the current state of the art in specific area can be reflected using bibliometrics. While the traditional literature reviews suffer from subjectivity of researchers, a quantitatively



based bibliographic methods ensure objectivity of the research findings. Several bibliographic methods exist. The most popular one in the recent history has been a citation analysis. It is based on the number of citations and shows the most cited studies, authors or journal in the area [7]. The next one is a co-citation analysis, which is used to quantify the content similarity between publications, authors and journals using the frequency of two publications being cited together in one paper [8,9, 10]. The next one is the bibliographic coupling, which was also used in presented research. Selected method identifies the relationship between publication, authors or journals based on quantity of references common to two publications [11]. Higher the amount of overlapped references is, stronger is the relationship of two publications. In comparison to other bibliographic method a bibliographic coupling is not time affected since the number of shared references by two publications does not change [12,13].

### 3. METHODS

Presented section explains methodology used to extract the BI&A publications from the relevant databases, describes applied bibliometric method to identify the most relevant publications for this research and explains the qualitative approach used to identify originating areas based on theoretical paradigms.

#### ***3.1 The BI&A Publications Retrieval***

Relevant publications from the area of BI&A were identified through the acknowledged online publication platform Web of Science (WoS), which has been widely used for bibliometric analyzes of specific fields [14]. The following databases within WoS have been used: Social Sciences Citation Index (SSCI), Social Science Citation Index Expanded (SCI-EXPANDED), and Arts & Humanities Citation (A&HCI) Index. We have set the search strings “business intelligence,” “business analytics,” or “business intelligence and analytics” to be included in the title or topic of the individual publication considering the following subject categories: business, management, business finance, economics, library science, social science, information science, multidisciplinary science, interdisciplinary and computer science information system. The observation period was set in time window from 1.1.1990 to 30.8.2016. After qualitative examination of all found records 1123 publications have been extracted from the WoS to be examined by the bibliographic coupling, which consisted of 21893 cited references.

#### ***3.2 Identification of the Most Relevant BI&A Publications Applying Bibliographic Coupling in Selected Software Solution***

The method of literature review, as one of the most widely used techniques to review prior and relevant literature in the area offering a basis for further progress of the field [15], was complemented by a bibliographic method of bibliographic coupling to extract the relevant scientific papers from the BI&A area. Bibliographic coupling was selected as it is recognized in the literature as the most accurate method for representing the state of the art of the specific area [16, 7].

Various software solutions are available for appliance of bibliographic coupling. While the BibExcel, Sitkis and SciMat have been used widely in the past [7], nowadays the VOSviewer, a specialized software tool for constructing, analyzing and visualizing bibliometric networks [17], has gained on a popularity and was used for purposes of presented study. To construct the bibliographic structure the unit of analysis was set to documents and the association strenght method has been considered for nomalization of the strength of the relationships among the publications. WoS resulted in 1123 coupled publications and on the basis of the total coupling link strenght the 100 most influential publication have been seleected for the analysis.

### 3.3. Theoretical Paradigms and Originating Areas

All of 100 considered publications have been qualitatively analyzed, out of which for 75 publications it was possible to identify theoretical paradigms used. The rest of publications (25) were not considered in this study. Based on the analyzed publications the theories were classified into four originating areas with respect to selected BI&A literature.

## 4. RESULTS

This section presents the theoretical foundations of BI&A research based on qualitative examination of identified papers. The theories have been classified into four originating areas that are presented in the Tables 1, 2, 3 and 4 followed by the short analysis. The list of publications is provided in the Appendix I.

**Table 2**  
**Originating area: Strategic management**

Theories	Publications authors and years*
<b>Resourced-based view</b>	Cosic, R., Shanks, G., & Maynard, S. B. (2015); Shuradze, G., & Wagner, H. T. (2016, January); Shanks, G. G., & Bekmamedova, N. (2012, June); Wieneke, A., & Lehrer, C. (2016); Santiago Rivera, D., & Shanks, G. (2015); Bekmamedova, N., & Shanks, G. (2014, January); Krawatzeck, R., & Dinter, B. (2015); Ittmann, H. W. (2015); Kasemsap, K. (2015); Olszak, C. M. (2016); Weng, S. S., Yang, M. H., Koo, T. L., & Hsiao, P. I. (2016); Singh, H., & Samalia, H. V. (2014); Azevedo, A., & Santos, M. F. (2010); Wang, H. C. (2014).; Sangari, M. S., & Razmi, J. (2015); Rouhani, S., Ashrafi, A., Zare Ravasan, A., & Afshari, S. (2016).
<b>Knowledge-based view of the firm</b>	Peters, M. D., Wieder, B., Sutton, S. G., & Wakefield, J. (2016); Erickson, S., & Rothberg, H. (2013, October); Erickson, G. S., & Rothberg, H. N. (2014); Eom, S. (2014).
<b>Dynamic capabilities perspective</b>	Shuradze, G., & Wagner, H. T. (2016, January); Shanks, G. G., & Bekmamedova, N. (2012, June); Wieneke, A., & Lehrer, C. (2016); Sharma, R., Mithas, S., & Kankanhalli, A. (2014); Chae, B., & Olson, D. L. (2013); Fernández, A., del Río, S., López, V., Bawakid, A., del Jesus, M. J., Benítez, J. M., & Herrera, F. (2014); Bekmamedova, N., & Shanks, G. (2014, January); Kowalczyk, D. W. I. M., & Buxmann, P. (2014); Spruit, M., & Sacu, C. (2015); Olszak, C. M. (2014, September); Işık, Ö., Jones, M. C., & Sidorova, A. (2013); Sangari, M. S., & Razmi, J. (2015).
<b>Absorptive capacity</b>	Elbashir, M. Z., Collier, P. A., & Sutton, S. G. (2011).
<b>Ambidexterity theory</b>	Kowalczyk, M., & Buxmann, P. (2015).
<b>Theory of critical success factors</b>	Eybers, S., & Giannakopoulos, A. P. (2015, September); Yeoh, W., & Koronios, A. (2010); Olszak, C. M. (2016); Bole, U., Popovič, A., Žabkar, J., Papa, G., & Jaklič, J. (2015); Audzeyeva, A., & Hudson, R. (2016); Yeoh, W., & Popovič, A. (2016); Mohamadina, A. A., Ghazali, M. R. B., Ibrahim, M. R. B., & Harbawi, M. A. (2012, November); Anjariny, A. H., Zeki, A. M., & Hussin, H. (2012, November); Anjariny, A. H., & Zeki, A. M. (2014, December); Anjariny, A. H., & Zeki, A. M. (2013, December).
<b>Maturity models</b>	Thamir, A., & Theodoulidis, B. (2013, October); Olszak, C. M. (2016); Olszak, C. M. (2013, September); Chuah, M. H., & Wong, K. L. (2012); Chuah, M. H., & Wong, K. L. (2012); Olszak, C. (2013, February).
<b>Co-agency theory</b>	Foshay, N., & Kuziemy, C. (2014).

\*The full references data are provided in the Appendix I.

As it can be seen from the Table 1 the most widely applied theory in the Strategic management area is a Resourced-based view theory relating BI resources to company performance followed by the Dynamic capability perspective theory exploring capability of BI resources increasing companies' competitive advantages. Another important theory is related to Critical success factors, since it is vital for the companies to identify factors for successful BI implementation into their daily performances. Knowledge-based view of the firm and Maturity models are used occasionally when researching BI&A, while Absorptive capacity, Ambidexterity theory and Cogency theory are rarely considered.

**Table 2**  
**Originating area: Information systems**

<b>Theories</b>	<b>Publications authors and years*</b>
<b>The Delone and McLean IS success model</b>	Grublješić, T., & Jaklič, J. (2015); Foshay, N., Taylor, A., & Mukherjee, A. (2014); Popovič, A., Coelho, P. S., & Jaklič, J. (2009); Hou, C. K. (2012); Popovič, A., Hackney, R., Coelho, P. S., & Jaklič, J. (2012); Popovič, A., & Jaklič, J. (2015); Wieder, B., & Ossimitz, M. L. (2015); Grublješić, T., & Jaklič, J. (2015); Gonzales, R., Wareham, J., & Serida, J. (2015).
<b>Technology acceptance model (TAM)</b>	Tijssen, R., Spruit, M., van de Ridder, M., & van Raaij, B. (2011); Grublješić, T., & Jaklič, J. (2015); Foshay, N., Taylor, A., & Mukherjee, A. (2014); Popovič, A., Coelho, P. S., & Jaklič, J. (2009); Grublješić, T., & Jaklič, J. (2015).
<b>Unified theory of acceptance and use of technology</b>	Grublješić, T., & Jaklič, J. (2015).
<b>Diffusion of innovations theory</b>	Yoon, T. E., Ghosh, B., & Jeong, B. K. (2014, January); Brooks, P., El-Gayar, O., & Sarnikar, S. (2015).
<b>Task-technology fit theory</b>	Brooks, P., El-Gayar, O., & Sarnikar, S. (2015).
<b>Technology-organization-environment (TOE) framework</b>	Burnay, C., Jureta, I. J., Linden, I., & Faulkner, S. (2016); Grublješić, T., & Jaklič, J. (2015).
<b>Motivation theory</b>	Li, X., Hsieh, J. P. A., & Rai, A. (2013);

\*The full references data are provided in the Appendix I.

The most widely applied theory within the area of Information systems relates to The Delone and McLean IS success model considering the user satisfaction, intention to use, and net benefits from the BI use. The second most commonly used theory was Technology acceptance model (TAM) undertaking the usefulness of BI systems. Diffusion of innovations theory, Motivation theory and Technology-organization-environment (TOE) framework are used occasionally, while Unified theory of acceptance and use of technology and Task-technology fit theory are used rarely.

**Table 3**  
**Originating area: Organizational behavior**

<b>Theories</b>	<b>Publications authors and years*</b>
<b>Information processing view</b>	Cao, G., Duan, Y., & Li, G. (2015); Kowalczyk, D. W. I. M., & Buxmann, P. (2014); Ferrari, A. (2011); McCormack, K., & Trkman, P. (2014); Trkman, P., McCormack, K., De Oliveira, M. P. V., & Ladeira, M. B. (2010); de Oliveira, M. P. V., McCormack, K., & Trkman, P. (2012).
<b>Contingency theory</b>	Ebner, K., Bühnen, T., & Urbach, N. (2014, January); Cao, G., Duan, Y., & Li, G. (2015)
<b>Institutional theory</b>	Ramakrishnan, T., Jones, M. C., & Sidorova, A. (2012).

\*The full references data are provided in the Appendix I.

The most widely applied theory within the area of Organizational behavior relates to Information processing view, which was used to bridge the gap between information processing needs and information processing capabilities. Follows the use of Contingency theory, while the Institutional theory is used occasionally.

**Table 4**  
**Originating area: Design science**

<b>Theories</b>	<b>Publications authors and years*</b>
<b>Design science</b>	Kao, H. Y., Yu, M. C., Masud, M., Wu, W. H., Chen, L. J., & Wu, Y. C. J. (2016); Sangupamba, O. M., Prat, N., & Comyn-Wattiau, I. (2014, October); Mwilu, O. S., Comyn-Wattiau, I., & Prat, N. (2015); Arnott, D., & Pervan, G. (2014); Foshay, N., Yeoh, W., Boo, Y. L., Ong, K. L., & Mattie, D. (2015); Shollo, A. (2011); Hartl, K., Jacob, O., Mbep, F. L., Budree, A., & Fourie, L. (2016, January).

\*The full references data are provided in the Appendix I.

Within this study we considered Design science as its own originating area, since many publications considered it in their researches and applied it to many various areas of BI&A, i.e healthcare, finance and performance management. Analysis showed that Design science was primarily used to upgrade the behavioral science to design, implement and use BI&A systems in companies as well as to point out the practical relevance of BI&A research.

## 5. CONCLUSION AND FUTURE WORK

Presented study shows the current state of the art in the area from the perspective of theoretical paradigms considered in BI&A publications. Based on the bibliographic coupling 100 most relevant BI&A publications were identified and qualitatively analyzed to link the BI&A publications with theoretical paradigms allowing for their classification into four originating areas, namely Strategic management, Information system, Organizational behavior and Design science. Even though the study rely on publications from WoS as a scientific database, which does not necessary include all possible BI publications, the presented research sufficiently complements the former studies implying the research diversity of BI&A [2,17,18,19] and offers interesting insights on the current state of the area enabling researchers to better understand the theoretical underpinnings of the BI&A field. In the future studies researchers could include additional search strings to be used for bibliographic analysis as well as apply some other bibliographic methods to supplement the presented findings.

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## APPENDIX I: FULL REFERENCES DATA

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