



Proceedings of
the 8th Business Economics and Communications
International Conference 2021

“Business Creativity and Innovation in the Age of Transformation”

April 1st, 2021

Organized by



Faculty of Business, Economics and Communications
Naresuan University, Phitsanulok, THAILAND

In Cooperation With





The 8th Business Economics and Communications International Conference

Theme: Business Creativity and Innovation in the Age of Transformation

1 April 2021

Faculty of Business, Economics and Communications (BEC)

Naresuan University



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About Naresuan University

Naresuan University emphasizes the improvement of educational opportunity and equity for all as one of the top government universities in Thailand. A strong focus is placed upon research, innovation, partnership, and internationalization. Naresuan University aspires to be the University of Innovation. It is strategically located at the heart of the Thai Kingdom, Phitsanulok province, the major city of the lower northern region, and more importantly, the birthplace of King Naresuan the Great for whom our University is named. In line with the auspicious date of the 400th anniversary of King Naresuan the Great's accession to the throne, the University was officially founded on July 29, 1990. The institution's history can, however, be traced back to its inception as the College of Education in 1967.



The comprehensive university lives up to the public expectations in providing diverse, cutting-edge programs through 22 faculties, colleges, and a demonstration school. Our vision statement affirms a commitment to continue proactive roles in promoting high standards in higher education both in the national and international arenas. Through ongoing review and the development of new paradigms of the best practice, the university continues to improve the quality of teaching and learning, especially highlighting the project-based, inquiry model throughout the university. All the programs are continuously enriched and informed by the rapid transfer of new knowledge used in ongoing curriculum improvements. To produce graduates of international standing, where expertise is in high demand and whose contributions and practice are of the highest caliber and integrity, the university instills in students at all levels the six “**SMARTS**”; smart with ideas, smart at problem-solving, smart a work, smart in people skills, smart in life skills and smartly equipped with knowledge and skills.

About Faculty of Business, Economics and Communications (BEC)



On October 1, 2003, the Higher Education Commission approved the establishment of the Faculty of Management and Information Sciences (MIS). This faculty separated from the Faculty of Humanities and Social Sciences (HSS). The Faculty is divided into the Office of the Secretary and 8 academic departments: Business Administration, Tourism, Business Computer, Accountancy, Economics, and Information Sciences for Communication, Mass Communication, and Public Relations.

On September 7, 2005, the Higher Education Commission approved in the minutes of meeting # 14/2005 the reorganization of the Faculty, from 8 academic departments to 1. The Department of Business Administration consisting Business Administration, Tourism, and Business Computer. In 2008, the Faculty introduced a new major, Finance and Banking.

2. The Department of Economics and Accountancy
3. The Department of Communications consisting Public Relations, Information Sciences for Communication, and Mass Communication.

The Faculty was renamed as the Faculty of Business, Economics and Communications (BEC) on 21 August 2012. The Faculty is now divided into 3 parts:

1. The Office of the Secretary consisting Administration, Accounting and Purchasing, Plan and Policy Analyst, Academic Affairs, Research and Academic Services, and Student Affairs and Alumni Relations. Each division is managed by a head of the division and the Associate Dean.

2. The Faculty currently consists of 5 academic departments:

- 2.1 The Department of Business Administration consisting Business Administration, Business Computer, Finance and Banking

- 2.2 The Department of Tourism

- 2.3 The Department of Economics

- 2.4 The Department of Accountancy

- 2.5 The Department of Communications consisting Public Relations, Mass Communication, and Information Sciences for Communication

3. The Centre for Excellence for Stock Exchange of Thailand (SET) has the same status as a department. The purpose of the Centre is to create networks both inside and outside of the country, provide investment information, support for lecturers to produce high-quality research for publication and use for commercial purposes.

On February 22, 2015, the Higher Education Commission approved the Faculty of Business, Economics and Communications plan to divide the Office of the Secretary into 7 parts. The Faculty contains 5 departments and 2 centers of excellence. The detail is as below;



1. The Office of the Secretary
 - 1.1. Administration
 - 1.2. Accounting and Purchasing
 - 1.3. Academic Affairs
 - 1.4. Student Affairs and Alumni Relations
 - 1.5. Research and Academic Services
 - 1.6. Strategy
 - 1.7. Graduate Education
2. The Department of Business Administration
3. The Department of Tourism
4. The Department of Economics
5. The Department of Accountancy
6. The Department of Communications
7. Center of Excellence in Tourism Management
8. Center of Excellence in Small and Medium Enterprises Management
9. On February 22, 2015, the Center of Academic Service in Capital Markets, Economic and Applied Business was established and now is replaced by the SET Investment Centre (SET IC)

A message from the Chairman of Naresuan University Council



I would like to express my great pleasure in welcoming all the participants to Phitsanulok and the BECIC 2021 conference. The conference is organized by the Faculty of Business, Economics, and Communications. The faculty combines major social sciences such as business management, economics, finance, accounting, tourism, and communications. I consider them as one of the most important fields in any modern social science because these sciences offer each of us new perspectives and a new way of understanding in the face of disruptive technology. Thus, educating the next generation of leaders in these fields is always a priority for any country.

This conference is an important part of how to move forward to the business creativity and innovation and to share research experience among scholars around the world which provides a forum for networking building together with other professors, researchers, government officials, and industrial partners to talk about the challenges and opportunities of creativity and innovation in the age of transformation.

As the Chairman of Naresuan University Council, I would like to take this opportunity to thank the faculty as the conference organizing committee for their hard work and dedication to this conference and also, the guest speakers and presenters who honor Naresuan University with their academic contributions. I truly think that this academic companionship is here to stay.



Prof. Dr. Krasae Chanawongse
Chairman of Naresuan University Council

A Message from the President, Naresuan university

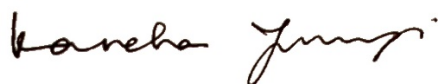


It is my great pleasure to welcoming all the conference participants today of which the scope of this conference involves “**Business Creativity and Innovation in the Age of Transformation**”. This is the 8th Business, Economics and Communications International Conference 2021 (BECIC2021). The forum is provided as the function as a host between the main international conference. The conference is considerate as annual arrangement of BEC, so we received academic experts, practitioners and the postgraduate student community. The first being was who deliver contemporary business administration as well as research items which have been credited as forming the basis for business creativity and innovation in the age of transformation. The focusing outcome is important to driving business, economics and communications.

We anticipate that the business, economics and communications development will be further progressive, so raise up and promote the cooperate mutually, especially in the areas of research, academic exchange, business, economics and communications development. The most important concept is to create and undertake research to meet the communities and nation’s needs. However, the international conference this time is only part of the way towards the achievement of the academic communities so I would like to notify that lecturers or administrators concerned will motivate your students or your teams to learn about the society, business, economics, and cultural research in each country internationally.

I would like to take this opportunity to say thank you very much to the BECIC2021. I wish you objective success and I hope the presenters and presentations lead to new knowledge which may be gained from this international conference to utilize for the development and betterment amongst the new normal situations COVID-19 across the countries of the world.

On behalf of the Naresuan University community, I cordially invite you to attend and support this opportunity that brings the business creativity and innovation process in fully operated cycle and will be pleased to welcome you on April 1st, 2021 at the Faculty of Business, Economics and Communication in Phitsanilok, Thailand.



Honorary Professor Dr. Kanchana Ngourungsi
President of Naresuan University

A Message From Dean, Faculty of Business, Economics and Communications



This is the eighth annual multidisciplinary edition of our International Conference dealing with new technologies that enabled business innovations in the ways in which we create knowledge access information, and eventually transform our future. The conference consists of International academic seminars, and oral presentations under the theme: **“Business Creativity and Innovation in the Age of Transformation”**. At the inaugural sessions of the Business, Economics and Communications (BECIC2021), many authors and participants are joined to share their insights on the theme of the colloquium followed by technical sessions from different fields to share their experiences and to present the research results.

At our previous meeting in 2018, we were honored to welcome world-class speakers discussing “Digital Knowledge and Business Innovation”. Those speakers included **Dr. Supachai Panitchpakdi**, a Former Director General of WTO & Former Secretary-General of UNCTAD; **Professor James Owers** from Harvard University; **Professor Amir Mahmood**, Dean of School of Business at Western Sydney University, Australia; **Professor Robert Van Der Meer** from Strathclyde Business School, University of Strathclyde, UK.

Three years later in 2021, we continue to focus on innovation but in the transition period where the coronavirus COVID-19 pandemic becomes the global health crisis with an unparalleled effect on economic activities. However, we take this time as an opportunity to gather experts and researchers around the world to share and discuss their works and hopefully create some helpful ideas to cope with the adverse effects of the pandemic. This year, we continue to add to the list of leaders as well as other strong speakers and presenters. We are privileged to have two world-renowned speakers with us today. Please welcome **Professor Terry Williams**, a professor in management science at the University of Hull, UK. He is well known in operations research and project management with countless publications in top-tier journals. He is now a member of the UK government’s “REF” panel which reviews UK research.

Second keynote speaker, please welcome, **Venkateswaran Govindarajan**, IBM Global Markets- Cloud Sales based in Singapore. Mr. Govindarajan is an expert on consummate care banking technology, Business and Technology Architecture, and with more than 20 years’ experience in major global banking institutions.



On behalf of the conference organizing committee, we invite you to attend and support this tremendous opportunity that brings the innovation process full circle. We look forward to seeing you on April 1st, 2021 at the Faculty of Business, Economics and Communications, Phitsanulok, Thailand.

Vie Ratt

Assoc. Prof. Vichayanan Rattanawiboonsom, Ph.D.
Dean, Faculty of Business, Economics, and Communications
Naresuan University, 65000, Thailand

A Message from the Conference Program Chair



I would like to welcome you to the eighth Business, Economics, and Communications International Conference (BECIC 2021), in Phitsanulok, Thailand. A large number of research papers will be presented at the conference which focuses on the theme of “**Business Creativity and Innovation in the Age of Transformation**” in the transition period where the coronavirus COVID-19 pandemic becomes the global health crisis with effect on economic activities, both onsite and virtual presentations as “Hybrid Conference” have organized. I would like to thank all authors who submitted papers. High-quality submissions are the starting point for a superb conference.

These papers were double-blinded peer reviewed. Each paper received two written reviews. Our Program Committee (PC) were restricted to being co-authors on at most two submissions. The physical-presence PC meeting and the relatively small PC, contributed to a collegial process and open discussions, pooling the expertise of the entire committee. I am immensely grateful to the committee for their cooperative spirit and extraordinary efforts. It was a true privilege to work with such a dedicated and focused team, many of whom seem to serve continuous team of PC duty.

Beyond the technical program in these proceedings, the conference is enriched by other items. These include exceptional invited talks. This year’s keynote address is by **Professor Terry Williams**, a professor in management science at University of Hull, United Kingdom. He is well known in the operations research and project management with countless publications in top-tier journals. Second keynote speaker, **MR. Venkateswaran Govindarajan**, IBM Global Markets-Cloud Sales based in Singapore with more than 20 years’ experience in major global banking institutions.

I would like to express my thank you very much to the conference support teams including, a secretarial team dealing with their team experience and their dedication to the conferences including Rommanee Jairux, Chayaporn Khunpratum, Patidtar Kong-im, Piyapan Mukpetch, Worachet Sriundee, Chawewan Sudsang, Chatchaphon Sumroengrit, Kriangsak Kalapukdee, Pornpan Kerddee, and Peerayut Prikthim. Also, I would like to thank the academic and research team for their support, expertise, and coordination in working together and make the 8th BECIC move forward. Thanks to Dr. Pawinee Stargell for the successful proceedings process, Assistant Professor Passawan Korakotchamas for driving publicity and organizing the presidential reception ceremony, Dr. Sukij Khorchurklang for his great hospitality extended to all special guests, Assistant Professor Pnomsit Sonprajuk for the evaluation procedure, Dr. I-lada Sooknark for the fundings and financial section, Dr. Rattapol Chaiyarat for the venue and all the accommodations support, Assistant Professor Kanokkarn Snae Namahoot and Dr. Nalinee Moprasit for their help and support in the registration process, Ajarn Thanawat Kwanboon for great catering service, Panuwanitchakorn and Songpol Chumnumwat for supporting the BECIC2021’s media, and

to others that have not mentioned in details who dedicate their efforts and take good care of all single details for this conference.

On behalf of the conference program chair, it is our great honour and pleasure to organize the challenges conference. We hope that the conference will be stimulating, informative, enjoyable and fulfilling experience to all attend it.



Asst.Prof.Bhagaporn Wattandumrong, Ph.D.
Associate Dean for Academic Service and Networking,
Faculty of Business, Economics, and Communications
Naresuan University, 65000, Thailand

Keynote Speakers Biographies



Professor Terry Williams

MA MSc PhD FIMA FORS CMath PMP

Professor of Management Science

Hull University Business School

University of Hull

HU6 7RX, UK

Terry Williams has 40 years' experience in Operational Research (OR), modelling the behaviour of complex systems particularly projects. He was until February 2016 Dean of a major Business School at the University of Hull, UK. Prior to that he was Director of Southampton University's Management School, and previously at Strathclyde University. The last 3 years he has set up and directed the successful Risk Institute at the University of Hull, undertaking consulting and applied research in areas involving risk, particularly in complex systems involving human aspects.

He has experience of working with public organisations such the Cabinet Office Infrastructure & Projects Authority (IPA) (where he is one of the leaders in project delivery research); UK Ministry of Defence (as advisor and also as a technical auditor for Dstl), Home Office (as a researcher in cross-working across all departments), Department for Business Innovation & Skills (on entrepreneurship skills for small business performance) and the OECD (where he got to know the Directorates and their management of projects). While in industry, he spent 9 years building up a successful practice (and a small team) in non-military OR in engineering consultancy YARD; this first worked in logistics but then specialised in Project-Risk Management (PRM) of major projects, including acting as Risk Manager for some major defence projects. From here he went to Strathclyde where, as well as working in PRM, a team developed to support major post-project litigation claims, which supported claims, particularly Delay and Disruption, totalling over \$1.5 billion in Europe and North America. He continues to act as a consultant on major Delay & Disruption claims and advise on project behaviour. He is known for managing business schools, and has acted as a Business School reviewer.

He is well known in the OR and Project Management worlds. He co-edited the prestigious Journal of the OR Society for 10 years. He has written 90 peer-reviewed journal papers and a number of books, and has an "h-index" of 50. His research covers modelling uncertain systems involving humans, from real-world modelling of complexity and modelling UK operations within the remit of the Home Office, to modelling battles and to production systems. A feature of much of this research has been the multi-disciplinary team

approach. He has been involved in multiple EPSRC/ESRC contracts as well as multiple Project Management Institute (PMI) research contracts. He is a member of the UK government's "REF" panel which reviews UK research (2014 and 2021 panels).

He has particularly concentrated on modelling complex projects, and has become a leader in the worldwide Project Management research community and a widely used speaker. He is currently a theme leader on the IPAs "Project X", looking at how to manage the Government Major Projects Portfolio. He sits on the Academic Members Advisory Group of the PMI. He is a member and leader of multiple research groups and writes and speaks on projects, including around a number of books on modelling projects, learning, governance and front-end analysis

He tepped down to concentrate on research and consulting, and in particular to set up a Risk Institute. A major part of this researches operational risk arising from human factors; he is a theme leader on the University's "Aura" project, supporting offshore wind farms, and holds a major contract to research human-factors-related risk to wind-farm operations & maintenance; he also works with utility companies on human factor risk within their workforce

He has an MA in from Oxford University, an MSc and PhD in from the University of Birmingham. He is a qualified project manager (PMP), is a Fellow of the Institute of Mathematics and its Applications (and Chartered Mathematician); a Fellow of the Operational Research Society; and a Fellow of the Higher Education Academy.

History

1975 1978: University of Oxford (Christ Church). M.A. (1st Class) degree in Mathematics

1978 1980 (and part-time to 1983): University of Birmingham. M.Sc. in Operational Research; PhD in Engineering Production

1981 1984: University of Strathclyde. Lecturer in Operational Research.

1984 1992: YARD LTD (now BAE SYSTEMS). O.R. Principal Consultant

1992 2005: University of Strathclyde. Lecturer rising to Professor in Operational Research. Head of Dept. 2001-2005

2005- 2011: University of Southampton. Professor of Management Science. Head of School of Management 2008-2011.

2011- 2016 Dean of the Hull University Business School and Professor of Management Science.

2016- Director of the University of Hull Risk Institute

Research & Consulting Funding

Examples of consultancy:

- Considerable consulting work in Delay and Disruption litigation and other project analysis for clients in Canada, England, Scotland and N.Ireland.

- A number of assignments for OECD, including project management practice

- Advice to firms on occupational stress amongst workers

- Work in Project Risk Management eg for MoD.

- A number of OR contracts (eg with UK Home Office on top-level modelling.

- Advisor to dstl (activity auditor) and consultancy to dstl on decision-making

Examples of major research projects:

- Research Councils

- ESRC / IPA Project X grant "improving project delivery"

- Facilitated EPSRC Science & Innovation contract

- CI in EPSRC "Complexity for the real world"

- EPSRC Masters Training Packages (MTPs)

- EPSRC network
- ESRC Postdoctoral scholarship
- Industrial research projects
- Demowind grant on human factors in offshore wind operations & maintenance.
- Dstl PhD+ grant on systemic risk in contracts
- Multiple Project Management Institute grants, totalling over \$500m as well as PMI “Value” project
 - Business Process Outsourcing (BPO) research centre (H&IE and EPSRC)
 - Set up KTP with RNLI
 - Project into risk in major manufacturing projects; renewable energy economics.; processes in Milwaukee Childrens’ Hospital etc.

Example Publications

Books include:

- Williams TM (2002) Modelling Complex Projects. Wiley, Chichester, UK. ISBN 0-471-89945-3
- Williams TM (2008) Management Science in Practice. Chichester UK: Wiley
- Klakegg OJ, Williams TM, Magnussen OM (2009) Governance frameworks for public project development and estimation . Newtown Square, PA, US: Project Management Institute.
- Williams TM and Samset K (2012) (eds) Project Governance: Getting Investments right. Basingstoke, UK: Palgrave 90 peer-reviewed publications including:
 - Williams, T.M., Eden, C.L., Ackermann, F.R., and Tait, A. (1995). Vicious circles of parallelism. International Journal of Project Management 13, 3, 151-155.
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- Geraldi JG, Maylor H and Williams TM. (2011) Now, let's make it really complex (complicated): a systematic review of the complexities of projects. *Int.J.Ops.Prod.Mgmt.* 31, 9, 966-990
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- Williams TM (2016) Identifying Success Factors in Construction Projects: A Case Study. *Proj.Mgmt.J.* 47, 1, 97-112
- Bloomfield K, Williams T, Bovis C, Merali Y (2019) Systemic Risk in Major Public Contracts. *International Journal of Forecasting.* 35, 2, 667-676
- Chipulu, M., Ojiako, U., Marshall, A., Williams, T., et al (2019), A dimensional analysis of stakeholder assessment of project outcomes, *Production Planning & Control*, 30, 13, 1072-1090
- Williams TM, Vo H, Samset K, Edkins A (2019) The front-end of projects: a systematic literature review and structuring. *Production Planning and Control* 30, 14, 1137-1169
- Williams T, Vo H, Bourne M, Bourne P, Cooke-Davies T, Kirkham R, Masterton G, Quattrone P and Valette J (2020) A Cross-national Comparison of Project Benefits Management Practices – The Effectiveness of Benefits Management Frameworks in Application. To appear in *Production Planning & Control*
- Petro, Y., Ojiako, U., Williams, T., and Marshall, A. (2020), Organizational ambidexterity: using project portfolio management to support project-level ambidexterity. To appear in *Production Planning & Control*,
- Eltigani A, Gardiner P, Williams T, Kirkham R, Ou L, Calabrese A (2020). Learning in projects: The learning modes and a learning capability model. To appear in *Production Planning & Control*

Keynote Speakers Biographies



Venkateswaran Govindarajan

IBM Super Learner 2019

Govindarajan Venkateswaran, a.k.a “Venky” believes in working for the betterment of enterprises, their customers, and communities by harnessing his skills and experience and doing something he loves doing. A consummate career banking and technology professional, he brings his technical and management skills to help clients transform their businesses to deliver outcomes and customer/staff experiences that delight. He sees value in the use of technology and tools to help enterprises maximize their potential and performance, and generate tangible business benefits with a guaranteed measure of success.

Venky specializes in Business and Technology Strategy, Architecture, and Design, he has seen action across Corporate and Institutional Banking, Financial Markets, Payments and Wealth Management, and businesses. For a while, early in his career, he also worked with Supply Chain Logistics and finance with large FMCG’s. In this context, he has worked with operating models, strategy and roadmaps, governance, and due diligence of various large projects/platforms and business domains. This has been possible given his skills and knowledge of banking and technology domains coupled with excellent stakeholder management and collaboration with several partners that deliver the client desired outcomes.

His experience has been over many years with major global banking institutions as well as emerging global and super-regional banks operating in Asia. The roles have geographically covered a footprint that stretches from Australia and New Zealand to OECD markets and also emerging Africa, Middle East, and Asian markets. Since early 2019, Venky has been with IBM, as a Client Architect to several banks and government institutions, primarily in Thailand. The consulting mostly is associated with digital transformation using cloud and container-based technologies, using data and AI/ML, Digital Automation, and some Block Chain use cases.

In his career, he has started as a developer, and worked as a product owner, software quality assurance, and audit manager, and has been a career architect heading the function for Institutional Banking for several banks. He has kept pace with the arrival of new technologies and methodologies in technical areas like Dev/Ops, Cloud usage, Data and Analytics, Container-based development and deployment, Open Banking, and API led architecture and makes it a point to ensure he is armed with up-to-date knowledge of technology and tools to deliver optimum results as befitting the client needs. He is also well aware of new regulations in the banking domain such as GDPR, CCPA, PSD2, etc., and the emergence of disruptors that have an impact on the financial services industry.

His commitment to a better future also drove him to lecture at leading universities as an adjunct professor, primarily in the field of Banking and Technology. He is also committed to serving the community through his various efforts to help those less fortunate through organizations like Habitat for Humanity, Riding for the disabled, and several independent initiatives of his own. He is also an avid sportsperson, personally involved in equestrian sports and cycling, and an avid follower of the rugby union. His hobbies include music, documentaries, travel, and photography.

Venky graduated with a bachelors degree in Chemical Engineering and followed it up with a Post-Graduation in Business Management specializing in Technology and Systems Management.

CONFERENCE COMMITTEES

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The 8th Business Economics and Communications International Conference

“Business Creativity and Innovation in the Age of Transformation”

April 1st, 2021

Faculty of Business Economics and Communications, Naresuan University

Thursday, April 1st, 2021

- 8:00 – 8:45 AM Registration**
- Onsite Venue: Room 6203, 6th Floor, Faculty of Business, Economics and Communications, Naresuan University, Phitsanulok, Thailand
- Virtual via Zoom – Scan QR code for registration
- 8:45 – 9:45 AM Opening Ceremony**
General Remarks
Associate Professor Dr. Vichayanon Rattanawiboonsom
Dean of the Faculty of Business, Economics, and Communications
Naresuan University
Welcoming Speech
Honorary Professor Dr. Kanchana Ngourungsi
President of Naresuan University
Opening Remarks
Professor Dr. Krasae Chanawongse
Chairman of Naresuan University Council, Thailand
Thai physician, Professor of Medicine, and Politician
- 9:45 – 10:00 AM Performance in the theme of “The golden age of Transformation”**
- 10:00 – 10:15 AM Refreshment**
- 10:15 – 11:00 AM Keynote Speaker I**
“Major projects and their contribution to Transformation in the UK public sector”
Professor Terry Williams
Professor of Management Science, Hull University Business School
- 11:00 AM – 12:00 PM Keynote Speaker II**
“Creating/Managing disruption in the era of Digital Transformation”
Venkateswaran Govindarajan
IBM Global Markets - Cloud Sales
- 12:00 – 1:00 PM Lunch**
Venue: 1st Floor, Faculty of Business, Economics and Communications
- 1:00 – 5:00 PM Oral Presentations**
Venue: 6th Floor, Faculty of Business, Economics and Communications

Please note that the schedule is subject to change upon matters





Conference Schedule of Sessions

Business Creativity and Innovation in the Age of Transformation

April 1st, 2021

Venue: **BEC6102** (Online)

The 8th Business Economics and Communications International Conference

Session 1

Business / Management / Information Technology

Discussants

Dr.Pawinee Stargell and Dr.Warawude Rurkwararuk

Staff

Narumon Singhapan

Papers:

APPROACHES TO CUSTOMER DATA MANAGEMENT AND KNOWLEDGE DISCOVERY IN SMALL RETAIL ANALYTICS: THE CASE OF A TINY COFFEE SHOP IN BANGKOK, THAILAND

Mr. Pakawat Paiboon :Time 13.00 - 13.20 (UTC+07:00 Bangkok)

SUPPLY CHAIN FINANCE FOR SMALL AND MEDIUM-SIZED ENTERPRISES

Ms. Alexandra Fiedler and Prof. Dr. Dirk Sackmann :Time 13.30 - 13.50 (UTC+07:00 Bangkok)

FACTORS INFLUENCING USE OF BUSINESS SIMULATION COMPUTER GAME BY UNDERGRADUATE STUDENTS

Assistant Professor Dr.Wasin Liampreecha :Time 14.00 - 14.20 (UTC+07:00 Bangkok)

PRODUCTION PROCESS QUALITY MANAGEMENT STRATEGIES WITH DIGITAL TECHNOLOGY OF READY-TO-EAT FOOD INDUSTRY IN GLOBAL EMERGENCY SITUATION

Miss. Suttida Chaisri :Time 14.30 - 14.50 (UTC+07:00 Bangkok)

THE INFLUENCE OF SHOWROOMING TOWARDS SEARCH PROCESS SATISFACTION THAT MEDIATED BY CUSTOMER EXPERIENCE IN THIS AGE OF TRANSFORMATION

Mr. Yusepaldo Pasharibu :Time 15.00 - 15.20 (UTC+07:00 Bangkok)

THE DEVELOPMENT OF TEAM LEARNING SKILLS THROUGH KNOWLEDGE MANAGEMENT OF HIGHER EDUCATION STUDENTS IN 21ST CENTURY

Assistant Professor Dr.Wasin Liampreecha :Time 15.30 - 15.50 (UTC+07:00 Bangkok)

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Conference Schedule of Sessions

Business Creativity and Innovation in the Age of Transformation

April 1st, 2021

Venue: BEC6103 (Online)

The 8th Business Economics and Communications International Conference

Session 2

Economics and Finance / Accounting

Discussants

Assoc.Prof.Dr.Sujinda Chemsripong and Dr.Warawit Phetruen

Staff

Matthana Khamcharao

Papers:

IMPROVING THE CAPACITY OF THE STATE AUDIT OFFICE OF THE KINGDOM OF THAILAND

Mrs. Chutapa Sringarm : Time 13.00 - 13.20 (UTC+07:00 Bangkok)

SITUATION OF INEQUALITY IN HEALTH UTILIZATION AMONG THAI ELDERLY IN 2020

Mr. Sila Tonboot : Time 13.30 - 13.50 (UTC+07:00 Bangkok)

EMPLOYEE EXPERIENCE ANTECEDENT & CONSEQUENCE

Ms. Pin Kasemsiri : Time 14.00 - 14.20 (UTC+07:00 Bangkok)

Faculty of Business, Economics and Communications

Naresuan University, Phitsanulok, 65000, THAILAND





Conference Schedule of Sessions

Business Creativity and Innovation in the Age of Transformation

April 1st, 2021

Venue: **BEC6104** (Online)

The 8th Business Economics and Communications International Conference

Session 3

Tourism / Communications / Other

Discussants

Assoc.Prof.Dr. Panida JongSuksomsakul and Dr.Petchsri Nonsiri

Staff

Chayapon Kunpratrum

Papers:

THE GENDER ROLE PORTRAYAL OF DISNEY PRINCESSES AND ITS IMPACT ON THE AUDIENCE

Miss. Sohani Shahid : Time 13.00 - 13.20 (UTC+07:00 Bangkok)

COMMUNICATION STRATEGIES OF NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION VOLUNTEER (NEV) TO DRIVE LOW CARBON COMMUNITY: A CASE STUDY OF BAN TOR PHAE, KHUN YUAM DISTRICT MAE HONG SON PROVINCE

Miss. Jeeraporn Chookietwana : Time 13.30 - 13.50 (UTC+07:00 Bangkok)

SOCIAL MEDIA OVERCOMING IMPEDIMENTS FOR SUCCESSFUL STRATEGY FORMULATION BY SMALL AND MEDIUM ENTERPRISES (SMES)

Kritcha Yawised and Darlin Apasarawirote : Time 14.00 - 14.20 (UTC+07:00 Bangkok)

Faculty of Business, Economics and Communications
Naresuan University, Phitsanulok, 65000, THAILAND



APPROACHES TO CUSTOMER DATA MANAGEMENT AND KNOWLEDGE DISCOVERY IN SMALL RETAIL ANALYTICS: THE CASE OF A TINY COFFEE SHOP IN BANGKOK, THAILAND

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ABSTRACT

Although coffee shop is the highest competition comparing to others in Thailand for the past four years, only 10% of all new restaurants are success. To increase a success rate, data as an important resource needs to be significantly used to increase sales and maintain advantages. However, complications of data processing and lacking analytical models are common challenges to small businesses management as it requires huge investment on data management system. This study proposed data management framework as economically solutions to processing existing customer data into actions. Data from the tiny coffee shop in Bangkok as our case study are used for illustration. In data management, existing data were designed to combine all daily transactions into one structural file by using python script and use it as a data source for reporting. As of reporting, LINE chatbot was selected as a channel to send quick reports and analytic results of co-occurrence items, and Dashboards with interactive filtering ability via Power BI are employed for detailing sale information. These approaches can help owners to have deep understanding on sale and customer data which leads to better profits, and be applied to any retails that face with similar issues of customer analytics.

KEYWORDS: 1) CUSTOMER DATA MANAGEMENT 2) APPLIED DATA MINING 3) CHAT BOT 4) RETAIL ANALYTICS 5) CASE STUDY

1. Introduction

70,149 restaurants were newly opened in Thailand during 2019. However only 10% of those restaurants are successful during the past three years. Interestingly, Bangkok has the highest number of newly restaurants opened in Thailand. A secondary survey from Wongnai's market research in 2020 shows that there are 18,000 new restaurants out of 70,149 (Wongnai, 2020). In term of restaurant types, a coffee shop is the most popular ones among all types in Thailand, supported by 17,000 of new coffee opened in 2019 both franchises and new own brand which is represented 81% of growth rate, comparing to 2018 (Wongnai, 2020).

According to 90% of failures of new restaurants and the highest competitive environment of coffee shop, business owners target at increasing sale amounts while reducing all possible costs with available resources without additional costs in order to prolong survival rates (Suad S. Mohamud, et al., 2017). As suggested in the literature, the highest value of their available resources is data, for instance, sale data and transactions. By utilizing existing daily sale data, business owners can better insightfully understand on the trends of popular menu which one is the rising star or the beast (Pengfei W., et al., 2014). This leads the companies to gain more promotion opportunities and competitive advantages. One of the most important data is the sale data from Point-of-Sales (POS) database that can enhance firms to deeply find out their customer behavior. With mentioned benefits, coffee-shop owners can use the right information for better profit optimizations. The advantages of customer analytics have been proved for the big firms where have enough funding (Ranjit, 2009). However, there is little knowledge of how small and medium-sized enterprises (SMEs), especially in Thailand, apply the data analytic and management effectively. This is the key to our study that will go through.

The objective is to propose the approaches to customer data management and knowledge discovery in small retail shops. The study case for this study is a small café and bistro in Bangkok name "WAAK". WAAK is a small café and bistro shop is facing similar problems with other small business due to small investment such as lack of financial liquidity, not good enough in store management, and especially lack of effectively use their store and customer data. The data for development is POS data such as transaction and inventory. The problem is that a basic capability of POS service usually provides only daily sale information sending through email in "csv" format. Based on those available data format led to inefficiently use and transform any data's insight to action due to complication of data structure, integration, and processing also lack of data analytics model together within platforms that always directly connect business owners to their data. Those all issues are root cause of lower opportunity for increasing profits through up-selling, cross-selling as well as cost reduction through inventory and resources optimization.

Thanks to a scant of limited capability on data management and data analytics based on small system's investment. All those challenges stand for the opportunities that aim to suggest small retail businesses to effectively use their data for better planning and execution. By creating data management and automated reporting system in order to help transforming data into action without additional cost. This is the main contribution of our study.

2. Literature Review

2.1 Data Management (Transaction) and Data Structure

Proper data management leads to clear insight and proper actions for profitability optimization of SME. There are a ton of services and software for data management especially for transaction sale data. However, those service also leads to significant additional cost with some unnecessary functions to business (Deli Zhang, 2016) that

because of business's uniqueness. Even though same business type, each of coffee shop is different from each other based on their theme, service quality, and location those leading to their customer, best seller menu, etc. Any of those impacts to data insight which leading to action to improve business profitability. Shouhong W. and Hai W. (2020) also stated in the similar way that strategic use of data, data requirements, and knowledge products are the major constructs of big data for small business those also lead to design of structure data that based on need of use.

2.2 Efficiency Data Reporting (Chatbot & Dashboard)

Now a day in digital world, it provides more comfortable also effective using any data. As same as in business, when compared with a manual system, the use of digital applications is more effective and efficient in business management (Rahmatullah, Inanna, Sahade, et al., 2020). Efficiently access to insight of data with time limitation and proper action are the keys success of business that have many studies support such as following: Mohsen A. & Jeremy W. (2019) have stated that the digital revolution is helping organizations transform their businesses to better engage and stay connected with their customers, suppliers, and employees. Fatma Chiheb, et al. (2019) have been studied on decision making model also mention that the analysis of data created day-to-day provides new information that has the potential to enhance the decision-making process, thus improve the quality of decisions and achieve a competitive advantage for organizations.

2.3 Association Rule & Promotion

Association rule learning is a rule-based machine learning method for discovering interesting relations between variables in large databases. It is intended to identify strong rules discovered in databases using some measures of interestingness. Based on the concept of strong rules, Rakesh Agrawal, Tomasz Imieliński and Arun Swami introduced association rules for discovering regularities between products in large-scale transaction data recorded by point-of-sale (POS) systems in supermarkets (Wikipedia, 2020). This information can be used as the basis for decisions about marketing activities such as promotional pricing together with cost optimization also inventory optimization. Paul D.B. and Nada N.B., (2001) also support on benefit of application which stated that the major benefit of relationship marketing is the ability to make decisions based on their impact on customer equity. On Shaohui and Robert (2017)'s study also provide clear benefit of optimization models that their output of the model provides optimized prices, display and feature advertising planning together with sales and profit forecasts that generates accurate sales forecasts and increases category profits by approximately 17% and that including cross-item and cross-period effects is also valuable.

3. Research Methodology

Methodology for this study follows Cross-industry standard process for data mining, known as CRISP-DM that was developed in 1996 by incorporation of 3 companies which are Daimler Chrysler, SPS, and NCR (Colin Shearer, 2000). CRISP-DM is an open standard process model that describes common approaches used by data mining experts. It is the most widely used analytics model. The CRISP-DM breaks the process of data mining into six major phases. However, it was adjusted a bit by combining phase 5 and 6 together as showing in Table 1 to be more suitable applying for this study in small business case.

3.1 Business Understanding

The first step which is the most important step is business understanding, which is key of all proper following actions leading to good result. This step is combination of learning from WAAK’s business owner, being a customer, and digging into all available data especially transaction data in order to understand business’s strength, weakness and any business problem together with business owner. Keys strength of WAAK is relationship with customers lead to major of the customer is existing customer. For opportunity, main targets are maintaining existing customer also increasing new customer rate by understand customer behavior using sale data.

Table 1: Adjusted Data Analytics Lifecycle with concept and result in each phase

Phase	Concept & Methodology	Result
1. Business Understanding	learning from WAAK’s business owner, being a customer, and digging into all available data to understand business’s strength, weakness, and any business problem with business owner	Keys strength of WAAK is relationship with customers. For opportunities are maintaining existing customer and increasing new customer rate.
2. Data Understanding	Digging down into daily available 13 csv data. A file, sales by user report or daily transaction.csv, was selected to be a source of data understanding.	A new extracted data type is created from data understanding phase for data analytic (association-rule) requirement which is “Item Type”. Krapao (Stir fried basil) menu was separated from other food as it is popular menu (high sale amount) and put as another item type.
3. Data Preparation	Using data and understanding of business to develop one data structure that contain all information to be ready for dashboard and reporting tool. For data storage, select data storage that easy to access for reporting and analytic tools.	Daily transactions in csv format were transformed and combined to only one data structure including new data type, Item Type, by new development python script. For data storage, “Firebase” was selected to be data storage location.
4. Data Modeling and Visualization	Using new data structure to develop visualization tools that friendly use, easy to understand and transform any insights to action.	LINE chatbot on mobile is selected for quick reporting that will provide 6 different reports based on business owner request. For more detail of daily sale, Dashboard is selected another tool using Power BI.
5. Evaluation and Deployment	Tools deployment at the same time with feedbacks gathering from business owners is key for this phase.	Chatbot and Dashboard were adjusted along the way to match with business owner needs with no additional cost.

3.2 Data Understanding

Second step, data understanding, 13 csv sale information files from POS system have been attached in daily email which is source of available data. All those available files are in format that cannot immediately use even there is csv format due to a lot of space between cell and column data.

In term of valuable data, information from all 13 files is quite duplicate as all related to sale information that transformed to different display in 13 templates. So, by digging down into available data, a file, sales by user report or daily transaction.csv was selected to be a source of data understanding also used to design new data structure for WAAK.

An interesting data was observed during digging down to transaction data, Krapao menu (Stir fried basil) is popup from other food menu (high sale amount), figure 1 show bar chart of top sale item, which related to discussion with business owner that Krapao is the best seller of food menu. This led to separation of Krapao menu from other food in Item type (new extracted data type). Even Beer is higher than Krapao but it was excluded from the interesting item and groped in beer group.

3.3 Data Preparation

Third step is Data Preparation, daily transaction in csv format were transformed and combined to only one data structure that contain all information, ready for dashboard and reporting by new development python script for WAAK’s data loading and data

transforming. One additional data also created from data understanding phase for data analytic (association-rule) requirement which is “Item Type”. The data storage is also important that need to be location that easy to access for reporting and analytic tools. For this study “Firebase”, which is a mobile and web application development platform, was selected to be data storage location.

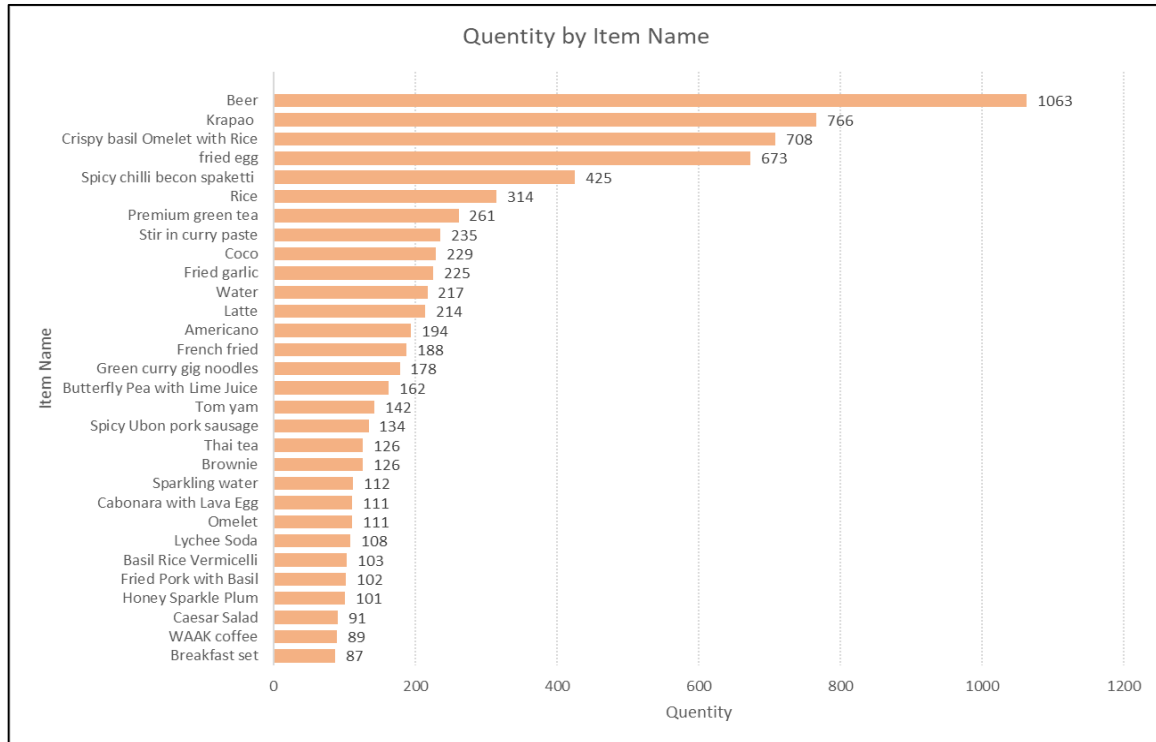


Figure 1: Bar chart show ranking of sale amount of each item.

3.4 Data Modelling and Visualization

Fourth step is Data analytics, Data visualization and Reporting, keys for this step are friendly use, easy to understand and transform any insights to action. For quick reporting whenever user want, chatbot on mobile is selected channel for connecting user to their data. LINE is not only the most famous instant communications application on mobile in Thailand but also a lot of available free platform and service to support conversational interfaces creation for chatbot especially Dialogflow those are the reasons to select LINE to be application for chatbot development in this study. Based on data understanding phase, information that related to daily sale amount and top item sale are the most popular that business owner needs to know by quick report that were designed and separated to 6 reports in chatbot.

However, they are some limitations of quick data reporting on mobile such as reporting space (small size and limited detail of information) and interactive filtering ability, so dashboard is selected to fulfill those limitations. Power BI was selected as a service tool for dashboard development in this study as it friendly use and many functions that match with WAAK information. The dashboards were designed to serves business owner need about detail daily sale information which are sale amount, sale quantity, sale by item also ability to filter and adjust the dashboards.

3.5 Evaluation & Deployment

As small business, study designed to combine phase 5 and phase 6 of CRISP-DM which are deployment the tools together with gathering feedbacks from business owners for tools adjustment along the way as no additional cost compare to big business scale. After been through all methodology steps using adjusted CRISP-DM, summary of data management and data reporting workflow for WAAK were summarized as figure 2 below. Daily data from email will be manually downloaded and processed together with existing data using python script. Json file format is one of product from processing process that need to be uploaded to Firebase. Once file is in Firebase, all data is ready for LINE chatbot and Dashboards to serve information to business owners.

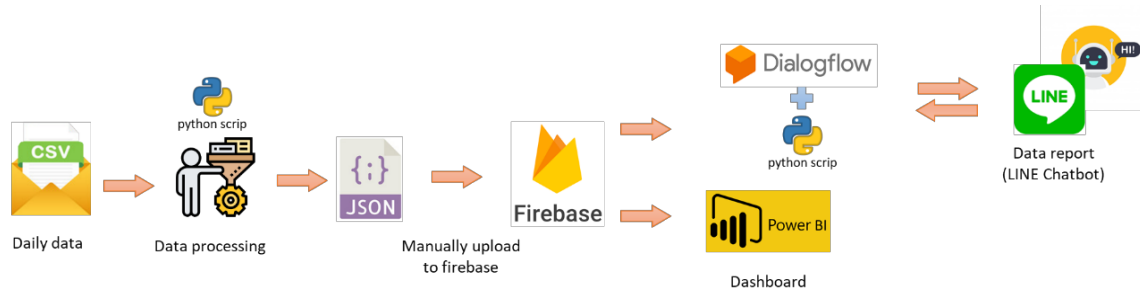


Figure 2: Data Management Solution Summary

4. Results

4.1 Data Management Solution

4.1.1 New Extracted Data

Item Type is a new data that was extracted from daily sale information based on phase of data understanding together with business owner’s knowledge and expert comments. It was separated to 12 types that consist of: Kao, Kaopao, Soup, Noodle, Salad, Appetizer, Coffee, Cake, Soda, Tea, Milk, and Beer. For Krapao, it was separated from other food as it is the bestseller menu also difference in term of sale amount from other menus.

Not only used for describing sale item but Item Type also used for association rule analysis. The analysis’s result will return pair of item type that popular occur in the same transaction, lead to cross-sale and up-sale opportunity by doing marketing campaign such as sale promotion.

4.1.2 New Data Structure

Daily 13 sale information in csv file format that normally stored in personal email system, rarely used by business owner, were transformed by python script to one structure in table combining all daily sale data. New data structure is containing bill number in each day, timestamp of bill, date of bill, type of sale (dine or take away), sale item name, sale item type, item price, quantity, and sale amount. Example of new data is as figure 3.

No.	Bill	Timestamp	Date	Type	Item Name	Item type	Item Price	Quantity	Sales
1	1012095	01/12/2019 13:06	01/12/2019	Dine In	ข้าวไข่กระทะเพรากลอบ	krapao	99	1	99
1	1012095	01/12/2019 13:06	01/12/2019	Dine In	มอคค่าช็อคโกแลตชิฟฟิน	coffee	99	1	99
2	1012096	01/12/2019 13:29	01/12/2019	Dine In	เครื่องดื่มโซดา	soda_beverage	79	1	79
2	1012096	01/12/2019 13:29	01/12/2019	Dine In	ข้าวไข่กระทะเพรากลอบ	krapao	99	1	99
3	1012097	01/12/2019 15:04	01/12/2019	Dine In	เค้กเวทเค้ก	cake	79	1	79
3	1012097	01/12/2019 15:04	01/12/2019	Dine In	ชาเอิร์ลเกรย์ Earlgey tea	tea	60	1	60
4	1012098	01/12/2019 15:57	01/12/2019	Dine In	{วรรค}โซดา	soda_beverage	65	1	65
4	1012098	01/12/2019 15:57	01/12/2019	Dine In	เส้นหมี่กะเพรา	krapao	65	1	65
4	1012098	01/12/2019 15:57	01/12/2019	Dine In	ไข่ดาว	etc	10	1	10
4	1012098	01/12/2019 15:57	01/12/2019	Dine In	ส่วนลด	etc	-6.5	1	-6.5
5	1012099	01/12/2019 17:30	01/12/2019	Dine In	นมผง	milk	85	1	85
6	1012100	01/12/2019 17:30	01/12/2019	Dine In	เอสเปรสโซ	coffee	50	1	50
6	1012100	01/12/2019 17:30	01/12/2019	Dine In	{วรรค}โซดา	soda_beverage	65	1	65

Figure 3: Example of new data structure

4.1.3 Data Storage

Firestore cloud data storage on web base was selected to be WAAK's data storage location for new data structure instead of email system. This help in term of data access for data reporting both chatbot and dashboard.

4.2 Data Reporting and Dashboard Visualization

4.2.1 LINE Chatbot

By observation and discussion with WAAK business owner to requirement of quick data reporting, 6 report types were created on chatbot to serves information by requesting with easy conversations on chat board of LINE as figure 4(a), the 6 reports type are consisting of:

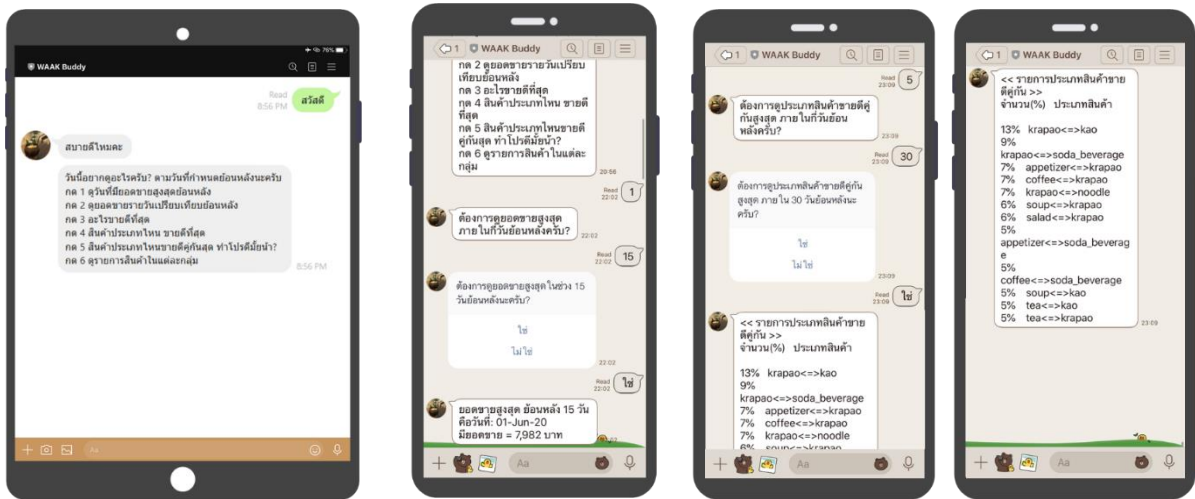


Figure 4: Examples of conversation on requesting information in LINE chatbot and maximum sale report (a): 6 report on Line chatbot, (b): example of Maximum sale amount and date during pass specific day report, (c, d): example of Top pair item type sale (Co-occurrence) report

4.2.1.1 Maximum sale amount and date during pass specific day (figure 4(b))

4.2.1.2 Daily sale amount during pass specific day

4.2.1.3 Top items sale

4.2.1.4 Top item type sale

4.2.1.5 Top pair item type sale (Co-occurrence)

The report required user to input number of day period to calculate and return support (%) and pair item type that ranking from higher support value based on minimum support that was set at 5% as figure 4(c,d). Only minimal information was included in this report by excluding other information such as confidence, consequence support, lift, leverage to be

simple for business owner understanding and applying. This is main benefit for sale optimization such as sale promotion.

4.2.1.6 Item list of item type

This report was created to help business owner easily access to list of items in each item type in order to identify item for future marketing action such as sale promotion based on co-occurrence report.

4.2.2 Dashboard via Power BI

Interactive filtering ability is required for detail sale information report. So, dashboard was selected to serve this ability via using Power BI. The sale information dashboards automatically pull information from Firebase using python script (same data source as the chatbot). 5 dashboards were created to deliver sale information in 3 different perspectives as following.

4.2.2.1 Overall sale information

Overall sale information dashboard will serve overall sale information that contain total sale, total customer number, quantity, and sale amount by item and by item type of specific interesting period that allow user to adjust, the example of this dashboard is showed in figure 5.

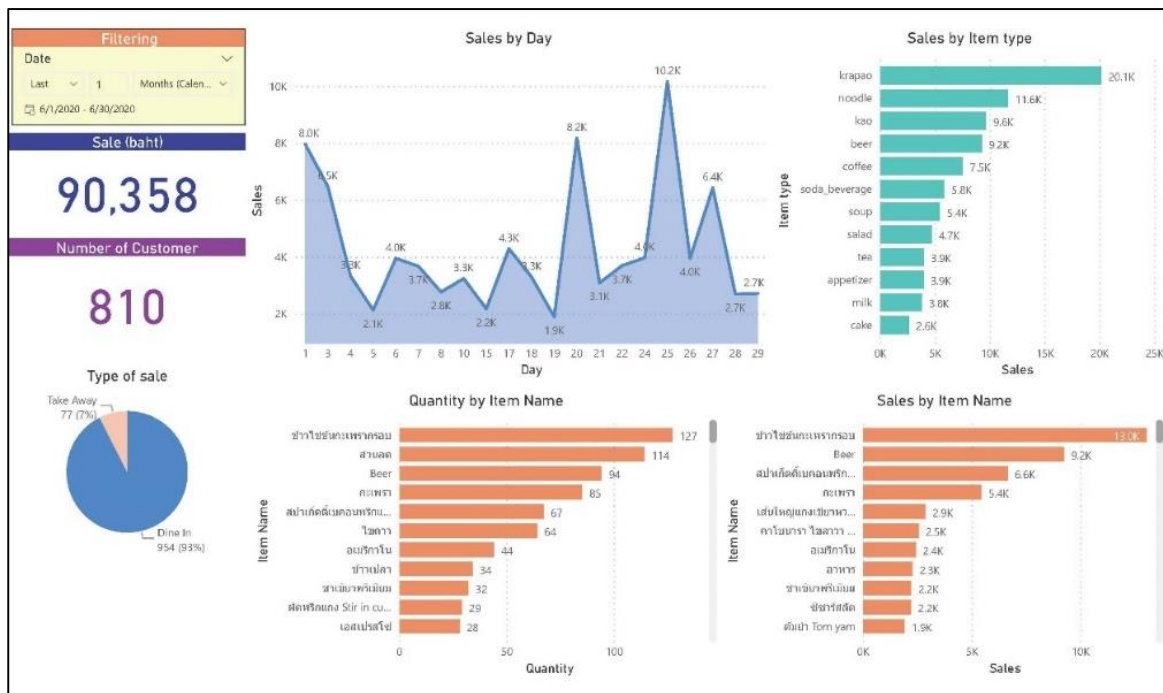


Figure 5: Example of overall sale information dashboard

4.2.2.2 Total sale amount by day and by Item type

2 total sale information dashboards provide total sale information in daily basis and total sale by Item type basis of specific interesting period that easily select by user.

4.2.2.3 Total sale divided into Item type in daily and monthly

2 total sale separated by Item type dashboards provide total sale information that separated into Item type in daily and monthly basis.

5. Discussions & Conclusions

5.1 Data Management

Combining daily sale information into one file is a big improvement for data management based on business owners' feedbacks that help them easily access to their sale data instead of using email system looking day by day in different email files as previous. Currently, business owners also have ability to use familiar program such as Microsoft Excel with new data structure to easily filter and dig down into their interesting data. Using cloud service to be data storage location is another benefit in terms of data accessibility also support any other application development in the future as well. In term of data management are met the study objectives that help business owner effectively use their data without any additional cost.

For improvement opportunities, daily new sale data still required manual download, run python script, and upload to Firebase cloud service. One opportunity to improve this process is automate system that can auto downloading attached csv files from email, processing, and auto uploading to cloud in order to get rid of these manual processes that will help on time management of business owner. Another point is additional information that could help using data more effective which are cost and benefit data of each item that can be generated from sale price information together with fix cost of store and variable cost of each item. That information will help to optimize more on marketing campaign. For cloud storage, back up location is also important to stability of application when the main server is down. So, by adding another file storage such as Heroku, Google, or Amazon as back up locations will support on application stability.

5.2 Data reporting and Customer analysis

By deployment both reporting tools quick report via LINE chatbot and Dashboards via Power BI are increasing efficiency of using data also transforming data's insight to action. Quick report via LINE chatbot is providing reports with immediately respond whenever business owner request also provides co-occurrence analysis that can be use as information for marketing campaign such as sale promotion. While Dashboards via Power BI are providing detail sale information reports that help business owner to evaluate and check store performance. With interactive filtering abilities, helps business owners easily access detail of sale data with many perspectives as they needed. In term of effectively used data are also met study objectives that help business owners understand more on their customer data also transform that to action without any additional cost.

In term of improvement opportunities, only text format is available in reports on LINE chatbot might not be interesting and comfortable enough, by adding dashboard in picture format might help on this potential issue together with adding more function into the chatbot based on business owner needed, via using menu template to select report instead of typing number. For customer analytics, membership system is very interesting that can help to get more insight of customer behaviors. Those data also can be used to get more accurate customer analytics such as collaborative filtering. By getting membership system can be both, develop system by our self or cooperate with existing membership service as a partner such as Privage, Gram Digital Publishing, or membership system from POS service. Cost and benefit will be main criteria for the service selection.

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SUPPLY CHAIN FINANCE FOR SMALL AND MEDIUM-SIZED ENTERPRISES

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ABSTRACT

The financing of small and medium-sized enterprises (SMEs) is a problem that has been discussed in practice and science for a long time. The information asymmetry between capital providers and capital borrowers was identified as one of the main difficulties. Supply chain finance provides solutions that can reduce this information asymmetry and offers instruments for the acquisition of working capital beyond traditional bank credit. The contribution shows the current state of supply chain finance in relation to SMEs and proposes an agent-based approach to minimize the capital costs of the supply chain. The aim of the agent-based model is to support the negotiations between the capital demanding company and the capital-providing companies, considering the information asymmetry between external and internal supply chain actors. To implement the model, a multi-agent system has been set up to support negotiations on financing options. An agent-based model consisting of three components is proposed, which automatically supports a capital demander in identifying the most favorable financing option for the supply chain. The potential of the use of multi-agent systems in supply chain finance is shown. Especially for SMEs there is a chance to overcome the difficulty of information asymmetry by working closely together through the instrument of the supply chain finance to finance projects that are favourable for the entire supply chain.

KEYWORDS: 1) SMALL AND MEDIUM-SIZED ENTERPRISES 2) INFORMATION ASYMMETRY 3) SUPPLY CHAIN FINANCE 4) MULTI-AGENT SYSTEMS

1. Introduction

Compared to the financing of large companies SME financing suffers from more serious information asymmetry due the fact that most SMEs are more opaque and can only provide less collateral. When it comes to SME lending there is a gap between borrower and the lender regarding both financial and non-financial information which is resultant in adverse selection and moral hazard. In this paper we address a Multi-agent system (MAS) approach in a Supply chain finance (SCF) setting to overcome the challenges of SME financing. Supply chain finance is a collaborative method that provides tools that enable small and medium-sized enterprises to meet their capital needs. The various instruments are based on the idea of converting non-liquid assets (e.g., raw materials, inventories, and receivables) into cash. Interest in SCF is growing (Hofmann and Kotzab 2010; Lekkakos and Serrano 2016), especially among SMEs, as they are often under pressure from more powerful, better capitalized members of the supply chain. Moreover, access to credit granted by banks is more difficult due to lack of collateral and information asymmetry (Fiordelisi et al. 2014; Gobbi and Sette 2014).

Among other things, digital structures are a prerequisite for SCF. Multi-agent systems have the potential to represent such structures, since the decentralized approach is able to represent the dynamic structures of a supply chain. The application areas of MAS in SCM have evolved from internal company processes such as order and production planning and control (Haasis et al. 2010) to complicated decision support processes involving the management of individual companies as well as interacting SCM partners (Lee and Kim 2008). As the name suggests, MAS consist of several agents. In this case, the agent is a closed computer system operating in a particular environment. It can act flexibly and autonomously to achieve its specified goals (Franklin and Graesser 1996). In multi-agent decision systems, the agents participating in the system must make joint decisions as a group. Mechanisms for joint decision making can be based on economic mechanisms such as an auction or on alternative mechanisms such as reasoning. The focus of supply chain management has been on optimizing and designing the flow of goods and information, whereas the financial flows in the supply chain are often neglected from a supply chain management perspective (More and Basu 2013). This is also true for the application of MAS technology.

2. Literature Review

As can be seen from the literature, there are numerous MAS application examples that support the management of goods and information flows in a supply chain (Moyaux et al. 2006; Rahman et al. 2019). In contrast, very few authors deal with MAS applications for supply chain finance (Abdollahzade et al. 2018; Fiedler et al. 2019). For this reason, an agentbased approach for SCF is proposed, which is particularly suitable for SMEs. Numerous studies on the development, instruments, and actors of SCF can be found in the literature (Caniato et al. 2019; Chakuu et al. 2019; Chen et al. 2020; Gelsomino et al. 2016; More and Basu 2013, Xu et al. 2018). However, only recently has the interest of SCF in relation to SMEs come into focus, as a literature review using the topic-guiding terms "supply chain finance" and "small and medium sized enterprises" in the EBSCO Information Services (EIS) and ScienceDirect databases revealed. From Figure 1, it is clear that interest in this topic has been increasing rapidly from 2018. Accordingly, more than 80% of the 40 articles classified as relevant in the literature search focus on the past three years.

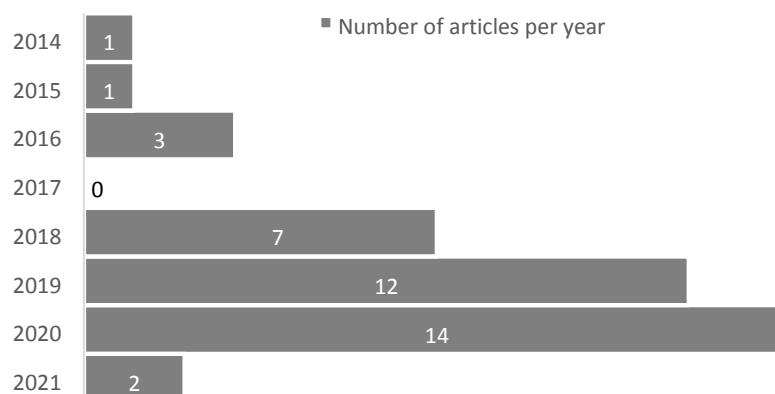


Figure 1: Distribution of the articles relevant to the topic over the years

Another interesting observation is the concentration of publications in China. Although there are papers on the subject spread around the globe, these are only isolated studies in each case, as figure two shows. In terms of international collaboration, China also has the largest number of papers. Liu, Zhou and Wu compared SCF in China to SCF in mature economies. They state that SCF in China is not exactly the same as "SCF" as it is perceived in the mature economy, which is articulated in mainstream SCM English literature. The Chinese business context in which SCF has been implemented has played a dominant role in initiating, affecting and even shaping SCF (Liu et al. 2015).

3. Research Methodology

Within our research we follow a design science research approach. The aim is to utilise gained knowledge to solve problems, create change or improve existing solutions and to generate new knowledge, insights and theoretical explanations. Therefore, we develop and implement a MAS to contribute to the SME financing in a Supply Chain setting. A critical feature of SCF is the provision of financial support based on a core company, which extends good credit to upstream and downstream companies and facilitates lending without assuming unacceptable risks. However, for a capital-demanding company that is in a complex supply chain, selecting appropriate financing options is not trivial. To this end, a MAS approach is proposed to automate and facilitate the process of selecting best possible financing options in the supply chain. The objective of the agent-based model is to support the negotiation between the capital-demanding company (N) and the capital-providing company (G), taking into account the information asymmetry between external and internal supply chain actors and the added trust in the adoption of SC financing. The best SC financing option for a project (P) is sought, and two decisions must be made. Firstly, it must be determined whether financing should be provided outside the SC via an external investor (K e.g. a bank) or internally via SC players with strong capital resources. Secondly, it is assumed that several potential (internal) capital providers are available within the SC. It must therefore be determined who provides the best financing option, taking into account information asymmetry and trust. The ideas presented here enhance the model of Gomm (2008).

The MAS must be able to determine the best internal financing option through automated negotiations. Thus, during the negotiation phase, the price or other terms of the

transaction are determined. Automated negotiation is an iterative communication and decision-making process between at least two agents who cannot fulfill their goals through unilateral actions and exchange offers and arguments to reach a consensus (Bichler et al. 2003). This negotiation process is implemented by an auction. Typically, when two or more agents enter into a conversation, they must first negotiate conversation rules. Such typical rules are called protocols. Juneja et al. (2015) have gathered various communication protocols developed and applied for MAS.

4. Results

To implement the model, a MAS is set up to support negotiations on financing options. The underlying scenario runs in three phases. In phase one, the cost of debt capital (both the company demanding capital and potential internal investors are dependent on debt capital) and, on this basis, the expected returns are determined (cf. Figure 2).

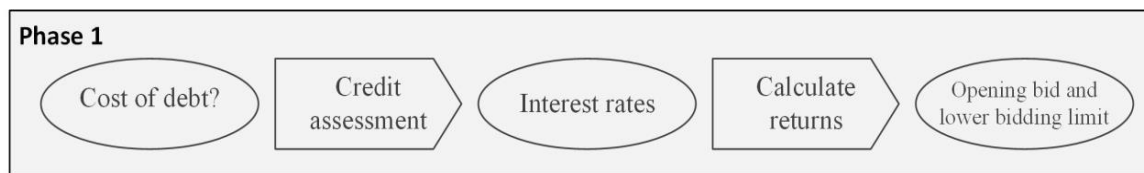


Figure 2: Process MAS for SCF in Phase 1

The second phase (cf. Figure 3) is characterized by negotiations. At this stage, potential internal investors know their respective costs of capital and the extent of the expected gain in confidence. The basis of the agent-based negotiations is an auction, implemented by means of a negotiation protocol developed for this purpose based on the Iterated-Contract-Net Protocol (FIPA 2000). Two types of agents participate in the auction, a capital demand agent as the initiator of the auction and several internal capital providers/investors as participants. The initiator invites the participants to bid and they submit their bids in the form of proposals. The initiator can accept one or more of the bids and reject the others. Or he restarts the process by issuing a revised request for bids (new starting bid) with the intention of getting better bids. The initiator is thus enabled to gradually refine his request for proposals until a suitable contract is concluded. The auction ends when no participant is willing to submit any more bids.



Figure 3: Process MAS for SCF in Phase 2

In the third and final phase (cf. Figure 4), a winner has emerged from the previous negotiation phase. Now it must be checked whether the winning offer of the internal investor is more advantageous than that of the external investor (e.g., a bank). In both cases, the actual lending, repayment, and profit determination take place and the process is complete.

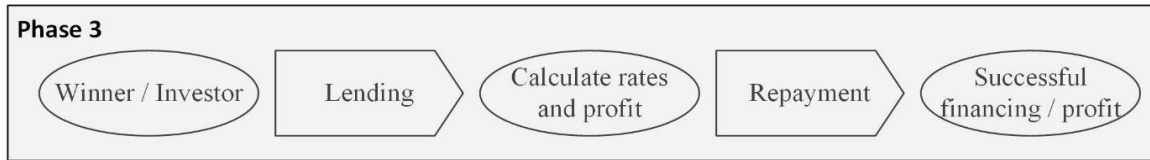


Figure 4: Process MAS for SCF in Phase 3

The parameters used in the model (Gomm 2008) are explained below:

- i_N is the interest rate of K for company N
- i_G is the interest rate of K for company G
- r_N is the net return of N from the project P
- r_G is the return demanded by G from N for the financing of P
- $r_{Project}$ is the gross return of the project P
- $0 < p \leq 1$ is the Likelihood of success of project P from G's point of view
- p_0 is the estimation of project success at the starting point (G has a certain amount of cost-free information, since SC actor)
- p_{infopt} is the optimal level of information for N with respect to G
- y is the non-financial external effect (benefit) of G in financing P
- C are the costs of information transmission per communicated share

Calculation of the expected return for the capital-demanding company N:

- In the case of external financing via the capital market K
 $r_N = r_{Project} - i_N$
- in the case of internal financing via investor G
 $r_N = r_{Project} - r_G - c$
 $c = \Delta p * C$
 $\Delta p = p_{infopt} - p_0$

Calculation of the expected return for the capital-providing company G (internal Investor):

- $r_G = p_{infopt} G y$
- $p_{infopt} i_G C$

A numerical example shows how information asymmetry is considered in the model and its effects. Since the focus here is on information asymmetry, the parameter y is not considered and is assumed to be zero. As summarized in Table 1, the example depicts a supply chain consisting of a capital seeker, four internal capital providers/investors, and a bank as an external capital provider. For a project to be financed, for which a return of 20% is expected upon successful implementation, there is a capital requirement of 2000 monetary units (MU) for a financing period of 2 years.

Table 1: Key data of the experiment

	N	G_1	G_2	G_3	G_4
i	6,0%	5,5%	4,5%	3,5%	2,5%
Credit volume	2000 MU				
Duration	2 years				
C	100 MU				
$r_{Project}$	20,0%				
p_0	45%				

It is assumed that the internal investors would also finance the project with external capital and borrow money on the capital market. The individual internal investors have different conditions, which can be explained, for example, by different positions within the SC or by different degrees of relationship with the lender. The higher the lender's assessment of the risk due to the availability or non-availability of information, the higher the cost of capital. But there is also information asymmetry within the SC. Whether an internal investor considers financing the project and on what terms also depends on the assessment of the risk. This happens in the model based on the level of information regarding the project risk ($p_{inf opt}$). Initially, all investors have the same information level of 45%. The transmission of further information is possible but is associated with costs of 100 MU for each additional share of information. Thus, the more information available to an internal investor, the lower its return requirement from the company seeking capital. However, transferring further information to reduce the required return only makes sense up to the point where the costs exceed the benefits. The scenario just explained is implemented by the three types of agent capital demander (N), internal investor (G) and external investor (K) in the MAS, whereby the agent "internal investor" is needed four times and the other two once each. The negotiation starts with the opening bid of 6%, i.e., the interest rate that would be due in the case of financing via an external investor. The four potential internal investors enter the auction and aim to take over the financing with the highest possible prospect of profit.

Table 2: Lower bid boundaries and optimal information levels

	G_1	G_2	G_3	G_4
$p_{inf pt}$	100%	94,87%	83,67%	70,71%
r_G	5,5%	4,74%	4,18%	3,54%

For this purpose, the lowest possible bid, i.e., the required returns ($r_{G1} - r_{G4}$), must be calculated before the auction starts (cf. Table 2). These depend on the likelihood of success of the project in the form of the parameter $p_{inf opt}$, i.e., the level of information that the potential internal investor has regarding the project. For N, it is worthwhile to transfer information in order to reduce the required rate of return until the costs are higher than the resulting reduction in the cost of capital (Gomm 2008). The course of the auction is shown below.

Table 3: Auction results

Starting bid	6,00%			
round	G_1	G_2	G_3	G_4
1	5,66%	5,66%	5,93%	5,58%
2	5,58%	5,15%	5,16%	5,48%
3		4,83%	4,81%	4,98%
4		4,81%	4,66%	4,77%
5			4,21%	4,46%
6			4,21%	3,96%
7				3,72%

G_4 wins the auction (cf. Table 3) and is willing to provide the financing for a required return (r_G) of 3.72%. The return (r_N) of 14.99% for the company seeking capital is now the result of the project return of 20% minus G_4 's return requirement and the information costs (c) of 1.29%. From N 's point of view, it would therefore make sense to allocate the financing internally, since approximately one percent more return can be expected here than with financing via the capital market ($r_N = \max(14,99\%; 14,00\%)$). This result is also due to the fact that the level of information regarding the project, which the actors within the SC have at the beginning, was measured at 45%. The situation is different if the starting point of the information level is only 20%. Then the share of the information to be transferred increases and thus the costs incurred for it. The required return of G_4 determined in the new auction is now 4%. Because of the information costs of 2.54% now incurred in this scenario, the expected return of the company demanding capital is only 13.46%. Thus, internal financing by the auction winner is not the best option, as a higher return of 14% can be expected with financing via the external capital provider.

5. Conclusions

SCF turns the actors within the supply chain into intermediaries who can partly overcome the problem of asymmetric information between capital markets (e. g., banks) and the parties seeking capital. Due to the numerical example, it can be concluded that it is in the interest of all SC actors to exchange information regarding projects to be financed. Close cooperation and networking between the companies within the SC are advantageous in this respect, as this enables a level of information based on their position in the SC that is significantly higher than that of external players. Especially SMEs may benefit from our proposed SCF approach due to the higher information asymmetry compared to the financing of corporations. For future research, we consider it furthermore as worthwhile to investigate the different meanings of SCF in Asian and European literature and practice.

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FACTORS AFFECTING USE OF GAMIFICATION BY UNDERGRADUATE STUDENT

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ABSTRACT

Gamification uses techniques in the form of games without using the game itself. To be something that helps to motivate and motivate learners. Engage learners in learning in a fun way. Simple to use game mechanics as operators. Gamification attracts the learners to develop behavioral checks, improve and find solutions to problems. The objectives of this research were 1) to study the factors that influenced the use of business simulation game by the undergraduate students in Business Computer 2) to study the relationship between perceived usefulness, perceived ease of use, and perceived enjoyment towards attitude to use business simulation game, and 3) to study the attitude to use towards the behavioral intention to use business simulation game strongest determinants that influenced the students' attitude to use business simulation game. Fifty-eight NU undergraduate business computer students enroll the course 231461 Enterprise Systems in Term 1 in 2019 to answer 58 questionnaires. Data analysis used percentage, mean and standard deviation to test the hypothesis with Pearson Product Moment Correlation Coefficients and multiple regression.

This study showed that the acceptance factors of using computer game simulating business situations affecting 4th- year undergraduate students' attitude in business computer— faculty of Business Administration Economics and Communication Naresuan University at a high level. Perceptions and attitudes in using business simulation computer games significantly related at the level 0.01 level and attitudes towards use influenced behavioral intention in using simulation computer games. Business with a significant level of 0.01

KEYWORDS: 1) TECHNOLOGY ACCEPTANCE MODEL 2) GAMIFICATION
3) UNDERGRADUATE STUDENT

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Introduction

Nowadays, computer game technology has increasingly played a role in teaching and learning. Especially business simulation games at many universities in Thailand, they have taught practical work in subjects related to business operations AEC10NEWS reported earlier in 2020 that Thailand's number one oil company has signed a cooperation agreement with Eastern Universities. In education for human resource development. The intention of bringing knowledge and expertise in doing business in conjunction with education develop an education platform for human resource development. This is the cornerstone for developing the country to be stable and sustainable. Wawer et al. (2010) concluded that the business simulation computer game is a useful learning program to manage business processes in modern organizations. Business simulation computer games have become a popular educational tool because participants can learn many useful skills, such as individual participation, teamwork, strategic thinking, and analysis, including communication.

Technology has been developed to change the lives of users for the better. Industries are continually developing new technologies to improve the efficiency of their users. It is wasteful if the end-user does not accept new technology, so the inventor or marketer of the technology needs to know the factors that motivate the user to use the technology. It affects students' use of computer games to simulate business situations. This study has adopted the Technology Acceptance Model (TAM) as a theoretical research framework.

Background of research problems

There are currently studies on factors affecting the use of computer games in business simulation as a user study tool, especially in Thailand (Sitiwong, 2017; Netsawang, 2016; Peandee & Pasawano, 2015). It is because computer games, business simulation are new in the higher education environment of Thailand. Tao et al. (2009) noted that business simulation computer games had become popular tools for informal learning. Because of this era, many technologies using in their daily lives. For example, in Thailand, e-learning has been widely accepted and used by students, so this research. It intends to fill knowledge by explaining the factors and attitudes that affect computer games' use to simulate business situations among undergraduates.

To make the research more complete, the researcher then applied the Technology Acceptance Model (TAM) framework has applied in various research areas such as web-based content management systems (Ngai et al., 2007), hands-on trading. Hold (Wu & Wang, 2005), online banking (Pikkarainen et al., 2004), web-based teaching (Al-Adwan et al., 2013; Roca et al., 2006). Besides, the TAM concept was applied to the measure of attitudes towards business simulation games, although the business simulation games are limited (Tao et al., 2011). Monsoonsim's business simulation computer game was the program of choice in this research. Because it is a simulation game-planning the use of enterprise resources (Enterprise Resources Planning: ERP), this program can simulate a business's structure. For students to study, plan, connect by creating a model company and operate the business of production and distribution choosing to produce fruit juice boxes of three flavours, three sizes, and retail and wholesale. This program Includes the following business modules: Production, Marketing and Sales modules, human resource management module and accounting and finance modules. Therefore, this research aims to study the factors of adopting business simulation game technology that directly affects business computer simulation usage.

Research objectives

This research aimed to 1) study the factors of adopting computer games simulating business situations affecting the fourth-year undergraduate students' attitude in business computing. Faculty of Business Administration Economics and Communication Naresuan University 2) to study the relationship between perception and attitude in using computer games to simulate business situations. To study attitudes toward behavioral intentions in computer games for business simulation and 3) to study the acceptance of new business simulation computer games. Through the Technology Acceptance Model: TAM)

Literature review

A literature review for this research. Based on the concepts and theories of the Davis et al. (1986) Technology Acceptance Model as a conceptual framework for research, it comprises of the perceived benefit factor. Intuitive perception of enjoyment Attitude towards use behavioral intentions and computer games simulating business situations. The researcher has reviewed the relevant literature.

Technology acceptance model

Davis et al. developed the Technology Acceptance Model, or TAM, in 1986. The model was built based on the theoretical model of human behavior (Fishbein, 1967; Fishbein & Ajzen, 1975) or the Theory of Reasoned Action.: TRA). TAM theory has been cited more than 700 times (Tao et al., 2009) and is widely used in various fields of study, such as the web content management system (Ngai et al., 2007), operates. Mobile business (Wu and Wang, 2005), online banking (Pikkarainen et al., 2004), web-based teaching (Roca et al., 2006), and many others. This model can help technology innovators understand. Factors Affecting User Technology Acceptance of Newly Developed Technologies. The TAM model is comprised of four factors, including perceived benefits and perceptions of ease of use. These two factors influence the attitude of use. Moreover, the attitude towards use also affects the behavioral intentions of use.

Perception of benefit

Perception of benefit is the extent to which individuals are confident in using a specific system that increases people's productivity (Davis et al., 1989). Despite the development of new technologies, consumers are skeptical and use it. Especially technology is not well established. In many studies, the perception of benefit was a key factor in user attitudes (Ngai et al., 2007; Park, 2009). Therefore, the relationship between perceived benefits and attitudes towards use was studied. Beyond that, Davis et al. (1989) believed that feelings, whether negative or positive, arising during the intention to use the system would motivate people to continue using the system. If the system optimizes their work, this research will examine the relationship between perceived benefit and intention of behavior to be used.

Intuitive perception

The perception of ease of use is the extent to which an individual thinks and believes that less physical and mental effort is needed to use a specific system (Davis et al., 1989). Its use profoundly affects user acceptance of the technology (Al-Adwan et al., 2013; Ngai et al., 2007). People will be more optimistic, so this study aims to lead the findings by defining the effect of intuitive perceptions on user attitudes in computer games. Business

Perception of enjoyment

Lee et al. (2005) are perceived enjoyment addresses the factors involved in the processes of human and social transformation integrated into TAM. This helps to explain better about factors of adaptation in information technology. True motivation means activities are interesting and satisfying in some way, so it is associated with a perceived

enjoyment, the idea of which is an activity that is enjoyable (Lee et al., 2005). This factor is included in Cheng's et al. study (2003) and Tao et al. (2009), where enjoyment and attention are some elements that should be evaluated. In addition to their studies, Wawer et al. (2010) noted that computer games simulate business situations. It is regarded as one of the most interesting forms of education. And it is proof in research that Almost half of the respondents identified computer games as a form of enjoyment. The perception of enjoyment is one factor that affects the attitude of users. Another relationship is the relationship between the perception of enjoyment and the behavioral intention to use. According to Davis et al. (1992), the perception of enjoyment provides another perspective that significantly affects the intention to use. Therefore, without considering the perceived benefits, this study aimed to study the relationship between perception of enjoyment and behavioral intention to use.

Attitude towards use

Attitude towards use is Judgment: Evaluation of the target behavior in terms of certain dimensions, for example, good versus bad, harmful versus favorable versus unpleasant, etc. (Holden & Karsh, 2010). Recognition of both of this ease of use. Is a factor that determines attitude towards use, which affects the intention of the behavior to use, so this study would like to review the relationship between attitude towards use and behavioral intention in use.

Behavioral intentions

Behavioral intent is the driving force or willingness of an individual to achieve a target behavior (Holden & Karsh, 2010). This can be translated into the level of acceptance of the technology by the end-user. In this study, many of the questionnaire questions assess whether the user intends to use the technology.

Business simulation computer game

Business simulation computer games or gamifications are computer games that educate or are intended for training players to manage business activities effectively and decision-making processes within the business environment simulation, as concluded by Wawer et al. (2010). It is noted that business simulation computer games are one of the most effective ways to improve business process management knowledge in the most modern organizations of the time. There are two types of business simulation computer game users: Business users and students (Faria, 1998; Tao et al., 2009; Wawer et al., 2010), according to Faria (1998), Companies that use business simulation computer games as a training tool are large corporations. Other users who have been reviewed widely and comprehensively. Most of them are students. This is because students can develop a wide range of skills, such as individual participation. Teamwork Includes strategic thinking and analysis In this research, and the user is a fourth-year undergraduate student applying for a computer game. Business simulation is one of the methods of contemporary education. And it is because students have been passed on their knowledge in business practice before Students can also imitate more real-world situations. When it comes to computer games

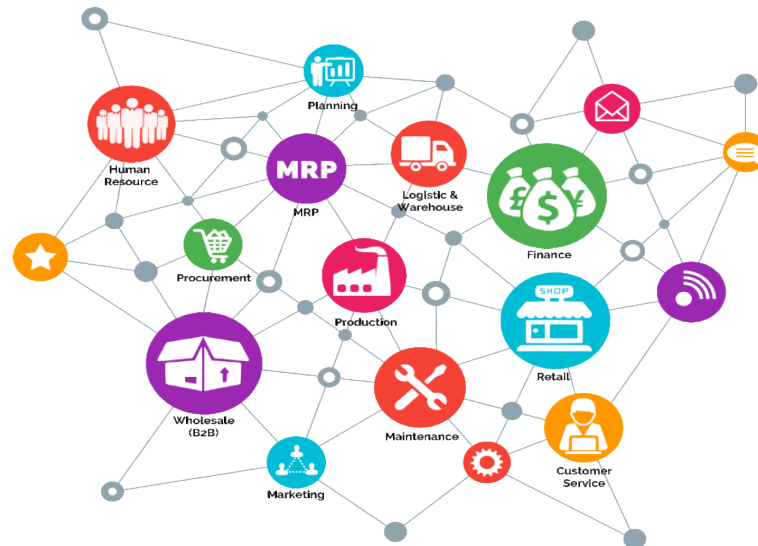
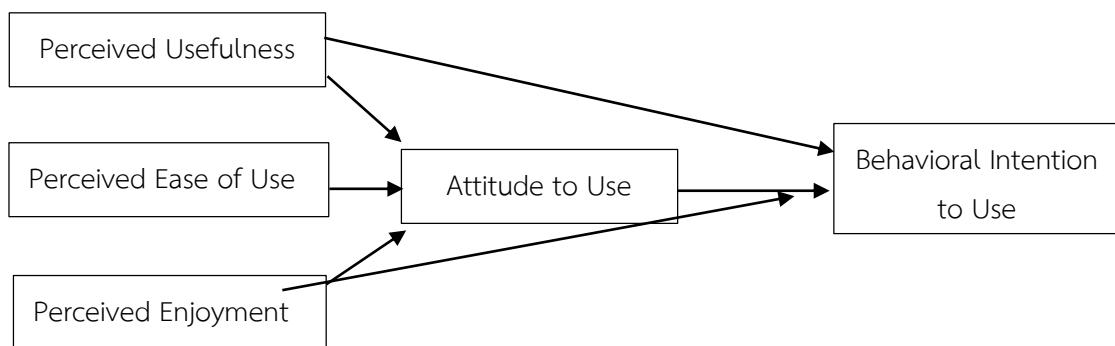


Figure 1: Business simulation game business module
Source: www.monsoonsimthailand.com

Research framework



Research Methodology

Methods for conducting this research use quantitative methods. Use questionnaires to collect data because questionnaires are suitable for a quantitative survey. This study was a cross-sectional study because the data were collected only once. Finally, the data is analyzed in detail in a deduction.

Samples and Collection

This research performed at the Faculty of Business Administration Economics and Communication Naresuan University a total of 58 subjects were students in the 4th year in Business Computer. Enrolled in courses 231461 Organization Management with content about organizational resource planning in the first semester of the academic year 2019, choosing this class of students is because he is a business computer student who has experience in using computer games in business simulation.

Data analysis

The descriptive data analysis from questionnaires was designed as a rating scale with a scale of 1-5 weights, separately measured and then analyzed the static by using mean and standard deviation, all items.

The researcher also used inferential analysis to test the hypothesis. Using two types of inferential analysis statistics: Pearson correlation and multilevel linear regression according to Kumar et al. (2013). Pearson correlation was used to measure the degree of linear association between two variables. On the other hand, multiple linear regression analyses the relationship between a single dependent variable with more than one independent variable.

Research instruments

A questionnaire developed from previous research by Venkatesh and Davis (2000), Ngai et al. (2007) and Liaw (2008), contained questions on the technology acceptance of Davis et al. (1989), consisting of a perceived benefit variable. The perception that it is easy to use perception of enjoyment, attitudes towards use and the intended use of 17 questions and 58 questionnaires were used to collect the data.

Three experts performed the analysis of the validity of these 58 questionnaires to consider and verify the Index of Item Objective Congruence: IOC to obtain an IOC value of 0.60 which is considered valid (Surapong Kongsat and Teerachat Thammawong, 2008). Next the researcher then used all the questionnaires to determine the confidence value by analyzing it with Cronbach's Alpha value was concluded as follows. The perception factor achieved a confidence factor of 0.799, followed by the attitude towards use. A confidence factor of 0.774 was obtained for the behavioral intention factor. Obtained a confidence factor of 0.770 and a perceived confidence value of 0.754, a perceived confidence factor as easy to use of 0.711, which tested the reliability of 17 questions. of all questionnaires, Cronbach's alpha value was not less than 0.70 (Nunnally, 1978). All the questions in the questionnaire had an acceptable level of confidence.

Results

Study results on factors affecting the use of business simulation computer games for undergraduate students in Business Computing objective are to study the factors affecting the use of computer games in business simulation affecting the attitude of use through the technology acceptance model found that the sample of 58 respondents, more than half of them were female students, 51.7 percent followed by male students' 48.3 percent.

Table 1 summarizes the mean and standard deviation of the technology acceptance.

Items	\bar{x}	S.D.	Level
Perceived Usefulness	4.19	.488	Highly
Perceived Ease of Use	3.37	.589	Average
Perceived Enjoyment	4.04	.609	Highly
Attitude to Use	3.92	.635	Highly
Behavioral Intention to Use	3.87	.599	Highly
Total	3.88	0.584	Highly

Table 1 showed that students' opinions on the overall technology acceptance were at a high level ($\bar{X} = 3.88$, $SD = 0.584$), separated by the side, in descending order as follows. The perceived benefit was at a high level ($(\bar{X} = 4.19$, $SD = 0.488)$). Students had a high level of perceived enjoyment ($(\bar{X} = 4.04$, $SD = 0.609)$) Students had a high level of attitude towards use ($(\bar{X} = 3.92$, $SD = 0.635)$). High level ($(\bar{X} = 3.87$, $SD = 0.599)$) and students commented that the perceived ease of use was moderate ($(\bar{X} = 3.37$, $SD = 0.589)$).

Table 2 Pearson correlation analysis

The relationship between variables	Pearson Correlation	Sig.2-tailed)
Perception of enjoyment with an attitude towards the use	.617	.000**
Perceptions that there are benefits to attitudes towards use	.341	.009**
A perception that it is easy to use with an attitude towards use	.780	.000**
Perceptions are useful for behavioral intentions	.548	.000**
A perception is easy to operate with behavioral intentions	.401	.002**
Perception of enjoyment with behavioral intention	.644	.000**

The relationship between perceived benefits and attitudes towards the use of computer games in business simulation.

From Table 2, the perception of benefit was positively correlated with the attitude of using computer games in business simulation because the r value was 0.617; the strength of this relationship was moderate. The correlation is significant because the p-value is less than 0.01.

Relationship between perceived benefit and behavioral intent in the use of business simulation computer games.

From Table 2, the perception of benefit was positively correlated with the behavioral attitude of the use. Moreover, this is significant because the p-value is less than 0.01; this relationship's strength is moderate since the R-value is 0.548.

The relationship between perception of ease of use and attitude towards the use of business simulation computer games.

Table 2 illustrates that the perception of ease of use was positively correlated with the attitude of using computer games in business simulation. This relationship's strength is small since the R-value is 0.341, but the correlation is significant because the p-value is less than 0.01.

The relationship between perception of enjoyment and attitudes in using computer games in business simulation.

Table 2 also shows that the perception of enjoyment was positively correlated with the attitudes of using computer games in simulating business situations. The relation is significant because the p-value is less than 0.01, the R-value is 0.780, therefore the correlation is high.

The relationship between Perception, Enjoyment and Behavioral Intention in Using Computer Games for Business Simulation

From Table 2, the perception of enjoyment was positively correlated with the behavioral intention of using computer games to simulate business situations. The correlation is significant because the p-value is less than 0.01, the R-value is 0.644, so it is a moderate correlation.

The relationship between usage attitudes and behavioral intentions in the use of business simulation computer games.

Table 2 shows that the attitudes in using computer games simulate business situations. There was a positive correlation with behavioral intent in the use of business simulation computer games. This relationship is significant because the p-value is less than 0.01. The strength of this relationship is moderate since the R-value is 0.646. The

relationship of perceived benefit Perception of ease-of-use perceptions of enjoyment and attitudes in computer games in business simulation.

This analysis is performed to assess in more detail the relationships between independent variables. (Perception of benefit Ease of use, variable based on (attitude towards the use of computer games, business simulation, in addition to identifying the elements of the technology acceptance model that most affect students' attitudes in the use of computer games business simulations.

The relationship of perceived benefit Intuitive perception and the perception of enjoyment and behavioral intention

This analysis is performed to assess in more detail the relationships between independent variables. (Perception of benefit, perception of ease of use and perception of enjoyment) According to (intention Behavior in using computer games to simulate business situations. In addition to identifying the technology acceptance model elements, it has the greatest effect on student attitudes in using computer games in business simulation.

Table 3 The results of the multilevel linear regression equations.

Model	R	R Square (R ²)	Adjusted R Square	Std. Error of the estimate
1	.815	.664	.645	.36255

Table 3 shows the R-value of the relationship mentioned, 0.815, which means 81.5% of the user's intelligence using the business simulation computer game. This can be expected from the perceived benefits. The perception that it is easy to use and the perceived enjoyment with R2 of 0.664 means 66.4% of the change in user attitudes toward running a business simulation game. Is affected by independent variables.

Table 4 Analysis of multiple regression equations

Model	Unstandardized Coefficients		standardized Coefficients Beta	t	Sig.
	B	St. Error	β		
1 (constant)	.416	.437	-	.952	.345
The perception of useful	.341	.119	.723	2.853	.006**
The perception of easy to use	-.108	.095	-.104	-1.129	.264
The Perception of enjoyment	.653	.100	.681	6.554	.000***

Discussion

From research on factors affecting the use of business simulation computer games for undergraduate students in business computing can debate whether the adaptation factor for business simulation computer game use had a significant effect on usage attitudes of 0.01, consistent with research by Ngai et al. (2007) Park (2009) and Yatim (2018) that students perceive. That business simulation computer games are one of the learning tools useful if they can be used to improve their learning. However, this study found results that differ from a study by Al-Adwan et al. (2013) because Students are happy to use computer games and business simulations. Nevertheless, the benefits must be considered. Therefore,

after using a computer game in a business simulation Students will recognize that it is a good learning system because it can improve their learning efficiency.

The relationship between perception and attitudes in using computer games in the business simulation was significantly correlated at a significant level of 0.01 to study attitudes towards behavioral intentions in computer games simulating business situations. This is consistent with the findings of Davis et al. (1989) Lee et al. (2005) Amoako-Gyampah, (2007) and Ngai et al. (2007), but also conflicts with the Park (2009) study that said. It is because university students have recognized the system's benefits since, they learned them in high school. Hence, the perceived benefit has no significant correlation with the behavioral intentions of running a business simulation computer game. and

The perceptions of enjoyment and attitudes in the use of computer games in the business simulation were correlated at a significant level of 0.05, the results of this relationship consistent with previous research (Dickinger et al., 2008; Van der Heijden, 2003) That can be concluded that the cognitive effect influences the attitude of use and is consistent with the benefits that are received. Besides, the study's portal has enjoyable functionality, so perception is considered an integral component. Important Portals are like business simulation computer games. Where enjoyment has a great impact on user attitudes for use, students view business simulation computer games as a fun learning system.

The adaptation of a new business simulation game Through the Technology Acceptance Model (TAM) showed a significant correlation of 0.01. This correlation is consistent with research by Al-Adwan 2013), Ngai et al. (2007) and Park (2009). The perception of ease of use had a profound effect on using computer games in business simulation. However, the study found that Have a little relationship. This is in line with Hwang & Cruthirds (2017) research, which says that some students feel that the ERP system used in business simulation computer games is complex, so this phenomenon affects students' attitudes to using computer simulation business situation as well.

The relationship between cognition and behavioral intent in the use of business simulation computer games was significantly established at a 0.05 level, consistent with previous studies (Dickinger et al., (2008) and Lee and The Faculty (2005), who says that any technology that is meant for young people should have fun and enjoyable functions to encourage users to use it with recommendations related to computer games business simulation. As the target market is made up of universities or tertiary institutions, it also includes an enjoyment function due to many respondents in this stud agree that using this system is so much fun that time flies. It is also consistent with Chang et al. (2003), where students commented that business simulation computer games are interesting. Moreover, proven to have other essential elements (In addition to perceived benefits and use attitudes) affecting intentions and behaviors to use the computer game system to simulate business situations.

Recommendation

This research points out that computer game developer business simulation. The factors that motivate users to use this technology must be considered in consideration of its benefits. Perception of ease of use the perception of enjoyment and attitude to use These factors are included in the consumer perspective, which is one of the external factors' developers should consider during the development of new technologies. Doing so to increase user intentions of business simulation computer games. Besides that, this education has implications for higher education. Computer games simulating business situations used as educational tools can be advantageous if there are various factors, such as perceiving benefits Intuitive perception and perception of enjoyment. Moreover, perceived enjoyment is the most important factor of attitudes to use. The research results

can help this institution. Realize the importance of perceived enjoyment in a new learning system. However, the system may be difficult to learn or understand by first time users. Nevertheless, students are welcome to use them if they perceive enjoyment. For example, the perceived factor of enjoyment can be in the form of using a computer. The younger generation is more likely to use computers to learn. Therefore, computer games simulate business situations. Therefore, there is a high level of enjoyment due to the use of computers in teaching.

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PRODUCTION PROCESS QUALITY MANAGEMENT STRATEGIES WITH DIGITAL TECHNOLOGY OF READY-TO-EAT FOOD INDUSTRY IN GLOBAL EMERGENCY SITUATION

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ABSTRACT

This study was conducted as a qualitative research-based analysis. It has the following objectives; one is to examine production process quality management of the ready-to-eat food production in global emergency situation. The second is to arrive at a strategy to quality manage the production process with the use of digital technology. The research was conducted by using an in-depth study of a ready-to-eat food company that has recorded the highest related revenue in Thailand. Research tools employed were interviews, voice recording, software packages for analyzing qualitative data. Data were collected from study activities and in-depth interviews. The findings were as follows; 1) the three case studies companies use digital technology in production process quality management. 2) the companies can devise a strategy to lower its production cost, reduced production time, reduce the error rate and resulting in higher quality and safety products as well which enable the company to deliver the highest value to its organization in the manufacture of products to the customers. Moreover, the company build trust in cleanliness and safety for businesses to survive this global emergency.

KEYWORDS: 1) QUALITY MANAGEMENT STRATEGIES 2) PRODUCTION PROCESS 3) DIGITAL TECHNOLOGY 4) READY-TO-EAT FOOD INDUSTRY 5) GLOBAL EMERGENCY SITUATION

1. Introduction

In the food industry it is the main industry in Thailand. The food industry is important in that it uses almost all of the ingredients in the country. Helped create a large number of downstream industries. It is also an industry that tends to grow in line with the economic recovery. This is especially true with ready-to-eat products that have grown higher than the overall food and beverage market. By 2020, the value of the ready-to-eat food market is at 20,200- 20,500 million baht, expanding by 3- 5 percent, which has contributed to growth from an increase in distribution sources close to consumers such as convenience stores. The growing popularity of eating out due to some limitations such as lack of time and space for cooking. Urban lifestyle Single-family life on the rise Including a variety of novelty products resulting from the entrepreneur's product development competition. (Kasikorn, 2020)

This is in line with the current global emergency situation that has resulted in the food industry changing trends. In addition to the above factors, safety is the most important issue. Consumers also want food that has an innovative, different immune system. Making ready-to-eat food has a high growth rate Consumers are more likely to buy food to eat at home. Increased self-cooking activities And the popularity of online purchases has grown to become New Normal.

CJ CheilJedang's 2020 HMR Trend study found that after the coronavirus outbreak Consumers focus on saving time in food preparation. By eating ready-to-eat meals at home, an increase of 83 percent, an increase of 23 percent compared to the previous year. Because the food group is ready to eat And ready-to-cook food It is one of the safest options in the times of the coronavirus crisis, as consumers can keep them for a long time. Reduce the risk of shopping in the market. Or a store that is crowded And with the current food production technology Making frozen food in addition to being stored for a long time Still able to maintain quality and complete nutrients.

This is an opportunity and an important factor that motivates Thai ready-to-eat food processing companies to adjust their strategy to meet the market needs. Which must build confidence in the brand In production facility And providing consumer information To ensure food safety It is important to have a process that monitors the quality and safety of food production with modern digital technology. To reduce costs, reduce time, reduce error rates And resulting in higher product quality and safety, as well as The company is able to deliver the highest value to the organization to produce products to the customers. Moreover, the company builds trust in cleanliness and safety for businesses. Survive in this global emergency too (Food Institute, 2020)

Research objectives

1. To study the production process quality management of the ready-to-eat food production in global emergency situation.
2. To study the strategy to quality manage the production process with the use of digital technology.

2. Literature review

Production process

Production is a process in which economic resources or inputs (com-posed of natural resources like land, labour and cap-ital equipment) are combined by entrepreneurs to create economic goods and services (also referred to as outputs or products).

A production function is usually defined as a schedule (or table, or mathematical equation) show-ing the maximum amount of output that can be produced from a fixed

amount of resources, given the existing technology or the art of production. In short, the production function is a catalogue of a firm's output possibilities. (Jim, 2019)

Production process quality management

Quality control is a key component of a well-run business. A quality control program helps to ensure your small business is delivering a consistent product, service and customer experience. Developing quality control processes allows your business to operate without you, making it easier to expand into new locations, delegate duties and even sell your business when the time comes. (Score, 2019)

The quality system in the food industry is as follows:

1) Good Manufacturing Practice (GMP) is a practice and proven quality assurance system from a global group of food academics to ensure food safety. It is trusted and accepted by consumers. By relying on many factors that are interrelated Therefore, if all the prescribed guidelines can be followed, the food will be of the highest quality, standard and safest.

2) Hazard Analysis and Critical Control Point (HACCP) Analysis of product hazards to consumers Along with the formulation of control measures And fix the problem Together with the use of laboratory analysis (Lab) to confirm the efficiency of the HACCP system used in the product manufacturing process. Give consumers confidence in the quality and safety of that food product (Ministry of Industry, 2018).

3) Total Quality Management (TQM) A focus on achieving customer satisfaction. Process improvement From receiving raw materials until the product or service to the customer must have quality and process improvement continuously. So that mistakes and losses can be reduced. To a minimum or no, all employees in the organization must be involved. Because the operator will know the problem And can be improved as best Mixing up activities Quality must reflect all activities of the organization. And have the correct measurement (Rawat , 2009)

Digital technology

Another technology used in industrial plants. Is to work automatically using robots (Robotic Process Automation: RPA) is a program that allows businesses to create robots to perform various tasks as specified. With each robot that is built will work accordingly The format was set differently. To be used for repetitive work in different ways Instead of employees having to do the work themselves, robots can be used to do that job on their behalf in order to increase productivity and reduce costs in the long run. The robot innovation in the factory will be as follows (Sumipol, 2019)

1. Multi-purpose robot Much of it is developed primarily as a robot "arm". Both to handle and transfer work smoothly The device can also be installed to perform other tasks such as fine-work assembly.

2. Welding robots One of the important robots in the Thai manufacturing industry. Since the automotive manufacturing industry has a high use of robots. The welding robot looks like a robotic arm with a steel tip at the end They often work in conjunction with a conveyor system that sends materials into the distance.

3. Product and material sorting robots are robots that are widely used in industrial plants. Including warehouses, especially Amazon and Alibaba, that have developed their own factory sorting robots.

4. Safety Inspection Robot that the more the industry develops Safety is even more important. Many jobs are too risky for humans to perform or in hard-to-reach areas. For those reasons, factory safety inspection robots have come into play, such as detecting leaks in factories.

5. Plastic molding robots Plastic molding robots are responsible for handling. Plastic injection molding according to application Into a large number of finished products in a short time, such as plastic pipes, equipment parts to utensils, plates, cutlery

Production process quality management strategies

Reijers, & Liman Mansar (2005) 's The Devil's Quadrangle concept is based on four dimensions of efficiency: time, cost, quality and flexibility. In principle, the design of business processes reduces the time required to handle cases, reduces the costs required to execute processes, improves the quality of the services delivered, and increases the ability of business processes to handle.

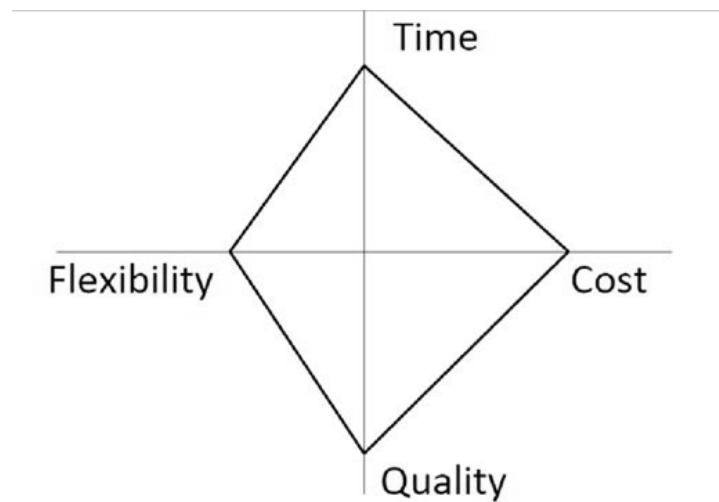


Figure 1 : The Devil’s Quadrangle
Source: Reijers, & Liman Mansar, 2005

Cost side If there is a positive impact Shows that the production process costs are reduced Estimate with different types of expenses such as fixed or variable costs, human or systemic use, processing or management or support.

And quality If there is a positive impact Shows that there are fewer errors and mistakes Have reduced waiting times Evaluated by external and internal factors, quality products and processes meet international quality standards such as GMP, HACCP or TQM.

Consistent with the lean manufacturing strategy The main goal of the strategy is to deliver value to customers, focusing on the value creation process to improve value creation. It is also less focused on asset and technology optimization and the flow of products and services based on customer demand (Collins, 2016). It can reduce production costs by increasing labor productivity. Reduce production time Reduces inventories and cuts errors and material waste in half. Therefore, lean manufacturing strategy It is an easy and efficient way to perform production and quality processes.

Research framework

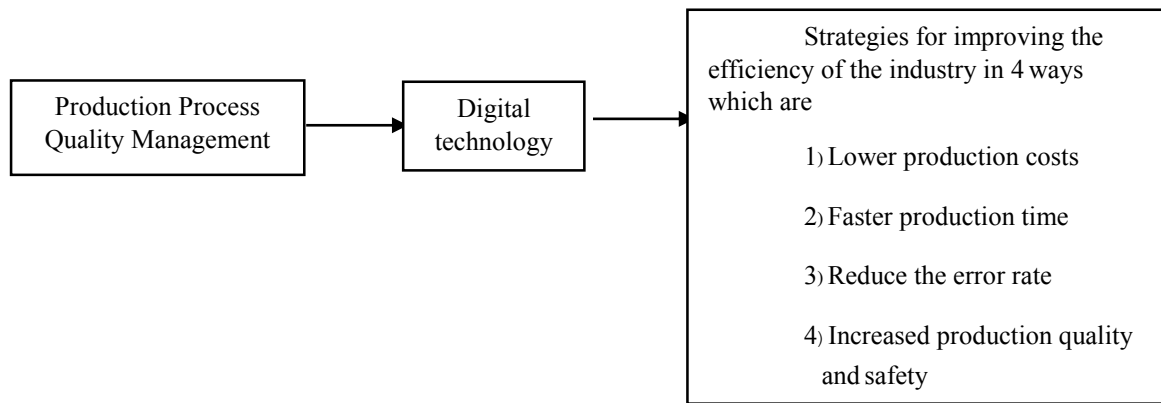


Figure 2 Research framework

3. Research methodology

Research scope

1. Scope of content

Study the strategy for quality managing the production process using digital technology of the ready-to-eat food industry in Global Emergency Situation, which studies from secondary data, documents from observation Study trip and information from interviewees regarding production processes from in-depth interviews.

2. Scope of data collection

In this research, study the business process which has the scope for data collection only in the production process as follows

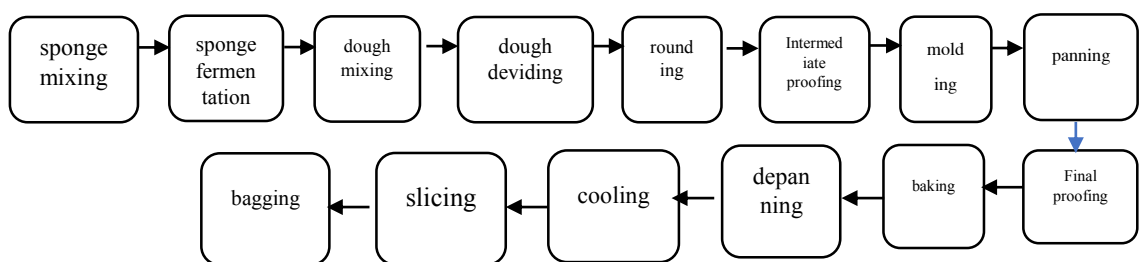


Figure 3 Scope of data collection

Population and samples

A case study of 3 ready-to-eat food production business, ready-to-eat bread type and the beginning of Thailand. By interviewing a total of 3 people

Data collection

1. Document study

The researcher has collected and studied various information from research papers, academic articles and internet information related to production process management strategies to be used in the analysis of the data obtained from in-depth interviews, which will give more accurate and complete information.

2. Observation

The researcher observed without participation from field trips. Able to collect data without having to participate in the activities of the sample is a structured observation to record data. By the researcher observed from activities within the scope of the production process that occurred and recording the data in various formats and analyzing it systematically in order to be able to analyze the results in the future.

3. Interview form

This research uses a semi-structured interview form and recording audio during the interview to gather various information during the interview which is very important to help prevent forgetfulness.

4. The researcher using Nvivo11 program for analyze data from interviews.

4. Analysis results

Analysis of results in case studies of digital technology quality management strategies of ready-to-eat food industry in global emergency situations It operates in line with the objective of monitoring the quality management of production processes of ready-to-eat food production in a global emergency. And to arrive at the strategy for quality management of the production process using digital technology That makes it efficient in cost of production, production time, fault rate and the quality and production safety are improved. Which shows details as follows

Table 1: shows the summary of the study from the documents of the 3 companies.

Company	Type	Quality	Technology Digital
A	Bread, Sandwich	GMP HACCP	Robot Product and material sorting robots
B	Bread, Sandwich	HACCP TQM	Robot Product and material sorting robots
C	Bread, Sandwich	GMP HACCP	Robot Product and material sorting robots

The results of the study from the document found that all 3 companies have a standard system for quality management of production processes, whether GMP, HACCP and TQM, with Product and material sorting robots to help make the production process more efficient in terms of Quality management as well.

Table 2 : shows the comparison of labor costs.

Labor	Cost	Difference	%
		$[3]=[2]-[1]$	$[4]=[3]/[2]*100$
Robot (Working 24 hours, 365 days)	200,000,000 [1]		
Employee (4,800 people, daily wages 325 baht, working 24 hours, 365 days)	569,400,000 [2]	369,400,000	65%

From Table 2, it was found that the cost of using the robot was less than the cost of hiring 370 million baht, 65 percent of the labor force.

Table 3 : shows the summary of the interview

Company	Quality and Safety	Interview	Transcribe	Lean
A	GMP HACCP	<ul style="list-style-type: none"> • Use robots to increase production efficiency faster to help reduce workforce. • To increase the speed in working as fast as it comes with efficiency. • Accurate sales data 	<ul style="list-style-type: none"> • Cost reduction • Reduce mistakes. • Reduce time • Increased quality and safety. 	<ul style="list-style-type: none"> • Cost reduction • Reduce time • Reduce mistakes. • Increased quality and safety.
B	HACCP TQM	<ul style="list-style-type: none"> • Develop their own technology and innovation To reduce production costs, reduce costs • The time is 6-7 hours shorter than before, reduced to 2-3 hours only. • Develop standard potential 	<ul style="list-style-type: none"> • Cost reduction • Reduce mistakes. • Reduce time • Increased quality and safety. 	
C	GMP HACCP	<ul style="list-style-type: none"> • With the use of robots to help work For speed, accuracy, reduce costs in management. 	<ul style="list-style-type: none"> • Cost reduction • Reduce mistakes. • Reduce time 	

Company	Quality and Safety	Interview	Transcribe	Lean
		<ul style="list-style-type: none"> • Reduced from 12 months to 3-6 months or left 1 month • Strict manufacturing process control standards for every step 	<ul style="list-style-type: none"> • Increased quality and safety. 	

From the study of cleaning documents and in-depth work from employees in quality management of the production process, data can be examined through a package for qualitative data analysis. Safe in Manufacturing, with the use of technological robots, allows companies to be managed, reduce time, reduce error rates, and improve quality and safety, in line with lean manufacturing at a competitive advantage in a global emergency situation.

5. Conclusion

By examining the data in the mechanical process management of the ready-to-eat food industry in the global emergency situation, it is understood that the company in the case study manages quality in its manufacturing processes with a material robot and that the company is Manage production downgrades, reduce production times, improve quality and safety, resulting in a production error rate, which is consistent with lean manufacturing standards, as well as enabling the company to deliver to manufacturers. In addition, the company builds a trust in cleanliness and safety for businesses to survive this global emergency.

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THE INFLUENCE OF SHOWROOMING TOWARDS SEARCH PROCESS SATISFACTION THAT MEDIATED BY CUSTOMER EXPERIENCE IN THIS AGE OF TRANSFORMATION

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ABSTRACT

Showrooming is part of the multichannel that consumers can choose in this age of transformation. It is because the changing technology allowed them to search and gather information about a product in the physical store and purchase a suitable product online. However, the research regarding showrooming towards search process satisfaction from a customer perspective could be explored more. This research aims to analyze the showrooming effect through confidence and smart shopping feeling toward the search process satisfaction of Indonesian cosmetic consumers. The data were collected using questionnaires from 100 respondents with a non-probability technique, particularly judgmental sampling with specific criteria. Thus, the data were examined using the Sobel test to examine the mediating variable. Finally, the research result showed that showrooming has a significant influence on customer experience, including confident and smart shopping feeling as well as the customer experience influences search process satisfaction. Moreover, customer experience also has a significant role as a mediation variable between showrooming and search process satisfaction.

KEYWORDS: 1) SHOWROOMING 2) CUSTOMER EXPERIENCE
3) SEARCH PROCESS SATISFACTION 4) CONFIDENCE 5) SMART SHOPPING
FEELING

1. Introduction

Showrooming is part of a multichannel trend that shifts the consumers' way in conducting a transaction in this age of transformation mainly because of both technology support and interest from the customers' side in doing different ways of shopping. The use of technology or online medium to purchase while explore the product through offline stores is the characteristics of showrooomer, which is the opposite of webrooomer (Arora, Singha, and Sahney, 2017; Flavián et al., 2019; Gensler, Neslin, and Verhoef, 2017; Kang, 2018). Multiple channels are also found as the trigger that make consumers spend more money, purchase more products and make them more satisfied Chatterjee (2010) and Piercy (2012), since they will get more information and power during their purchase-decision process (Van Bruggen, Antia, Jap, Reinartz, and Pallas, 2010). Showrooming also facilitating shopping activities and make consumer more comfortable with shopping online (Stevens, 2016), and it increases consumer satisfaction (Herhausen et al., 2015), since they feel that they did the right purchase through search all the information needed by themselves (Voropanova, 2015). The high degree of confidence comes from the decreasing disproportionately of information and increases control over the purchase process, and less of an issue during seeking the low price in the multiple channels (Flavián et al., 2016; Rapp, Baker, Bachrach, Ogilvie, & Skinner, 2015). On the other words, all processes in gathering information will create a consumer experience, which then becomes a core to accomplish customer satisfaction (Verhoef et al., 2009).

Consumer experience is a crucial part of accomplishing customer satisfaction (Chandra, 2014). The previous research by Pauwels, Leeflang, Teerling, and Huizingh (2011) determined that the effective path to eliciting feelings of satisfaction is by letting the customer undergo the control, feel confident, and undergo smart shopping feelings. Smart shopping feelings are probably to occur in cross-channel shopping settings (Flavián et al., 2019), and the personal traits, such as thrift or expertise, can be affirmed by using multiple channels (Chiu et al., 2011). Based on those explanations, it can be stated that showrooming is part of multichannel to evoke consumer experience, both confidence and smart shopping feeling. However, the researcher found that the showrooming studies can be explored more, particularly referring to the previous research conducted by Flavián et al. (2019), which is only focusing on the webrooming impacts on satisfaction. Moreover, the researcher will fill this gap by replacing the webrooming variable with a showrooming variable, and analyze how showrooming influences search process satisfaction through the customers' search experience. This study also wants to prove the statement by Arora et al. (2017), whether the curiosity in touching and feeling the product motivates customers to visit the brick and mortar store before buying online. Moreover, this study adopts the research model from Flavián et al. (2019) with an emphasis on showrooming that gets less attention in his previous research. Therefore, in this study, the researcher focuses on the consumer's feeling of confidence and their feeling of being a smart shopper, as drivers of the influence of showrooming on search process satisfaction, especially in the cosmetics products. L'Oréal cosmetics will be the object of this research, since it is the number one cosmetic group founded by Eugene Schueller in 1909 (L'Oréal-Indonesia, 2017). In the past decades, that product has grown into double-sized in Indonesia market (Spencer, 2018).

2. Literature Review

Showrooming

Showrooming is part of the cross-channel process where the consumer searches and gathers information from the physical store, but they will purchase the product online (Flavián et al., 2019). Showrooming helps the consumer to find a suitable product confidently (Mehra, Kumar, and Raju, 2013). Showrooomer can straight away diagnose the product, and it refers to the capability of consumers to assess product characteristics, such as "touch and feel" aspects (Gupta, Su, and Walter, 2004a), that cannot be evaluated online. Furthermore, there are some

trigger factors to do offline from Marmol and Fernandez (2019) such as to gather stock availability information (product's availability, variety, and quality) that might be more informative than online viewing, physical atmosphere, and price (attractive offers).

Search Process Satisfaction

Creyer and Kozup (2003) defined that search-process satisfaction is satisfaction with the real information search process. The essential elements of customer experience management are satisfaction (Lemon and Verhoef, 2016). Shopping experience and chosen products are affecting the satisfaction of the consumer (Puccinelli et al., 2009). The total of subjective and objective knowledge of the consumer during the process is considering the level of consumers' information satisfaction (Shah and Marchionini, 2013). By comparing consumer expectation and the actual delivered performance psychologically will result in satisfaction (Lemon and Verhoef, 2016; Mehra et al., 2013). Research by Chandra (2014), Piercy (2012), and Rapp et al. (2015) stated that the critical outcome of cross-channel shopping is satisfaction. By comparing the single-channel information searches and multichannel searches Flavián et al. (2019), and Piercy (2012) found that multichannel information searches provide greater satisfaction. Thus, this study will focus on the search process satisfaction.

Consumer Confidence

The consumer's attitude toward choice decisions can be seen from their confidence (Rucker, Tormala, Petty, and Briñol, 2014). Moreover, Andrews (2016) stated that consumers think and act in a purchase situation determined by the confidence of the consumer. Consumers who are confident in making decisions show signs like an increase in willingness-to-pay (Thomas and Menon, 2007), high satisfaction (Heitmann, Herrmann, & Lehmann, 2007), and strong choice commitment (Clarkson et al., 2008). Rucker et al. (2014) stated that qualities (consistency, quantity, importance, ease-of-processing, source credibility, comprehensiveness, validity) of external information is reflected by the drivers of choice confidence.

Therefore, this study develops the hypotheses stated below in response to our curiosity towards the relationship between showrooming, consumer's confidence and search process satisfaction. The hypotheses are as follow:

H1: Showrooming has a positive impact on search process satisfaction

H2: Showrooming has a positive impact on confidence

H3: Confidence mediates the impact of showrooming on search process satisfaction

Consumer Smart Shopping Feeling

Consumers are always trying to minimize their spending of time (time-saving), money, and energy to gain suitable value from experience, and this phenomenon is called smart shopping (Atkins and Kim, 2011). Voropanova (2015) stated that smart shopping feelings will be retrieved while the information needed make the right choice in the shopping process. The smart shopper requires rational planning by purchasing only essential and formerly planned goods at a cheaper price (Atkins and Hyun, 2016; Voropanova, 2015). Therefore, this study develops the hypotheses stated below in response to our curiosity towards the relationship between showrooming, smart shopping feeling and search process satisfaction. The hypotheses are as follow:

H4: Showrooming has a positive impact on smart shopping feeling of consumer

H5: Smart shopping mediates the impact of showrooming on search process satisfaction

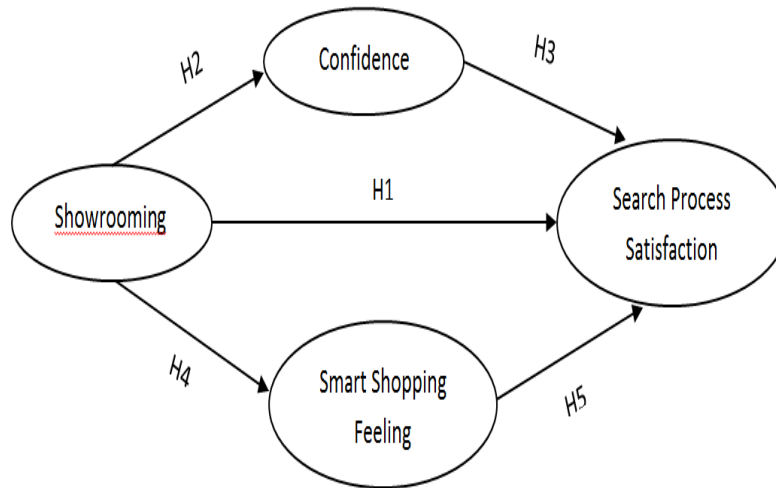


Figure 1: Research Model
 Source: Adopted from Flavián, Gurrea, & Orús (2019)

3. Research Methodology

Quantitative study has been chosen to measure every concept and relationship to every alternative in this research's result objective. Because the population size of L'Oréal Indonesia consumers is massive with an unknown amount, Slovin's formula was used to calculate the number of samples in this study. By using the formula, the calculations are as follows:

$$n = \frac{Z^2}{4(\text{Moe})^2} = \frac{(1.96)^2}{4(10\%)^2} = 96.04 = \text{rounded to } 100$$

n = sample size

Z = 1,96 score at a certain degree of significance (with 95% degree of confidence)

Moe = Margin of error (the maximum rate of error is 10%)

From the calculation above, then the research samples are 100 consumers of L'Oréal Indonesia. This research used the Likert scale and questionnaire for the data collection.

4. Results

Firstly, pre-test of validity and reliability to 30 respondents were conducted. Based on the results of the pre-test, it can be concluded that the data gathered were valid and reliable, thus all the questionnaire indicators can be used for the actual test. The demographics of 100 respondents in this research are in the millennial age (20 to 35 years old) who have used L'Oréal cosmetics. The majority of the respondents are between 20 to 24 years old (77%), between 25-29 years about 15% and the rest respondents are between 30 to 35 years (8%). Moreover, female respondents with a percentage of 83% dominate the respondents. The result of the validity and reliability test for the amount of 100 respondents also showed valid and reliable results. Moreover, the classical assumption (normality, multicollinearity, and heteroscedasticity) tests are used to determine the relation between variables. Based on the result, the data is normally distributed (Asymp. Sig. 2-tailed is 0.2 > 0.005), data is free from multicollinearity and heteroscedasticity.

Based on Table 1, it can be seen that the showrooming, confidence and smart shopping feeling influence search process satisfaction significantly, with all sig. values under 0.01 which are lower than $\alpha=0.05$. Those results mean that all variables have a direct effect, or on the other words, it can be stated that hypothesis 1, 3 and 5 are significantly proved. The result that stated showrooming has a significant influence towards search process satisfaction shows that offline search processes before online buying can help the consumer to sort the product well, this thing

will make the consumer feel satisfied while they are doing their search process. This research result supports Flavián et al. (2016) and Piercy (2012) research results that stated if multichannel information searches offer boost satisfaction. Based on showrooming variables descriptive-analytic such as product diagnostics, stock availability, physical store atmosphere, and price, these variables are relevant to describe the consumer. At the same time, they do their searching process of L'Oréal Indonesia products. This will lead to the consumer search process satisfaction.

Moreover, both hypothesis 2 and 4 also found significance which mean showrooming influences customer experience, both towards confidence and smart shopping feeling with sig. values under $0.01 < \alpha = 0.05$ (Table 1). The significant result of hypothesis two (H2) that stated showrooming has an impact in confidence also supports the previous statement by Flavián et al. (2016) that stated if the decreasing in lop-sidedness and increasing in control over the purchasing will increase the confidence degree. The confidence might occur since the consumers do their searching process about the product on site. Additionally, about the fourth hypothesis (H4), from Table 1 can be seen that the significant value is $0.000 < 0.05$ that means showrooming has an influence towards smart shopping feeling. This finding supports the research result by Gensler et al. (2017), which stated that if the ultimate thing that makes a showroom feel smart is when they can find lower prices or lower time spending in the purchase process.

Table 1. Hypothesis Analysis Results

Model	B	Std Error	T	Sig.
Showrooming --> Search Process Satisfaction			4.185	< .001
Confidence --> Search Process Satisfaction			9.422	< .001
Smart Shopping Feeling --> Search Process Satisfaction			5.813	< .001
Showrooming --> Confidence			4.760	< .001
Showrooming --> Smart Shopping Feeling			4.818	< .001
Showrooming - Confidence - Search Process Satisfaction				< .001
a	.265 (a)	.056 (Sa)	4.760	
ab	.843 (b)	.106 (Sb)	7.932	
Showrooming - Smart Shopping Feeling - Search Process Satisfaction				0.001
a	.246 (a)	.051 (Sa)	4.818	
b	.594 (b)	.136 (Sb)	4.370	

Source: Primary Data (2020)

Based on the data from analysis results (Table 1) and Sobel tests (Figure 2 and Figure 3) that have been conducted, then the other results from this study showed that there is an indirect effect from showroaming to search process satisfaction, which mediated both by confidence and smart shopping feeling. The p-value of confidence variable and smart shopping feeling variable are 0.00004769 and 0.00120541 respectively, which less than $\alpha = 0.05$, thus it can be assumed if both confidence and smart shopping feeling have a mediator role. The result of hypothesis two (H2) about confidence mediates the impact of showroaming on search process satisfaction proved that confidence could increase consumer satisfaction, even though showroaming can affect satisfaction directly without confidence as a mediating variable. The researcher assumes that the partial mediation comes from the respondents that have used showroaming for more than once during their search process of L'Oréal Indonesia product.

On the other hand, the fourth hypothesis (H4) also can be stated that showroaming has an influence towards search process satisfaction that is partially mediated by smart shopping feeling. This finding supports the research from Darke and Dahl (2003) who studied and found a definite link among smart shopping feelings and satisfaction. Furthermore, based on the result, the hypothesis that said if smart shopping feeling mediates the impact of showroaming on search process satisfaction is accepted. However, since it is partially mediated, it also means that showroaming only still affects the search process satisfaction without any mediation. The researcher assumes that partial mediation comes from the product that is not really specific and fancy enough. Hence, as smart shoppers, there is no need to require rational planning by purchasing only essential and formerly planned goods at a lower price.

Input:		Test statistic:	Std. Error:	p-value:
a	0.265	Sobel test: 4.06667525	0.05493308	0.00004769
b	0.843	Aroian test: 4.04313851	0.05525287	0.00005274
s _a	0.056	Goodman test: 4.09062788	0.05461142	0.00004302
s _b	0.106	Reset all	Calculate	

Figure 2: Sobel Test of Confidence as a Mediation Variable

Input:		Test statistic:	Std. Error:	p-value:
a	0.246	Sobel test: 3.23759708	0.04513347	0.00120541
b	0.594	Aroian test: 3.20003038	0.04566332	0.00137413
s _a	0.051	Goodman test: 3.27651866	0.04459733	0.00105095
s _b	0.136	Reset all	Calculate	

Figure 3: Sobel Test of Smart Shopping Feeling as a Mediation Variable

5. Conclusions

The outcomes of the research disclose that showroaming is associated with search process satisfaction from shopping experience of the L'Oréal consumer. Both confidence and smart shopping feeling as part of consumers experience partially mediates the influence of showroaming towards search process satisfaction. Even though confidence and smart shopping feeling did not completely mediate search process satisfaction, the cosmetics brand still needs to realise that satisfaction still comes from the right purchase making or consumers' confidence as well as their smart shopping feeling (time and money savings).

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THE DEVELOPMENT OF TEAM LEARNING SKILLS THROUGH KNOWLEDGE MANAGEMENT OF HIGHER EDUCATION STUDENTS IN 21ST CENTURY

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Abstract

The purposes of this research were 1) to study levels of knowledge management and the team of undergraduate students, 2) to compare levels of the team of undergraduate students who have different personal characteristics and 3) to study the relationship between knowledge management and the team of undergraduate students. The samples of this study were 57 undergraduate students chosen by purposive random sampling. Research instruments were observation form and questionnaire divided into 2 parts: knowledge management and teamwork and the reliability of the questionnaires were .813 and .895, respectively. The statistics used in this research were frequency, percentage, mean, standard deviation, and Pearson Product Moment Correlation Coefficients. This research revealed that the levels of knowledge management factors and the levels of team factor were in highest. The hypothesis testing results indicated that knowledge management factors were positively related to team factors at a significance level of 0.01. Moreover, team elements factors affected knowledge management elements factors at a significance level of 0.01 as well.

KEYWORDS: 1) LEARNING SKILLS 2) KNOWLEDGE MANAGEMENT 3) TEAM

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Introduction

Education has changed dramatically in the 21st century. The tools for acquiring knowledge are more important than the content of knowledge. Advances in communication technology have enabled students to find knowledge on their own from as many sources as ever as possible. Desired Causing the classroom to change from address Teaching changes the natural human behavior of helping each other. In learning things, teaching also transforms the process and serves as a tool to help people have a positive experience. There has been a change for the better. Able to live smoothly It is beneficial to oneself and the public (Prapaporn Pholyai, 2017)

Modern education focuses on skills development for students He sees that the key skills that enable students to adapt, learn and cope with new changes over time include thinking skills. Both creativity Conceptual thinking, problem- solving as well as communication and teamwork skills. Information Technology Skills Use of media and technology and life and work skills That students need such flexibility and adaptability Take initiative Have social skills and cross-cultural learning Including being responsible for oneself and others This 21st-century skill development education provides students with opportunities to work as a team. Know how to adapt and have social skills That help students prepare to achieve success and happiness in future life. (Office of the Health Promotion Foundation, 2019)

Teamwork is one of the most important skills for students in the 21st century. The faculty should promote the teaching and learning of working with others. To enable students to communicate or accept the opinions of fellow members of the same group. Make working as a group to achieve the planned goals. Nowadays, teamwork is essential in the information age world. Teamwork plays a huge role because it makes work more efficient and successful than working alone. Because everyone has abilities, but everyone's abilities are limited. Bringing everyone's talents together leads to more results. Moreover, some work requires creativity. Working together by thinking together makes the job successful.

Modern problems cannot be solved alone. Need to create a classroom as teamwork from now on. When the 21st-century classroom inevitably saw the need for the collaborative skills students needed to apply to the world of work, it was inevitable. This is because we cannot apply our knowledge and abilities to solve complex problems. The variety and may not have all happened before In- depth knowledge can solve some problems. However, with the problems in the society that we are facing, there are many dimensions and complexities involved, such as environmental problems related to technology. Increase in population and the law Solving the problem must come from cooperation from many organizations or sectors that may not be related.

In the same way, all roles and responsibilities in large and small organizations require both their own and others' knowledge to solve problems. Therefore, it is not a surprise The Future of Jobs report ranked the world's top 10 preferred skills trends by the World Economic Forum from 2015 onwards until 2020. It is still one of the market's most sought after skills.

However, it is not easy to get students to work together in groups to build such skills. Every opinion is completely compatible with how to solve the problem. Teams must go through trial and error repeatedly. Face stagnation from unclear communication problems, conflicts, or making mistakes at any time.

Casakin and Badke- Schaub (2013) said that teamwork is difficult. Nevertheless, most teachers agree that building the ability to work with others is essential. The most pressing problems we face in our communities and society are complex and multifaceted. They shy away from simple solutions and often require knowledge, understanding and

creativity. That can be reached when people gather Even educators who uphold the virtues of working together can fight to support students in doing good.

It is also important to know knowledge: Knowledge has become the most valuable commercial and educational institution asset. Knowledge management, therefore, plays a key role in enhancing the competitive edge of the team. Knowledge management is often involved in the creation, distribution, sharing and use of knowledge. Knowledge management research deals with management, including corporate learning, culture, personal management, etc. (Drucker, 1998) and technical. Model and environment support tool (Zhuge, 2002)

Understanding and developing new types of educational processes in the context of the cognitive revolution occurring in information and cognitive processes based on the concepts of IB and Popova (2015) revealed that the most important forms of educational activity in the educational system. Higher education that allows both students and faculty to have knowledge management capabilities. In the context of a transition to a knowledge society. This leads to the greatest conclusion about the importance of initiative and independence for students. A key factor in the higher education system assumes that the faculty must lead themselves to create the necessary and exemplary experiences for students in the knowledge management process and raise the cognitive revolution process's efficiency.

To prove this point, the researcher intends to do this research to describe and refine concepts and principles of knowledge management that arise with the learning and education systems in knowledge society building. To analyze and compare that knowledge management and teamwork are related and important to each other. Moreover, to demonstrate specific aspects in organizations with knowledge management processes and teamwork within a traditional framework.

Research objectives

1. To study learning skills for group operations of fourth-year students in business computer field Department of Business Administration Faculty of Business Administration Economics and Communication Naresuan University

2. To study the factors of knowledge management of the fourth-year students in the business computer field Department of Business Administration Faculty of Business Administration Economics and Communication Naresuan University

3. To study factors of teamwork of fourth-year students in business computer field Department of Business Administration Faculty of Business Administration Economics and Communication Naresuan University

4. To study the relationship between the factors of knowledge management and teamwork of the 4th year student in business computer Department of Business Administration, Faculty of Business Administration Economics and Communication Naresuan University

5. To study knowledge management factors affecting teamwork of the fourth-year students in business computing. Department of Business Administration, Faculty of Business Administration Economics and Communication Naresuan University

Concept, theory, conceptual framework

Teaching method for teamwork

Teaching method for working as a team is a teaching method that the instructor assigns students to work together as a group. Collaborate to study, research, find solutions to problems or perform activities according to their abilities, aptitudes, or interests to train students to work together according to the democratic method (Pranee Ratanachusri, 2013).

The aim of teaching methodology as a teamwork

1. To give students the responsibility to share in work That is, promote teamwork.
2. To create a culture of working together in a systematic and disciplined manner and to act as a good leader and follower.
3. To practice problem-solving skills according to scientific methods. Research And seek knowledge for themselves by performing work both individually and as a group.
4. To enable students to work according to their interests, aptitudes, abilities, and independence.
5. To provide students with direct work experience

Steps for teaching group practice

1. Teacher and student teachers jointly define the goals of their work in each group. This step is the stage that defines purpose and methods in detail.
2. The instructor recommends the scientific sources used for researching knowledge, such as providing details of books, articles and information on the Internet used in the study.
3. Students work together to plan and work as assigned.
4. Teachers and students work evaluation. In the case of being a teacher, observe the behavior of the students in practice. In case of being a student, jointly assess the performance of their own group. By telling the operating procedure Results obtained and further development of future jobs

The advantages of teaching methodology in the group practice

1. Students can express their opinions fully.
2. Students work according to their talents, abilities, and interests.

Observations of teaching methods for group practice

1. If the instructor is beginning to use the group practice method for the first time, the instructor must closely supervise them. For example, they must ensure that all students perform their duties as assigned. The student who is the leader of the group is responsible for coordinating the role of the group members and outside the group Including coordinating with lecturers.
2. Group leadership duties should be rotated according to the occasion. To practice good leadership and following

Teamwork

Teamwork means working together with more than one member, where all members must have the same goal (Pranee Ratanachusri, 2013)

The nature of the team has four key characteristics:

1. Social interaction of a person is defined as when two or more members are related in a group or team affairs. Realize the importance of each other.
2. Having a common aim and goal is the participation of group members that encourages joint activities. Especially the purpose of group members following the organization bring the success of the work.
3. The team's structuring refers to the behavioral system, which is a unique scheme of group members.
4. Members have the same role and feelings.

Knowledge management

Nowadays, the world has entered the knowledge-based economy, and jobs need to use knowledge to create more productivity and value. Knowledge management is a broad term meaningfully covering a wide variety of mechanisms to support knowledge workers' work more efficiently, such mechanisms include the gathering of knowledge scattered at different locations. Creating an atmosphere to invent, learn, create new knowledge, organising knowledge in documents and make a document to compile a list of people with knowledge in various fields and most importantly is to create channels and conditions for the exchange of knowledge between each other to be used to develop the work to be successful.

Panich (2008) said that knowledge management is collecting knowledge available in government agencies scattered in person or documents to develop into a system and to enable everyone in the organisation to access knowledge and develop themselves to be knowledgeable and work effectively. Resulting in the organisation had the highest competitiveness.

There are two types:

1. Tacit Knowledge is gained from an individual's experience, talents, or intuition in understanding things. It is the knowledge that cannot be conveyed in words or writing. For example, skills in work, crafts, or critical thinking are sometimes referred to as abstract knowledge.

2. Explicit Knowledge is the knowledge that can be gathered. It can be transmitted through written records, theories, manuals, and is sometimes referred to as concrete knowledge.

Newman and Conrad (2000) defined knowledge management as a collection of processes. It operates on the creation, distribution and utilisation of knowledge.

Trapp (1999) says that knowledge management. It is a process consisting of many different tasks that are managed in an integrated manner. To bring about the expected benefits Knowledge management. It is the organisation's concept of knowledge resource management.

Sveiby (2001) explains that knowledge management. It is the art of creating value from the intangible assets of an organisation. Knowledge management: It is a collection of organisational practices and processes involved in creating, implementing, and disseminating knowledge and the various contexts involved in the practice.

Knowledge management summary It is a process of management that has a process and a system from processing information, ideas, and individual experiences. Building knowledge must be kept in a manner accessible to the user. Moreover, it must be stored in a manner that can be accessed by the user through a convenient channel. Applying knowledge to applications cause the transfer of knowledge and has spread throughout the organisation.

Related research

Supranee Ratanachusri (2013) studies the teamwork by teaching method for group practice of high-level vocational students in marketing target population used by the researcher in this study. Namely, vocational certificate two students in marketing, 14 students. The tools used for data collection were questionnaire for opinions in working groups. The teamwork quality assessment forms the statistics used for data analysis were percentage and mean. The findings were as follows:

1. The students commented that they enjoyed working groups. 70% of students prefer to work in groups because of the reasons able to brainstorm various opinions Accounted for 57.14 per cent, followed by quick problem-solving. Accounted for 28.57

percent and helped provide materials, equipment or other factors used in working together. 14.29% of the students, respectively. Most students do not like working in groups because of the reasons. Friends in the group are lazy, selfish. Representing 71.43 percent and followed by Friends in the group do not cooperate at the appointed time and do not like to work in groups because they feel that they are not helping their friends Accounted for 28.57 percent. Most students prefer to work individually, accounted for 78.57 percent, followed by a pair accounted for 14.29 percent and each group accounted for 7.14 percent, respectively.

2. Most of the students' level of teamwork skills was at a high level with an average of 4.35, with the assessment points having the highest average. The mean of work-sharing is 4.85, followed by brainstorming, mean 4.57 and readiness within the mean group 4.21, respectively.

Kornchanok Sutamettra et al. (2018) explores the factors affecting teachers' teamwork efficiency in schools under the Secondary Education Service Area Office, District 3, Nonthaburi Province. Have concluded that the level of team performance of schoolteachers. Under the Office of the Secondary Educational Service Area 3, Nonthaburi Province There is a high average. Factors affecting the team performance of schoolteachers. Under the Office of the Secondary Educational Service Area 3, Nonthaburi Province, comprising communication skills factors. Team solidarity factor Team size factor and the team's status factor can jointly forecast the team performance of schoolteachers. Under the Office of the Secondary Educational Service Area 3

Kritsanai Kaewmanee (2010) investigates the relationship between knowledge management and teamwork of engineers: a case study of the engineers of Triple T Broadband Public Company Limited found that 1) engineers had the level of knowledge management as a whole and in each area, namely, awareness, promotion of knowledge management of executives. The knowledge management behavior and the perception of the personal value of the executives. 2) The engineer has an overall level of teamwork. Very level In terms of mutual benefits and goals setting and cooperation Very level Roles and responsibility were at the moderate level, and 3) Knowledge management had a statistically significant positive correlation with teamwork, both side by side and overall.

Khemanat Ming Siritham (2009) research the self-directed learning on the network. Have concluded that Creating knowledge for students to learn by self-lead Must arise from the students voluntarily learning no forced discipline and responsibility. It is, therefore, important for learners to learn meaningfully. Know the endless pursuit of knowledge for yourself. Which leads to the creation of a lifelong learning culture that is effective and durable.

The concepts, theories, and related research are used to create a research framework, as shown in Figure 1.

Conceptual framework

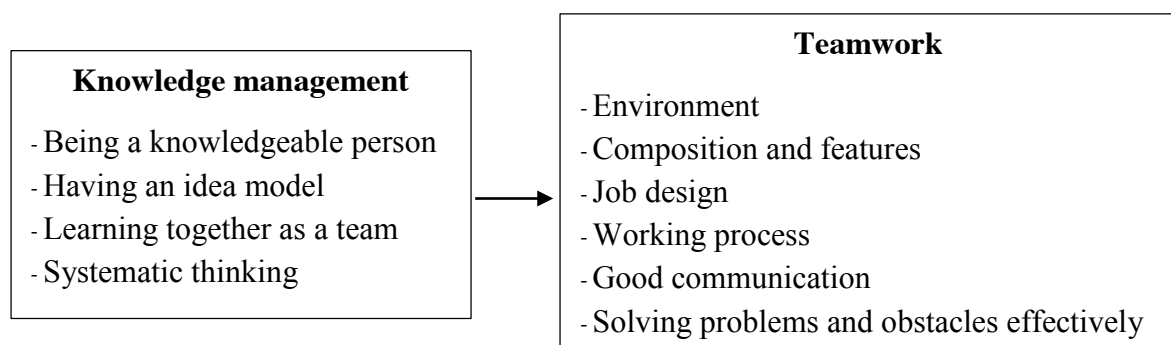


Figure 1: Conceptual Framework

Research hypothesis

Hypothesis, the factors of knowledge management positively correlated with the fourth- year students' teamwork in Business Computing. Department of Business Administration Faculty of Business Administration Economics and Communication Naresuan University

Research conduction

This research is to promote learning skills in the 21st century about teamwork and knowledge management using the method of teaching a group practice of thinking of studying in the year four in business computer Department of Business Administration, Faculty of Business Administration Economics and Communications

Population and Sample

The 4-year student in business computer Department of Business Administration Faculty of Business Administration Economics and Communication Naresuan University, 57 students who enrolled in the course 231461 Organisational Knowledge Management of the academic year 2018 using purposive sampling principle.

Materials, equipment, and methods

1. A learning skill development plan based on the 21-century skill development approach on teamwork. Worksheet 1 is distributed to all students in the third week of instruction. The case study of the Saeree ERP is conducted as a team-by-team members. Instructors are organized into 10 groups, according to Parker (1990) team organization concept.

1.1 Think and analyze information within a group of people working together. There are interactions between group members.

1.2 Help each other work to achieve the same goal effectively. Furthermore, the team members are delighted with their work (Sunanta Laohanthan, 2006).

1.3 Study problems and obstacles for the team. To improve work relationships, both quantitatively and qualitatively (Natthaphan Khajonnanand et al., 2002; Sunanta Laohannan, 2006)

1.4 After students have studied and analyzed the team building. The instructor leads each group of students to the Zingkit system (knowledge management system) to exchange knowledge on such case studies. The students' free time in the 5th week spent about 30-45 minutes per group at the meeting room BEC5201, a faculty member belonging to a grid room with zing program already installed.



Figure 1: Zing Knowledge Management System

1.5 In this first part, students do not have to appoint anyone responsible for anything. Nevertheless, having to film the team meeting of each group as a video sent via email. Teacher collects data for further analysis and grading.

2. A learning skill development plan based on the 21 - century skill development approach on the presentation for communication and team interaction with solutions to common problems and obstacles follow as the following steps.

2.1 The instructor distributes the second worksheet to students in the week eight (after the midterm examination) by allowing students to visit the website of a Thai clothing manufacturer with branches in the country and abroad. To provide information about company background, type of business Information technology used in the company, the number of employees, branches, and other relevant information.

2.2 The next step requires students to organize a group meeting to name the company to distribute software with their own address, location, company information, background, experience, phone number, and website by studying the project's feasibility and prepare for give a present the sales of Enterprise Resources Planning (ERP) project to the top garment manufacturers with details as follows.

2.2.1 Student team creates PowerPoint presentations no more than 10 slides, determined by each person's scope of work on the team. There are supporting documents for presentation such as software purchase agreement project book.

2.2.2 Students present a professional project proposal approach. Including speaking skills There are techniques for opening and closing sales, dressing, answering questions, persuasion, and teamwork for 30 minutes per group with 10 minutes of presentations, 10 minutes of answering questions and 10 minutes of teamwork evaluation. Moreover, to be presented at the boardroom BEC 5201 and BEC 5202 on the instructor's date and time.

2.2.3 The criteria for measuring presentation according to presentation criteria Analysis of Rubrics based teamwork quiz data for teachers to analyze further and score.

2.2.4 After another week, the instructor distributes questionnaires for all students to fill out.

3. A questionnaire for assessing knowledge management and teamwork in a 5-scale, obtained from literature reviews and related research papers which consisting of

3.1 Knowledge management in four areas as follows: being a knowledgeable person, thinking model, learning together as a team and systematic thinking. A total of 17 questions were also assessed for the questionnaire's confidence. The coefficient of Cronbach's alpha is .813, which is acceptable.

3.2 factors of teamwork in six areas: environment, composition and features, design, work process Good communication And solving problems and obstacles effectively. A total of 25 questions were assessed by the questionnaire's confidence.

Data collection

According to the following sequence of steps, the researcher has collected the data from 16 July 2019 to 25 October 2019.

1. The lecturer uses a group practice method of teaching in which the lecturer divides the groups according to the gender criteria and a GPA score of 10 groups of 6-7 people per group.
2. The lecturer initiates students to perform group work according to the teaching and learning activities of the Organizational Management Learning Plan for eight weeks and observe the teamwork skills of each group of students. Along with giving points for each activity.
3. The lecturer instructs all students to assess the quality of their teamwork using the quality assessment form created by the instructor.
4. The lecturer used questionnaires that were adjusted from the relevant previous research to survey ideas in teamwork through knowledge management of individual students in the classroom.
5. The instructor analyzes the data obtained and summarizes the research results.

Data analysis and statistics

The researcher analyzed the data by looking for statistics, percentage, mean and standard deviation. Pearson correlation and multiple regression equations with the criteria for interpretation as follows.

Since the measurement of the variables is a measure of Likert scale. The researcher used the mean scores of the sample group divided the knowledge management levels into five levels with the criteria for considering Likert theory (1967) as follows:

$$\begin{aligned} \text{Arrangement of layers} &= \text{Range} / \text{Number of layers} \\ &= \text{Highest score} - \text{lowest score} / \text{number of floors} \\ &= (5 - 1) / 5 \\ &= 4/5 \\ &= 0.80 \end{aligned}$$

Interpretation of knowledge management and teamwork factors.

Average between 1.00 - 1.80 means the least level of knowledge management.

Average between 1.81 - 2.60, referring to the low level of knowledge management.

Average between 2.61 - 3.40 means having a medium level of knowledge management.

Average between 3.41 - 4.20 means a high level of knowledge management.

Average between 4.21 - 5.00 means the highest level of knowledge management.

Results

Results of this research key points can be summarized according to the research principle as follows.

1. Findings from assessment and observation research indicate that most students agree that teamwork is beneficial for both themselves and the future. However, some like to work individually. This is consistent with the research of Pranee Ratanachusri (2013).

The researcher observed that the students gathered well in all groups. Only some of the students gathered late and did not meet the schedule. Nevertheless, the student team solved the problem by adjusting the time for a new team. Using social media to notify brainstorming in teams is another important factor for teamwork. Most of the students assign their topics and search them from the Internet or the library. This brought to exchange information in the team during a team meeting. Students edit by talking and adjusting their understanding. To determine team direction and goals, most students set a common goal to match the lecturer's group activity clearly. Team performance section, most students think that the team that the lecturer provides is a good fit. They cooperate in group work quite well. It made them realize that other fellow students have never worked together with a great variety of knowledge and abilities. However, it is noted that students focus on clear knowledge rather than deep-seated knowledge. Furthermore, students do not have the same knowledge causing much time to brainstorm while there is one group that can submit work two days ahead of schedule, it has time to update and review the assignments. Finally, every team achieves a specific goal because they have the same goal. Three teams are working as a team, where assigned fully on duty until receiving praise from the instructor, but two other teams must return to present the new sales because it can be noted that the team leaders of both teams' lack of the good relationship between team members. Up until there was a conflict in the team and bring it back to fix to improve teamwork out for good. Furthermore, it was noticed that the two teams returned to present them effectively that they received compliments from the instructor.

2. The findings from the questionnaire on various factors of knowledge management and teamwork. It can be summarized as the students' opinions on the knowledge management factors had the highest overall mean ($\bar{X} = 4.32$, $SD = 0.641$), sorted from descending order. The top three rankings were as follows: Students viewed that the factors of being well-informed were at the highest level ($\bar{X} = 4.43$, $SD = 0.589$). Students viewed that the systematic thinking factor was at a high level. The students were of the highest ($\bar{X} = 4.30$, $SD = 0.652$) and the students believed the team learning was at the highest level ($\bar{X} = 4.30$, $SD = 0.663$), respectively.

Students' opinions on all aspects of teamwork had the highest overall mean ($\bar{X} = 4.41$, $SD = 0.635$), sorted by most. The top three students thought that the team members had the highest level of communication ($\bar{X} = 4.51$, $SD = 0.647$). The team was at the highest level ($\bar{X} = 4.47$, $SD = 0.590$), and the students believed the effective solution of the obstacles was the highest ($\bar{X} = 4.46$, $SD = 0.651$) respectively.

Table 2: the results of the analysis of the correlation coefficients between knowledge management and teamwork.

ITEMS	TEAMWORK	
	Relationships (r)	P-Value
KNOWLEDGE MANAGEMENT	.899**	.000

**significant at 0.01 (2-tailed)

From Table 2, the results of hypothesis testing were found that knowledge management factors and teamwork factors were significantly positive or in the same direction ($r = .899$) at the .01 level according to the hypothesis

Table 3: the results of the stepwise multiple regression analysis of factors of knowledge management and teamwork.

KNOWLEDGE MANAGEMENT	TEAMWORK			
	R	R ²	Adjust R ²	F
X ₁	.778	.605	.598	12.485**
X ₁ X ₂	.838	.705	.691	84.307**
X ₁ X ₂ X ₃	.874	.763	.750	13.687**
X ₁ X ₂ X ₃ X ₄	.899	.809	.794	17.524**

Table 3 presents the results of hypothesis testing with multiple regression analysis of factors of knowledge management and teamwork. Have concluded that Factors Affecting Team Performance of Fourth Year Student in Business Computer Department of Business Administration Faculty of Business Administration Economics and Communication Naresuan University Knowing (X₁) thinking model (X₂), team learning (X₃) and systematic thinking (X₄) significantly affect teamwork. Statistics at the .01 level, i.e., cognitive individuality factor (X₁), cognitive modelling (X₂), team learning (X₃) and systematic thinking (X₄) was 70.2 percent. With a multiplicative correlation coefficient, that is .899, the error resulting from the forecast is .158.

Discussion

The results of this research the results of the study can be discussed according to the following importance.

1. Research results of knowledge management levels

From the study of knowledge management level, it was found that the fourth-year students in the business computer field Department of Business Administration Faculty of Business Administration Economics and Communication Naresuan University Have the highest level of knowledge management When considering each area of knowledge management, it was found that students had the same level of knowledge management. With the factor of being an expert with the highest average. This is consistent with Hartman's research (2002), which says understanding the sage's perspective using metacognitive principles in learning helps students develop and apply metacognitive knowledge automatically and without knowing. As needed, it guides the flow of information through the mind and controls cognition. Followed by the learning team together and systematic thinking. This is because in knowledge management Students can learn by themselves through research. From direct experience and hands-on practice. There is support and promotion by training Creating an information system for data storage and communication Convenient and fast This is in line with the concept of Khemanat Ming Siritham (2009) and Curran et al. (2019) said that the creation of knowledge for the learners was self-directed and must arise from the students voluntarily learning with no forced control and responsibility. It is, therefore, important for learners to learn meaningfully. Know the endless pursuit of knowledge for yourself. This leads to the creation of a lifelong learning culture that is effective and durable. Knowledge storage Causing knowledge to exist only at the individual level. They can only be conveyed in response to problems or

demonstrations due to the old corporate culture. Consistent with the concept of Namthip Wipawin (2004), it was found that being able to know It arises from knowledge management using technology to acquire and manage knowledge Resulting in obtaining the required knowledge and applying it in work.

2. Research results of the teamwork level

From the study of the level of teamwork, it was found that the fourth-year students in the business computer field Department of Business Administration Faculty of Business Administration Economics and Communication Naresuan University had the highest level of teamwork When each aspect of teamwork was considered, students were found to have the highest level of good communication teamwork. This is consistent with Piyapak Sinbuathong (2002) and Kornchanok Sutametri and Faculty (2018) research, saying that one of the essential skills in team building is the people's communication ability the team. Effective communication helps build a team that is good at target. The fundamental process of team building often involves communication as well, as a team of "more than one person" is involved, so communication is inevitable. By communicating as a mechanism for better understanding among team members. As a result, work can achieve goals faster, in line with Witharnee Jongsatitwattana (2020), who said listening communication skills. With the idea that If the team leader listens to the team members, the team members listened to the team leader and acted on what they were told - listening, paying attention, and accepting the other person's feelings. Good listening communication leads to success. In open communication, open confrontation and honest speaking, mutual trust, a good understanding of oneself and others within the team, and when problems arise within the team, problems must be addressed. Can face each other It is also in line with Kornchanok Sutametra and his team (2018), who said that the factor affecting the efficiency of teamwork was 72% of the communication skills, followed by the team environment. At the most level, the team environment here Is to create a good environment by creating an environment in which the other person can easily speak the subject. This is in line with Witarnee Jongsathitwattana (2020) concept, which concludes that If the team leader talks in a golden position as if he was insulting. It is challenging for team members to talk about things. It is essential to talk to each other in the same eye-level environment and look at the other person's eyes when speaking. It is also difficult to talk to each other, so a good environment is to try to smile and openly talk to the team members. The negative thinking has a significant effect on those around them.

Conclusion

Students can be enabled to acquire learning skills and teamwork through knowledge management with the must of inspiring team members 1) team admits the mistakes of teammates because an error occurs from a member of the team 2) team must have members suitable for the task of the job, subsequently training or training for team members to develop their skills for the job that Assigned 3) the team is free to perform their own tasks. Give students the freedom to perform their assignments to be performed efficiently and create pride in their student's performance. 4) team members can participate in setting goals for working together. Harmoniously And allow team members to know how to operate the work's goals, and objectives are clearly assigned for students to work in the same direction and 5) team members communicate by exchanging information and knowledge to make it easy to understand and give its to everyone on the team and 6) the team members must be more daring to express their opinions. Upon acknowledgement of the problems that arise in the team, actions must be taken promptly.

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IMPROVING THE CAPACITY OF THE STATE AUDIT OFFICE OF THE KINGDOM OF THAILAND

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ABSTRACT

During the Covid-19 pandemic, the State Audit Office of the Kingdom of Thailand (SAO) was considerably affected by the lockdown policy. As auditors cannot carry out audits normally, they need some approaches to help them maintain their obligation. Fortunately, the advancement of science and technologies provides opportunities to mitigate this threat. Therefore, the objective of this paper is to emphasize the importance of disruptive technologies on a public audit by illustrating how it affects SAO and the Supreme Audit Institution (SAI) community. Cutting-edge technologies like AI, Blockchain and 5G are increasingly adopted into audit works by many SAIs. Likewise, the SAO has also been introduced to the new audit techniques such as a remote audit and a real-time audit during this period. Additionally, this paper provides an approach to cultivate auditors of the future who possess strategic thinking, digital analytics, and soft skills as suggested in the Moscow Declaration. The last part is to discuss the way forward including recommendations for improving the SAO, international perspectives, and proper application.

KEYWORDS: 1) SUPREME AUDIT INSTITUTION (SAIS) 2) AUDITORS OF THE FUTURE
3) DATA SCIENCE AND AUDIT

Introduction

As science and technology have rapidly developed, organizations are seeking to take advantage of the advancement to improve their performance. According to the INTOSAI Framework of Professional Pronouncements, Supreme Audit Institutions (SAIs) are expected to carry out highquality audits and hold a high degree of good governance. To achieve this, SAIs should also make full use of cutting-edge technologies including, but not limited to, Artificial Intelligence and Data Science. Therefore, the objectives of this paper are to illustrate the importance of the recent technologies on state audit, as well as the characteristics of the auditors of the future. Lastly, the paper also discusses three interesting issues for the State Audit Office of the Kingdom of Thailand to take into considerations when developing a digital strategy.

Part I The Importance of Science and Technology on Public Sector Audit

It has been almost 300 years since the first Economic Revolution occurred. (SET, n. d.) Humankind has adapted from traditional agriculture to applied agriculture, and to internet-based agriculture where a farmer can take advantage of the internet of things to support their farms. Presently, the world is encountering the latest Economic Revolution called the “Data Revolution” (M Report, 2018), that causes impacts on every aspect, even a public sector audit.

Data Revolution aims at creating, storing, and developing data in order to facilitate business. Also, with the advancement of computers, the internet, and smartphones, information can be easily accessed and shared which dramatically changes how organizations operate their businesses. (Sarunya Chansawang, 2017) Additionally, both customer and producer behaviors have been gradually altered by disruptive technologies by which the traditional systems are replaced by more advanced properties. (Sumalee Mahanarongchai, 2019)

Nowadays, the ability to make more market shares depends on the ability to manage and analyze infinite information across the world, and use them to support a business. (Supattra Ammaranon, 2020) Both public and private sectors are managing to improve their IT systems in order to enable them to efficiently and instantly store, analyze, and take advantage of useful information for their works. Furthermore, the utilization of technologies is increasing as the Covid-19 arrived and spread out. (Thai PBS, 2020)

The Pandemic of Covid-19 causes unexpected impacts on economic growth, employment rates, public health, and social security systems to most countries. (Krungthai COMPASS, 2020) Since such measures as lockdown and social distancing have been strictly enforced by the government, this phenomenon greatly stimulates the application of technologies in many aspects. For example, E-learning becomes the main approach for teachers because students cannot go to school due to the lockdown policy (Sarnrangsit, 2020), mobile applications like shopping or food delivery become much more popular than ever because people do not want to go outside. (Bangkokbiznews, 2020) Moreover, both the private and public sectors also encourage their staff to work from home using the Cloud and VIDEO conference in order to maintain the performance during the pandemic. (Nattacha Tawannachot, 2020)

The digital and Covid-19 disruption (Twin Disruption) caused considerable impacts on the operation of the State Audit Office of the Kingdom of Thailand (SAO). Basically, SAO is a Supreme Audit Institution (SAI) of Thailand, responsible for auditing all expenditures of

the Thai government both central and local as well as promoting the fiscal and financial disciplines among audited entities as described in the Organic Act on State Audit 2018. SAO regularly conducts financial, compliance, and performance audits in accordance with the State Audit Policy established by the State Audit Commission. Furthermore, similar to other organizations affected by the pandemic, SAO's auditors cannot carry out audits normally due to the situation either, so they need some approaches to help them maintain their obligation. Therefore, SAO decided to adopt and apply technologies in its duties. For example, SAO conducted a remote audit for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), an international organization based in Vienna, Austria by using a virtual private network (VPN). Additionally, the Auditor General announced the Work From Home Policy (WFHP), and encouraged staff to use an online platform, e. g. , virtual meetings, cloud storage for three months (March-May, 2020) in order to mitigate the risks of getting infected or spreading the germ. In June 2020, only 50% of staff were allowed to work at the office as the situation became better. This was the first time that SAO practically integrated technologies with audit works.

Although the concept of the remote audit, real-time audit, and other sophisticated audit approaches were introduced a decade ago, only private audit firms and some potential SAIs can effectively conduct such audits because it requires a lot of resources both knowledge and budgets.

SAI	Example of Implementation of Science and Technology on Public Audit
1. China National Audit Office (CNAO)	Use data analytics for auditing the Government's Covid-19 responses
2. Tribunal de Contas da Uniao (TCO)	Use machine learning for auditing a pension system, social security system, and screening abnormal procurements
3. Accounts Chamber of the Russian Federation (ACRF)	Establish an information analysis system in order to launch a remote audit service
4. Comptroller and Auditor General of India (CAG)	Establish the Centre for Data Management and Analytics serving as a national big data audit development center for sharing information between the Ministry of Finance and other public organizations.
5. Auditor-General South Africa (AGSA)	Use data analytics for assessing the risks for fraud

Source: <https://terptoh.blogspot.com/2020/05/brics.html>

It was not until 2019 that most SAIs geared up towards the advantage of science and technology. During the 23rd International Congress of Supreme Audit Institutions (INCOSAI), all INTOSAI¹ members agreed that SAIs must adapt and apply disruptive technologies and data science into their operations in order to increase audit capacity as reflected in the Moscow Declaration. (INTOSAI, 2019) The Moscow Declaration has served as a vision and direction for every SAI. One of its principles focuses on applying data analytics, source code, and algorithms into audit works, as well as encouraging SAIs' staff to acquire "Auditors of the future" skills.

Consequently, the INTOSAI Congress established the Working Group on Impacts of Science and Technology on Auditing (WGISTA) to be responsible for studying the scientific and technological contexts of each SAI, identifying factors affecting audits, and sharing knowledge and experiences among SAIs. Interestingly, SAI United Arab Emirates, as a Chair of the WGISTA, stressed the impacts of science and technology on public audit including Data Analytics, Blockchain, Artificial Intelligence, and Cognitive Technologies. (INTOSAI Journal, 2019) Basically, Data Analytics is a new audit technique that enables an auditor to examine the whole population of a dataset instead of taking samples. Together with the Blockchain, auditors can easily and safely access the auditees' database and can explore, select, and compare useful information to support their analysis. Furthermore, this process can be even more efficient by using artificial intelligence (AI) for assisting auditors in simple tasks so that they can have more time to complete more value-added tasks. Eventually, as the AI is trained consistently, it becomes more capable as a cognitive technology. Hence, the INTOSAI community must be aware of the advancement of these technologies and be ready to adopt them as possible.

Part II Moscow Declaration 2019: How to develop the auditors of the future

The Moscow Declaration addresses the fundamental changes that SAIs are encountering with including 1) the adoption of the 2030 Agenda for sustainable development, 2) the data revolution, 3) the adoption of the INTOSAI Framework of Professional Pronouncement, and 4) expectations and obligations arising from ISSAI-P 12: Value and Benefits of SAI. Therefore, INTOSAI members decided to set the future directions of audit as follows;

- I. Providing independent external oversight on the achievement of nationally agreed targets including those linked to the SDGs,
- II. Responding effectively to opportunities brought by technological advancement,
- III. Enhancing the impact that SAIs make on public management accountability and transparency.

¹ INTOSAI stands for the International Organization of Supreme Audit Institutions (INTOSAI). It operates as an umbrella organization for the external government audit community.

MOSCOW DECLARATION

I. PROVIDING INDEPENDENT EXTERNAL OVERSIGHT ON THE ACHIEVEMENT OF NATIONALLY AGREED TARGETS INCLUDING THOSE LINKED TO THE SDGs

1. SAIs are encouraged to contribute to more effective, transparent and informative accountability for outcomes, keeping in mind the complexity of government efforts needed to support the achievement of national priorities and the SDGs.
2. SAIs are encouraged to develop a strategic approach to public auditing to support the achievement of national priorities and the SDGs.
3. SAIs can enhance the value of public auditing by extending the provision of audit-based advice on important and strategic issues of parliament, government and public administration.

II. RESPONDING EFFECTIVELY TO OPPORTUNITIES BROUGHT BY TECHNOLOGICAL ADVANCEMENT

4. SAIs could promote the principle of availability and openness of data, source code and algorithms.
5. SAIs could aim to make better use of data analytics in audits, including adaptation strategies, such as planning for such audits, developing experienced teams for data analytics, and introducing new techniques into the practice of public audit.

III. ENHANCING SAIs' IMPACT

6. SAIs can foster an experimental mindset to enhance innovation and development.
7. SAIs may extend the focus on (a) identifying risk areas of national and international interest and raising awareness of risks; (b) the need for managing systemic risks in the government, in addition to operational, enterprise and other risks of a single entity.
8. SAIs are encouraged to nurture the auditors of the future who can employ data analytics, artificial intelligence tools, and advanced qualitative methods, enhance innovation; and act as strategic players, knowledge exchangers, and producers of foresight.
9. SAIs should consider finding more ways to address inclusiveness when conducting audits as a key point of the 2030 Agenda with its principle of leaving no one behind and other development agendas.
10. SAIs can increase their positive impact by establishing productive interaction with the auditee, and enhancing cooperation and communication with the academic community and public in general.

source: https://www.intosai.org/fileadmin/downloads/news/2019/10/EN_23_Moscow_Decl_300919.pdf

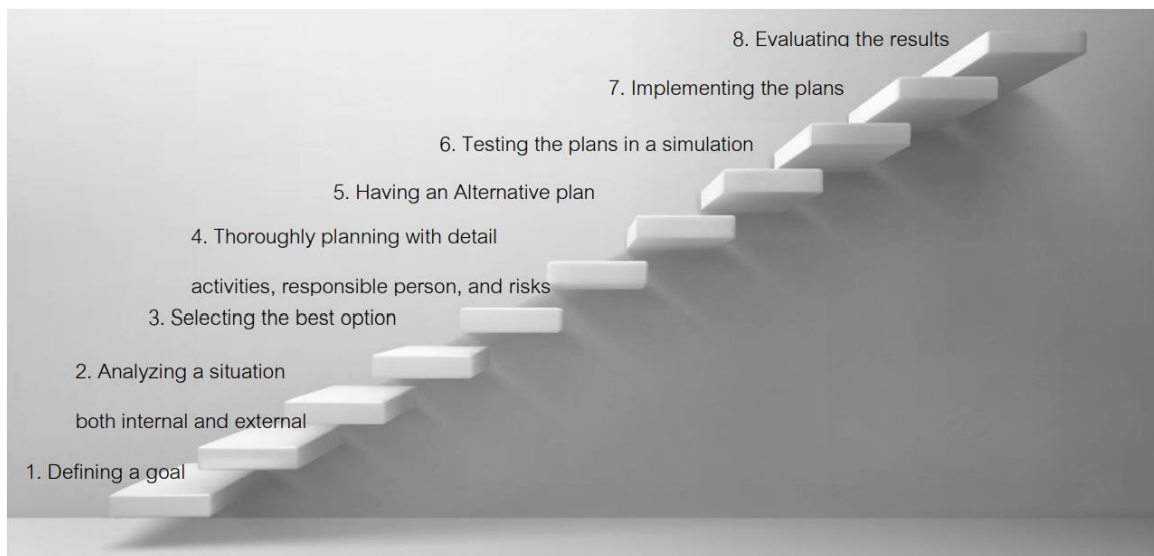
Additionally, to enhance the impact of SAIs as suggested in this document, auditors are encouraged to acquire the “auditors of the future” skills. That is, the auditors of the future are expected to be capable of employing data analytics, applying Artificial Intelligence (AI) and advanced qualitative methods into their works, promoting innovation; and acting as strategic players, knowledge exchangers, and producers of foresight, and so on. In other words, these characteristics can be classified as strategic thinking, digital analytics, and soft skills.

1. Strategic Thinking Skills

Strategic thinking is an approach to find the best option under a dynamic circumstance. This skill was developed based on multidisciplinary concepts so it includes both science and arts. The underlying concepts of strategic thinking skills are Holistic Thinking, Paradigm Shift, Vision, Innovative Thinking, Creative Thinking, Scenario Planning, Risk Management, and Game Theory.

The integration of these concepts affects the characteristics of strategic thinking skills. In other words, a person with the strategic thinking skills could logically think as a process, analyze and evaluate a situation step by step, effectively deal with potential alteration, and easily adapt to a given situation.

Generally, there are 8 steps to think strategically including (1) defining a goal(s); (2) analyzing a situation both internal and external as well as opportunities and threats; (3) selecting the best option; (4) thoroughly planning with detail activities, responsible person, and risks; (5) having an alternative plan; (6) testing the plans in a simulation; (7) implementing the plans; and (8) evaluating the results.



Source: <http://tpso4.m-society.go.th/images/DatabaseTPSO4/Research/2561/AcademicWork2561/P1.StrategicThinking.pdf>

Strategic thinking skills are important and necessary for auditors. With these skills, auditors could comprehensively plan an audit, understand the strengths and weaknesses of an audit team as well as an auditee. Auditors can also seek the best approach or technique for dealing with a given situation and analyze possible limitations in order to get prepared in advance.

2. Digital Analytic Skills

As stressed in the previous part, the Data Revolution is beneficial to auditors of the future in many aspects especially the application of Data Analytics. Auditors are encouraged to work with data, be able to analyze complicated information, and translate the insight into a very understandable format. For instance, in order to publish an audience-friendly audit report, an auditor may use data visualization or infographic, without audit jargon, for efficiently communicating with stakeholders.

(Comptroller and Auditor General of India, 2016)

Furthermore, Data Analytics is useful and necessary to auditors in the digital era, since they can utilize plenty of data for efficiently supporting an audit called “audit data analytics”. Audit data analytics is an advanced audit technique for discovering and analyzing patterns, identifying anomalies, and extracting useful information from collected data in order to plan or perform an audit. (Audimation Services, 2019) In other words, Audit Data Analytics is based on multidisciplinary concepts, especially applied mathematics and statistics, as well as computer coding. That is, auditors must firstly have advanced mathematics and statistics knowledge in order to understand the statistical relationship among complex variables. The next step is to code a programming command in which they are required to use the programming language skills so that they can analyze those relationships. Lastly, they have to use their auditing experiences for deciding whether that information can support an audit. Therefore, with this skill, an auditor would become both a data scientist as well as a data analyst at the same time. (Shri Deepak Mathew, 2020)

In the INTOSAI community, there is a group of SAIs that have credible experiences in big data auditing called INTOSAI Working Group on Big Data Audit. The main objective is to share knowledge and experiences in adopting and applying big data auditing in the real audit. For example, the Forensic Audits and Investigative Service (FAIS) of the U.S. Government Accountability Office (GAO) planned to examine potential fraud by using Data Mining and Data Matching techniques for comparing data of Medicaid providers with the United State Postal Service database. As a result, FAIS found that the USPS recognized several service providers who submitted invalid addresses. (GAO Watch Blog, 2014)

Programming Languages

- C
- R
- Java
- Python

3. Soft Skills

Auditors are required to have hard skills in order to carry out the duties. Nevertheless, because of the nature of an audit that includes considerable communication, auditors are encouraged to also possess soft skills.

Soft skills are the integration of personal qualities (integrity, ego, responsibility, self-management, and social skills) and interpersonal skills (teaching, negotiation, leadership, and teamwork). Therefore, a person with good soft skills is outstanding and beneficial to society. (Positioning, 2020)

SOFT SKILLS		
- Time Management	- Adaptability	- Complex Problem Solving
- Life-Long Learning	- Collaboration	- Critical Thinking and Decision-making
- Emotional Intelligence	- Communication	

Source: <https://positioningmag.com/1220556>

For auditors of the future, soft skills are very crucial for their obligations because of the nature of an audit that requires them to engage with stakeholders whether auditees or audit teams. By mastering soft skills, auditors can create a positive working environment that eventually increases the efficiency of an audit. Furthermore, the INTOSAI Development Initiative (IDI) has also embedded the relates-to-others skills in many training and workshops. These skills include respect for different views, the ability to work together, the ability to motivate others, communicate in an open and transparent manner, and being a good listener. (INTOSAI Development Initiative, n.d.)

Even though, SAIs. However, some of them may not be able to work with others or work as a team which makes it difficult, or even impossible, for the SAI to achieve challenging goals. On the other hand, if the SAI can embed auditors with the relates-to-others skills or soft skills, these auditors could together drive the organization towards the goals. Therefore, fostering these skills is advantageous to both SAIs and auditors. SAIs could accomplish their objectives and auditors could become valuable resources.

Part III Discussion

As SAO decided to take advantage of science and technology, a thorough study should be firstly conducted in order to examine factors affecting the accomplishment. Therefore, this part provides potential and interesting issues for future considerations. Consequently, the authors divided the discussion into three issues including institutional factors, international perspectives, and proper application.

1. Institutional Factors

Institutional factors are policy and regulation governing the organization. As SAO is encountering the twin disruptions, the immediate policy recommendations for effectively and efficiently responding. The authors classified the institutional factors into three levels including Macro,

Meso, and Micro level as follows;

- **Macro-level:** According to the Organic Act on State Audit 2018, the State Audit Commission (SAC) is responsible for determining the State Audit Policy in order to serve as a direction for SAO. The current State Audit Policy (2018 - 2022) focuses on various aspects regarding the application of science and technology on

audit work including, but not limited to, establishing a database management system and encouraging auditors to acquire the data analytics skills. In other words, the policy is comprehensive covering three important components of digital development including hardware, software, and peopleware. Nevertheless, the most important part of the policy cycle is the implementation phase where theories are transformed into practice. (UKEssays, 2018)

- **Meso-level:** Once the policy was set, it is the mandate of SAO to turn those policies into practice. The SAO Strategic Plan (2019 - 2022) is an implementation tool. The plan consists of 4 strategies including development of audit, promotion of fiscal and financial discipline, engagement with stakeholders, and high potential organization. Digital and technology adoption is also emphasized in the strategic plan, the 4th Strategy. However, only the strategic plan is insufficient for fostering digital behaviors among auditors, but the tone at the top is also very crucial for this situation. Management should encourage their staff to embrace and apply digital behaviors into their works. As mentioned earlier, some offices in SAO have used virtual meeting programs instead of a face-to-face meeting since March 2020, even for a general meeting. Additionally, digital signature and remote audits were also used during the Covid-19 pandemic. Therefore, it is very important for the Management to be a role model who is willing to adopt technologies and have a growth mindset so that other staff would do accordingly.
- **Micro-level:** This level emphasizes on individuals. That is, staff should be encouraged to possess an experimental mindset in addition to the aforementioned skills. According to the Moscow Declaration, experimental capacities, including learning, testing, and evaluating phases, can enhance innovation and development. However, SAO, itself, should provide opportunities for staff to test their assumptions through an organized setting such as an audit laboratory so that cutting-edge technologies and new audit approaches could be tested. Furthermore, in order to efficiently accelerate the experimental mindset², auditors and staff must be resilient and have a growth mindset. (Kaufman, 2012)

² The Experimental Mindset is the healthy approach to business. There's no way to tell what will work and what won't. You need to constantly experiment. Every experiment will teach you something new and prepare you better for the next challenge. Experimentation is learning through play. It is the center of living a productive and fulfilling life. (Kaufman, 2012)



Changing the organization to meet international standards is not a one-man task, yet it is a responsibility of everyone in SAO from the very top position to the bottom staff. As SAC places the issue of science and technology as a high priority, SAO has a very strong direction to follow. However, one concerning issue is about fostering an appropriate mindset among the staff so that changes can be easily successful.

2. International Perspectives As the Moscow Declaration suggests, the auditors of the future should possess Strategic Thinking, Digital Analytics, and Soft Skills. Additionally, the Association of Chartered Certified Accountants (ACCA) also provided a more detailed range of quotients for auditors especially financial professionals.

The ACCA believes that the future auditors should equip themselves with these characteristics including

- 1) Technical skills and ethics: the skills and abilities to perform activities consistently to meet a defined standard while maintaining professionally and ethically;
- 2) Intelligence: the ability to acquire and use knowledge for thinking logically and strategically;
- 3) Creative: the ability to use existing knowledge in a new situation, to make connections, explore potential outcomes, and generate new ideas;
- 4) Digital: the awareness application of existing and emerging digital technologies, capabilities, practices and strategies;
- 5) Emotional: the ability to identify and manage your own emotions as well as others;
- 6) Vision: the ability to anticipate future trends accurately by extrapolating existing trends and facts, and filling the gaps in knowledge by thinking innovatively; and
- 7): the ability and skills to understand stakeholder's expectation, meet desired outcomes, and create value.



Source: (European Court of Auditors, n.d.)

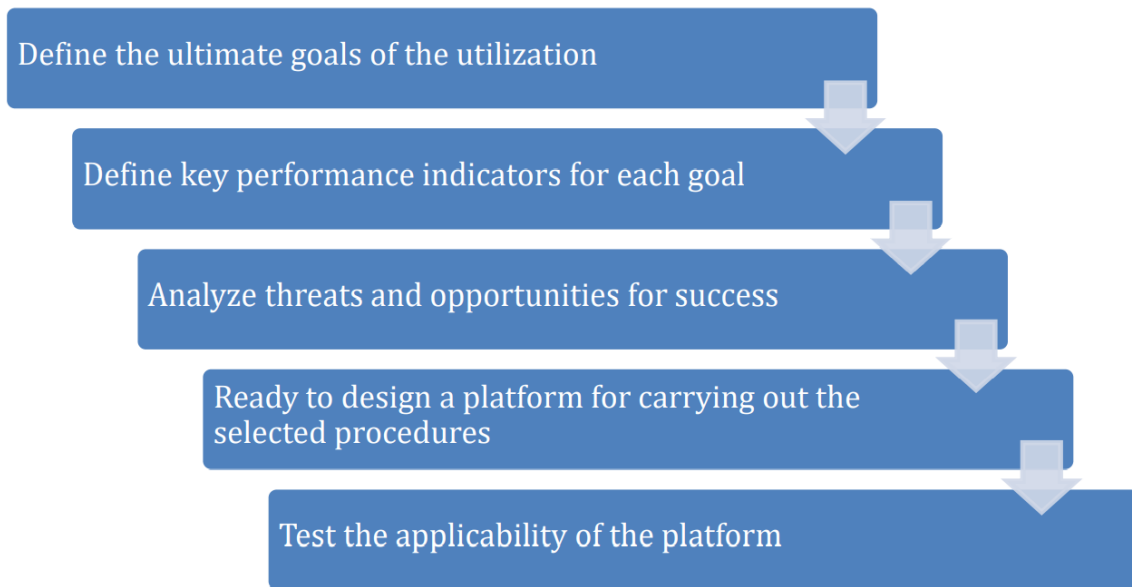
SAO realizes the benefits of these characteristics and encourages staff to practice accordingly. The SAO's Strategic plan (2019 - 2022) focuses on being a high potential organization (HPO) driven by high performing staff. Therefore, by raising awareness and providing knowledge in every possible means (bulletins, infographics, podcasts, multimedia, etc.), staff, especially the young ones, can be accustomed to the terms and vocabs used in these concepts. Once the staff is aware of the necessity of these concepts, they are likely to change their attitudes towards the new working mindsets and are ready to adapt to their works, which eventually change their practices as a result. However, one concerning issue is how to design an effective incentive system in order to motivate staff since mechanisms used in a private sector are not applicable for SAO.

Furthermore, in order to efficiently align itself with the international directions, SAO can take benefits from being a member of the WGISTA. Amid many INTOSAI working groups, WGISTA is new, yet very important. WGISTA facilitates SAs in orienting the strategic direction of the auditing profession as a result of disruptive technologies and developments in the fields of science and technology, as well as how SAs could respond to these developments. Therefore, SAO can greatly learn from others, and on the other hand, contribute to the community simultaneously.

The WGISTA is interested in topics including, but not limited to, Blockchain, Artificial Intelligence (AI), Machine Learning, Data Analytics, Quantum Computing, and 5G³. Among these topics, SAO also focuses on AI and Data Analytics. Recently, SAO signed an MoU with the Digital Government Development Agency and National Electronics and Computer Technology Center regarding the development of AI in auditing. Nevertheless, in order to sustainably develop the digitized organization, SAO should also conduct a feasibility study on the readiness of the organizational transformation towards AI.

3. Proper Application

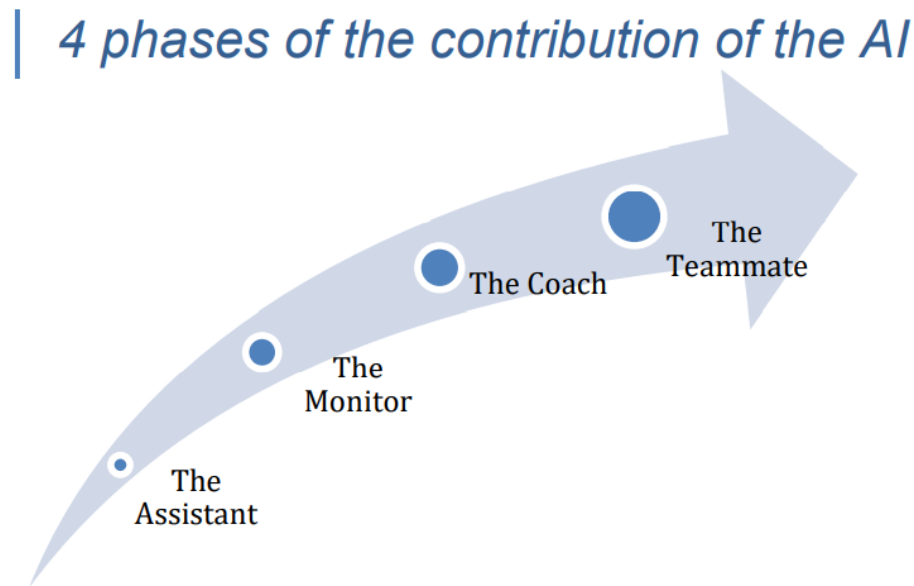
As mentioned previously, SAO may consider the following approaches when developing a digital strategy. According to the Discovery-Driven Planning concept, an organization should adopt technologies step by step. Firstly, an organization has to define the ultimate goals of the utilization by reviewing what procedures can be strengthened by technologies. Secondly, once the goals are set, the organization has to define key performance indicators for each goal in order to effectively monitor the progress. The next step is to analyze threats and opportunities for success, as well as stimulate the success factors while mitigating the risks. Up to this step, the organization is ready to design a platform for carrying out the selected procedures. The platform should be able to connect databases among users from one party with users from other parties so that the organization does not have to invest a considerable budget to establish a large system. Lastly, the organization has to test the applicability of the platform by defining milestones and incrementally experimenting. (Mcgrath R., & Mcmanus R., 2020)



Source: (Mcgrath R., & Mcmanus R., 2020)

³ For more information: <https://wgista.saiuae.gov.ae/Pages/default.aspx>

Additionally, as SAO decided to collaborate with the Digital Government Development Agency and National Electronics and Computer Technology Center regarding the development of AI in auditing, SAO may also consider to what extent the AI can contribute to the organization. There are four phases of the contribution of the AI. The first phase is the assistant. The AI will be trained to learn rules and regulations governing the organization and be assigned with simple, yet routine, tasks including, but not limited to, sorting information and automatically completing such as suggesting most used words or functions, etc. Therefore, auditors will have more time to carry out more valuable tasks. The second phase is the monitor in which the AI can provide real-time feedback. With a machine learning technique, the AI can precisely predict a human's decision and notify when there is an irregularity. This ability is suitable especially when a human is impaired or distracted while making a decision. The third phase is the coach in which the AI can provide staff with their performance evaluation. Unlike a traditional performance evaluation that staff will be evaluated once or twice a year in order to adjust their salary, with the ability of the AI, the staff could see their strengths and weaknesses regarding their obligation on a monthly basis so that they can develop themselves regularly. The last phase is the teammate. The AI will be considered a teammate as long as it can prove its performance and gain trust among staff. This phase is the ultimate goal of applying AI in an organization where staff and the AI can work together seamlessly. In order to achieve this phase, every decision made by the AI must be transparent. In other words, every stakeholder can understand the fundamental variables used in the algorithm which eventually affect decisions made by the AI.



Source: (Harvard Business Review, 2020 a)

However, one concerning issue is about the bias of the AI. The AI can possibly provide biased information if it was trained by staff with bias inputs in the first place. Therefore, staff must be considerably careful when training the AI. (Babic B., Chen D. L., Evgeniou T., & Fayard A., 2020)

Part IV Conclusion

During the twin disruptions, SAIs need to adapt themselves and take advantage of the advancement of science and technology so that they can deliver the most value and benefits to citizens who are the true owners of public money. In addition to investing in digital-related infrastructures, nurturing staff with the necessary digital skills is also the best strategic move. Auditors, as well as supporting staff, should be encouraged to acquire digital analytics and soft skills. Policies from the Management and tone at the top are very crucial for cultivating expected behaviors and stimulating the adaptation process. Furthermore, together with other members of the WGISTA, SAIs can share knowledge and experiences to strengthen the development and watch over the emerging issues, and eventually adapt themselves again to the dynamic world. Lastly, SAIs may consider the incremental approach when developing their digital strategy, and should clearly determine the boundary of technological utilization.

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SITUATION OF INEQUALITY IN HEALTH UTILIZATION AMONG THAI ELDERLY IN 2020

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Abstract

Thailand is facing a gap in access to health services, especially among the elderly. In this article, we aimed to explore the situation of the elderly in Thailand, the public transport system as one of the factors that create a channel for access, and distribution of public health resources to the needs of the elderly. We found that the elderly population mostly concentrated in the northern region. The high proportion of the elderly compared with the gross provincial product size is in the medium sized GPPs provinces such as Lamphun, Singburi, Samut Songkhram, Ang Thong, Chainat, Nakhon Sawan, Lam Bang Phrae, Nan, Sukhothai, and Uttaradit. While the province with the highest elderly rate per rural bus is in the North and Northeast region namely Phrae (1016 elderlies per vehicle), Chaiyaphum (923 elderlies per vehicle), Amnat Charoen (920 elderlies per vehicle), Si Sa Ket (887 elderlies per vehicle) and Buriram (878 elderlies per vehicle) respectively. When we compared the proportion of the elderly population in each province with the number of doctors and the Elderly Project funding per capita, It was found that resource management was not consistent with the number of elderlies in each age group. This underscores the existence of the gap in access to healthcare for the elderly.

KEYWORDS: 1) HEALTH INEQUITY 2) HEALTH UTILIZATION 3) ELDERLY
4) HEALTH ACCESS

Introduction

Thailand is facing an inequality problem in accessing health services among the elderly (Osornprasop, 2016). Some groups of elderly people live in remote areas, some are poor, and some are facing the problem of lack of care (Anderson, 1973; Cooper, Cooper, McGinley, Fan, & Rosenthal, 2012; Field &

Briggs, 2001; Joseph & Phillips, 1984; Lopez-Cevallos & Chi, 2010; Michael, 1993; Oladipo, 2014; Zyaambo, Siziya, & Fylkesnes, 2012). These problems reflected the issue of accessibility. However, that is only a situation that occurs on the service side, since there are still issues of the distribution of health resources (Andersen, 1995; Michael, 1993; Sun & Luo, 2017).

In this article, we explore the situation of the elderly in Thailand, which explains the population characteristics of the elderly. The current problematic situation of access to health services and the causes of problems urge inequality in access to health services among the elderly population. It also included the information of transportation systems of different provincial areas which affect access to health services of the elderly. The social transition that causes some forms of service to be disappeared from society such as the local public bus cooperatives, causing older people who are not able to keep up with the change being left behind.

Moreover, we also reviewed the health service system as a destination for elderly to reach a well-being state. Over the years, Thailand has been committed to improving the right to have universal health coverage, enabling all Thai people to have access to health services equally. But the cost of health services is not just only an expense incurred to elderly households. There are also travel expenses, accommodation expenses in using the services. Having a health system service, but difficult to reach is painful. To compile lessons learnt from aboard and experience transport solutions of the practical policy implementation, the literatures of aboard practices are also included.

Elderly situation in Thailand

The situation of the elderly population in Thailand is increasing steadily. The proportion of the elderly to the population of Thailand has increased every year. That means the fiscal burden of health expenditures increases as well. As of 2001, the population is only 8.43% elderly, while in 2019 there are 14.13% of the elderly. In two decades, the aging population has almost doubled (Department- of Provincial- Administration, 2020; National- Statistical- Office, 2020).

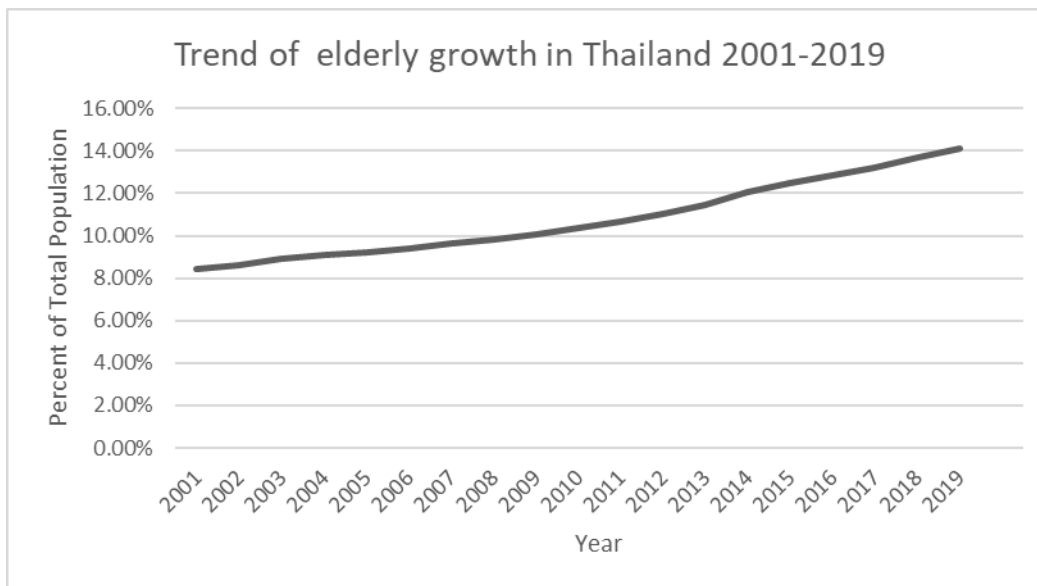


Figure 1: Shows the increase in the proportion of the elderly population in Thailand 2001-2019. Source: National Statistical Office of Thailand (2020)

In 2020, the elderly in Thailand are 11,136,059 people or 16.73% of the entire population (National-Statistical-Office, 2020). The five provinces with the highest population of the elderly are Bangkok, Nakhon Ratchasima, Chiang Mai, Khon Kaen, Ubon Ratchathani, which is considered as a large economy province. While the provinces with the highest proportion of the elderly per population were Sing Buri, Lampang, Lamphun, Phrae, and Samut Songkhram, respectively.

In Thailand, Seniors are people aged 60 and over according to the definition of the Elderly Act 2003 of Thailand (Department-of-Older-Persons, 2003). Elderly people are exposed to both physical and psychological vulnerabilities which are at risk of developing a range of diseases (Amaducci et al., 1997; Sinnige et al., 2013; Tran et al., 1990; Van Heuvelen, Kempen, Ormel, & Rispens, 1998; Vellas, Albarede, & Garry, 1992). For this reason, the elderly is more demanding for primary health care than any other age group (Oliver, Foot, & Humphries, 2014; Vrhovec & Tajnikar, 2016). However, primary health needs vary for different age groups.

The aging group can therefore be divided into several subgroups, for example, Chronological base (Kowal & Dowd, 2001). It is a time-based division divided into ranges 60-69 as young old, 70-79 as middle old, and 80-89 as very old (Forman, Berman, McCabe, Baim, & Wei, 1992). While some definitions have different age ranges starting from 65-74 as early elderly and over 75 as late elderly (Orimo et al., 2006; Zizza, Ellison, & Wernette, 2009).

This subset, although not consistent with the health status of the elderly, can make it possible to categorize the burden of primary care. As the age grows, the elderly is in a highly dependent state. As above, factors affecting the use of health services of the elderly are physical problems (Cheng, Goodin, Pahor, Manini, & Brown, 2020; Linden, Horgas, Gilberg, & Steinhagen-Thiessen, 1997; Powers & Oltmanns, 2012), social exclusion (Nayar, 2007; Preston & Rajé, 2007; Santana, 2002), socioeconomic problems (Blackwell, Martinez, Gentleman, Sanmartin, & Berthelot, 2009; Dixon, Le Grand, Henderson, Murray, & Poteliakhoff, 2007; Mutchler & Burr, 1991; van der Meer, van den Bos, & Mackenbach, 1996), and poor transport system (Al-Taiar, Clark, Longenecker, & Whitty, 2010; Arcury, Preisser, Gesler, & Powers, 2005). If we divided

the elderly into 3 subgroups: 60-69, 70-79, and more than 80, it would be possible to know the primary health needs of the elderly in Thailand by area of each province. According to 2020 data, the majority of the elderly are roughly in their 60s, about 50 percent, 70 years old, 30 percent, and 20 percent over 80, respectively.

Table 1 displays the provinces with the most elderly in the ages 60-69 and over 80 in 2020.

Rank	Provinces	60-69 (%)	Provinces	>80 (%)
1	Phayao	63.77%	Pattani	19.97%
2	Chiang Rai	63.42%	Nakhon Si Thammarat	19.61%
3	Chiang Mai	62.13%	Surat Thani	18.94%
4	Lamphun	61.84%	Phatthalung	18.83%
5	Nan	61.08%	Yala	18.83%
6	Nong Bua Lamphu	61.02%	Chumphon	18.80%
7	Sakon Nakhon	60.76%	Trang	18.10%
8	Pathum Thani	60.64%	Samut Songkhram	18.05%
9	Phrae	60.50%	Ang Thong	17.57%
10	Lampang	60.37%	Narathiwat	17.49%

Source: National Statistical Office of Thailand (2020)

When the elderly get older, the older age has a higher dependency index than other age ranges (Liu, Unick, Galik, & Resnick, 2015; Sinoff & Ore, 1997). When considering an area with a large number of older people, the proportion older than 80 years represents a greater workload for healthcare workers. The data in the table shows some interesting characteristics. The elderly in the 60-69 years are more abundant in the North, while the South has a higher proportion of older than 80 years than other regions. This feature of the elderly data can be used to prioritize policies related to the elderly, such as which region is the first priority to focus on long-term care and access to primary health services.

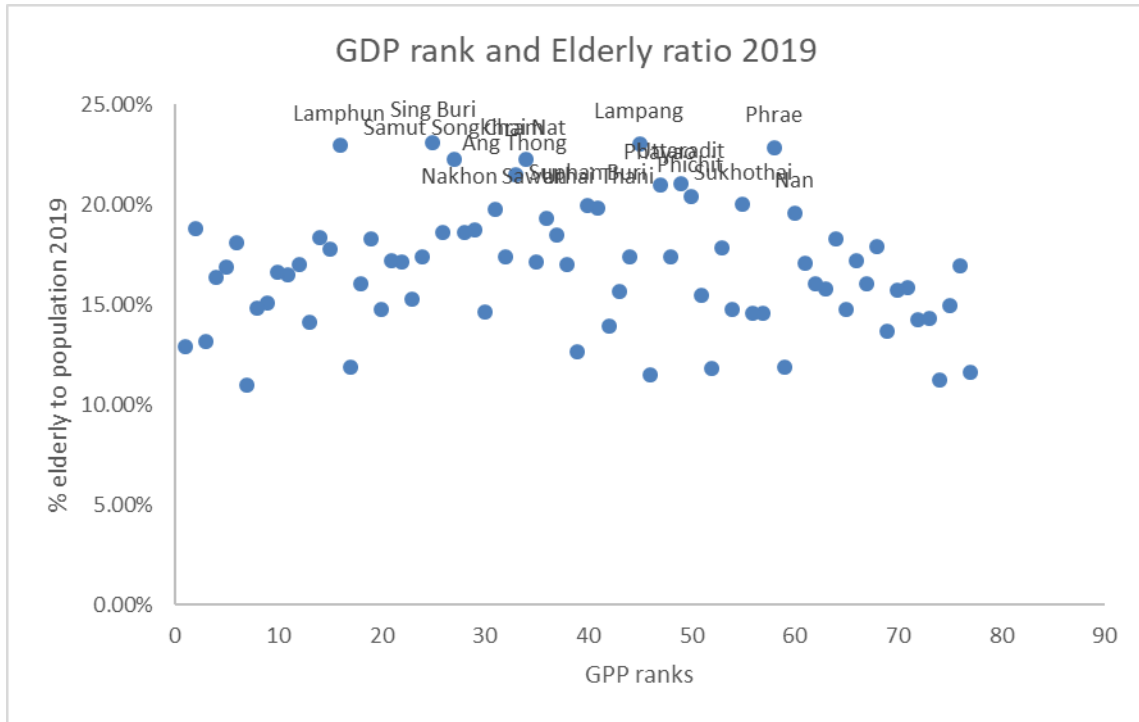


Figure 2: Demonstrated the concentration of elderly proportion relative to GPP rankings in 2019. Source: National Statistical Office of Thailand and Office of the National Economic and Social Development Council.

In Figure 2, the concentration of the elderly is ranked relative to the provincial gross product (GPP) rank, with the 1st ranked province is the largest GPP, and the ranked 77th is the smallest GPP. In the picture, it can be clearly seen that the provinces with the highest proportion of the elderly are the medium sized GPP provinces, while the small and large provinces have similar proportion of the elderly. It explains that the burden of care for the elderly is more concentrated in rural areas than in urban areas.

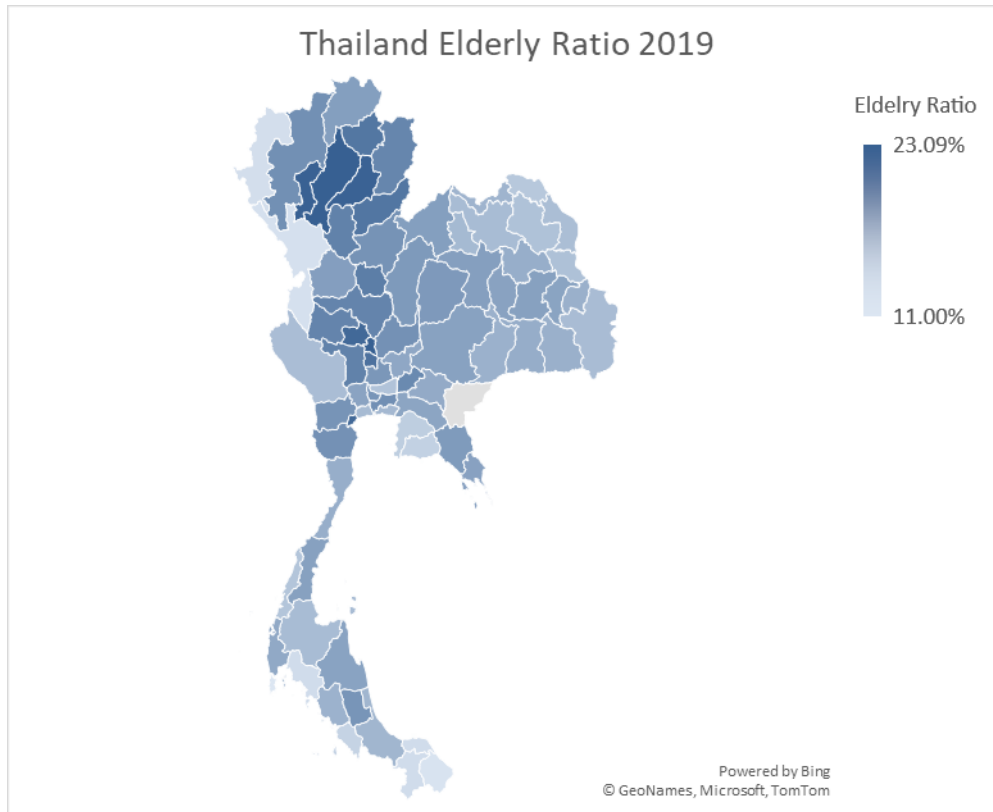


Figure 2: Demonstrated the concentration of elderly proportion by province 2019.
 Source: National Statistical Office of Thailand and Office.

In terms of the region, the elderly is much more concentrated in the north, while the central region is another region with much older people compared to the population proportion. From the aforementioned pictures and statistics, it can be seen that the North has completely entered the aged society. With a geographic perspective, it can lead to policy management in line with health resources.

Transport System in social transition

Although Thailand has implemented a universal health coverage policy that facilitates access to all levels of health services for the elderly. Nevertheless, access to services does not just come from having rights, but also having the ability to go to health units. In 2019, the Thai government gave a credit of 1000 baht to people aged 65 years and over as travel expenses for medical examination (Sanooknews, 2018). The said budget is given once per person and is not an annual government expenditure. It is worth asking if those sums of money are actually used by the elderly to pay for their trips to check-ups or they use it in daily consumption instead. Can the elderly have access to public transport to go to the hospital? Can the credit on the state benefit card be used for rural buses? Or if it was cash, would he really use it for health expenses? In this point, we do not aim to answer those questions, but rather whether our public transport systems are prepared for this. We can learn from the provincial public bus registration information in Thailand as follows.

Table 2: Number of Vehicle Registered in Thailand as of 31 December 2019

(Type of Vehicle)	Central	Eastern	North Eastern	Northern	Western	Southern
Urban Taxi	-	722	1,302	805	-	1,137
Fixed Route Taxi	-	-	-	-	-	518
Motor-tricycle Taxi (Tuk Tuk)	3,705	2,497	1,663	1,709	761	178
Public Motorcycle	42,419	15,893	4,302	4,157	13,006	8,771
Fixed Route Bus ¹	6,478	6,307	15,692	8,123	4,736	11,251
Section 1	689	1,260	1,897	1,150	485	2,189
Section 4	4,347	3,233	7,729	5,003	2,606	5,702
Non-Fixed Route Bus	9,403	9,237	6,429	9,185	3,678	19,599
Small Rural Bus	20	9	233	135	28	212

Source: Department of Land Transport (2020)

The above table demonstrates two forms of public transport: urban and rural public transport. In urban areas, Urban Taxi, Fixed Route Taxi, Tuk-Tuk, Public Motorcycle, and Fixed Route Bus can be found, while Non-Fixed Route Bus and Small Rural Bus are available in rural areas. As social transition creates problems that leave the elderly behind, public transport is rarely available in rural areas. The people prefer having their own cars in rural areas, causing public bus cooperatives in rural areas to cease its business. That is why there is a shortage of public transport in rural areas. In particular, the elderly who have to go to district hospitals do not have travel options. Not to mention the patient in referral system to the tertiary care, especially patient with mobility issues, they will face high traveling cost and medical bankruptcy.

Wordbank reported that “the lack of caretakers and the lack of support for non-medical costs such as transportation to health facilities, however, is making access difficult. This is a particular plight for the elderly poor in Thailand, especially those in the oldest age group who are over 80 years old and living in rural area. The lack of public and affordable transportation is the most important barrier to accessing health services among older people in rural areas, especially those who do not live near major highways and roads on which public buses operate.”(Osornprasop, 2016).

¹ Fixed route bus

Section 1: public bus operated in municipal area

Section 4: public bus operated between districts to cities or crossing provinces

Table 2: Elderly ratio, GPP and elderly per bus ratio comparison by province 2019

Province	Ratio pop	Ratio rank	Rank GPP	Elder/bus
Phrae	22.84%	4	58	1061.89
Chaiyaphum	17.87%	26	68	923.80
Amnat Charoen	15.82%	48	71	920.95
Sisaket	15.79%	49	63	887.81
Buriram	15.74%	50	70	878.34
Udon Thani	14.77%	57	54	845.82
Kalasin	16.02%	47	62	795.78
Lampang	23.03%	2	45	783.54
Roi Et	17.17%	34	66	772.87
Ubon Ratchathani	14.73%	59	65	741.63

Table 2 shows the ranking of provinces with the proportion of elderly people per one public bus in comparison with the ratio of the elderly and the rank of gross provincial product size in 2019. It can be seen that the provinces with the highest number of older people per rural buses were those with the lowest GPP. Phrae and Lampang provinces with the fourth and second highest proportion of the elderly, respectively, have a shortage of buses in rural areas.

Health Resources availabilities

One of the factors leading to the inequality of access to health services among the elderly is the distribution of healthcare workers. Today, the number of doctors per population ratio of Thailand has greatly improved as we look back decades ago. However, nowadays doctors are concentrated in large cities, while some areas have a high ratio of population per physician.

Table 3 displays the number of lowest and highest doctor per elderly ratio in 2019.

Lowest population/doctor provinces			Highest population/doctor provinces		
Province	Pop/doc	Elders/doc	Province	Pop/doc	Elders/doc
Bangkok	1224.34	110.10	Nong Bua Lamphu	9944.02	708.93
Phuket	1868.84	98.42	Bueng Kan	9526.74	622.29
Phitsanulok	2178.12	192.13	Nakhon Phanom	8261.91	578.26
Samut Sakhon	2288.97	162.50	Yasothon	7587.73	617.14
Khon Kaen	2304.91	191.22	Kalasin	7464.74	573.28
Nakhon Nayok	2332.67	217.30	Phetchabun	7449.74	635.50
Songkhla	2436.44	179.35	Sisaket	7402.07	561.07
Chonburi	2486.55	157.57	Amnat Charoen	7351.86	555.75
Chiang Mai	2589.93	232.63	Phatthalung	7343.27	647.97
Pathum Thani	2847.43	191.60	Kamphaeng Phet	7278.07	606.58

Data from the Statistical Office in 2018 found that the low population per doctor ratio was concentrated in the top 10 provinces: Bangkok, Phuket, Phitsanulok, Samut Sakhon, Khon Kaen, Nakhon Nayok, Songkhla, Chonburi, Chiang Mai and Pathum Thani. The population-to-doctor ratio is lower than 2800 people per doctor in the province. While the provinces with high population per doctor spread in the Northeast with a population ratio of more than 7000

people per doctor. The disparity of doctors to population is similar to that of doctors to elderly population, as shown in the table above.

Over the years, Thailand has awakened the advent of an aging society. The government has invested and promoted policies on the elderly, including Tambon Health Fund, Long-Term Elderly Care System, and Family Physician Policy. The policy implementation covers all provinces of Thailand with budget distribution through integration between agencies, namely National Health Security Office, Subdistrict Administrative Organization, Tambon Health Promoting Hospital, and a team of doctors and public health personnel in each area. If we look at the provincial total budgets invested in the elderly policy, we can see the direction of Thailand's elderly policy as well, as shown in the following table.

Table 4: Display the funding per elderly in total project by province in 2019.

Provinces	Total Budget	Participants	Per head	Total Elderly	Elderly cover
Phitsanulok	12,438,676	118,639	104.84	159,810	74.2%
Nakhon Phanom	4,603,870	70,060	65.71	104,903	66.8%
Mae Hong Son	2,431,852	19,072	127.51	33,067	57.7%
Lopburi	13,145,566	74,671	176.05	140,685	53.1%
Nong Khai	6,733,673	39,583	170.12	80,634	49.1%
Chai Nat	5,709,265	35,101	162.65	72,628	48.3%
Surat Thani	19,740,462	74,629	264.51	157,480	47.4%
Nakhon Nayok	5,836,417	23,426	249.14	50,301	46.6%
Kamphaeng Phet	9,573,175	57,582	166.25	126,366	45.6%
Lamphun	6,202,673	42,001	147.68	92,945	45.2%
Chiang Mai	23,671,134	146,543	161.53	333,692	43.9%

Source: National health security office (2020)

Data from the table are based on the expenditure of programs related to the elderly per capita from the National Health Security Office. The table shows the top ten coverage of the project, while the data clearly show that some project areas covered 70% of the elderly. If we use this information in conjunction with the number of the elderly, we will find that our budget is properly managed.

Recent challenges and transport system in health

From information on the situation of the Thai elderly and health resources, there are gaps that lead to inequality in accessing health services of the elderly. Based on information on medical resources and policy directions on the elderly, it is clear that Thailand does not have a regional policy in place. The concentration of doctors in large cities has not been resolved, in some areas there is still a high population-to-doctor ratio. Provinces with the proportion of the elderly population over 80 years compared with the elderly budget per capita can clearly see the direction of the policy on the elderly in Thailand.

Table 5: The comparison of elderly ratio and doctor per elderly population and population covered in the elderly funding project.

Highest % elderly > 80s		Highest Elderly/Doctor		Highest Project Covered	
Provinces	age>80(%)	Provinces	Elderly / doctor	Provinces	% elderly covered
Pattani	19.97%	Nong Bua Lamphu	708.93	Phitsanulok	74.24%
Nakhon Si Thammarat	19.61%	Phatthalung**	647.97	Nakhon Phanom***	66.79%
Surat Thani*	18.94%	Phetchabun	635.50	Mae Hong Son	57.68%
Phatthalung**	18.83%	Bueng Kan	622.29	Lopburi	53.08%
Yala	18.83%	Chaiyaphum	621.54	Nong Khai	49.09%
Chumphon	18.80%	Yasothon	617.14	Chai Nat	48.33%
Trang	18.10%	Kamphaeng Phet***	606.58	Surat Thani*	47.39%
Samut Songkhram**	18.05%	Samut Songkhram**	586.63	Nakhon Nayok	46.57%
Ang Thong	17.57%	Nakhon Phanom***	578.26	Kamphaeng Phet***	45.57%
Narathiwat	17.49%	Sukhothai	577.39	Lamphun	45.19%

Remarks:

* The proportion of the elderly over 80 years is high and the aging program covers the majority of the population.

** The proportion of elderly over 80 years is high, but a shortage of doctors.

*** The Elderly Scheme covers the majority of the population, but the proportion of elderly to doctors is high.

The table above implies that the implementation of the aging policy is lacking in a clear direction. Only Surat Thani, Kamphaeng Phet and Nakhon Phanom provinces have implemented the elderly policy in the right direction. While Samut Songkhram and Phatthalung show a high proportion of the elderly over 80 years, there is also a high elderly population per doctor. In addition, the problem of the proportion of the elderly in the next 20 years must be dealt with in a systematic manner.

In the next 20 years, the northern region will have the highest proportion of elderly 80 years, as the North region currently accounts for more than 60% of the total elderly population. The 10 provinces with the highest proportion of elderly age range 60-69 in the country are: Phayao, Chiang Rai, Chiang Mai, Lamphun, Nan, Nong Bua Lamphu, Sakon Nakhon, Pathum Thani, Phrae, Lampang, respectively.

While the proportion of doctors to population in the province was higher than 4,000 per doctor. In particular, Nong Bua Lamphu has the proportion of doctors per population 9,000 people per 1 doctor and Sakon Nakhon has a population of 7,000 people per doctor. Without good planning, the cost of elderly care and the inequality in access to health services will also increase compared to other provinces.

Transport to health units in aboard

The problem of inequality in access to health services of the elderly has many elements. Factors affecting access can be framed as follows: Acceptability, Affordability, Approachability, and Availability (Doetsch, Pilot, Santana, & Krafft, 2017; Levesque, Harris, & Russell, 2013). Improving access to healthcare for the elderly can be done in several ways, depending on the nature of the problem, such as: improve health insurance coverage, case management model of care, outreach service issues, cultural competency and communication, and improve transportation (Horton & Johnson, 2010).

In this article, we will discuss public transport, which are not very developed in Thailand, available in developed countries. In Thailand there are examples of promoting access to health services. Mobile health units in remote areas such as Tak Province is an interesting case study (Swaddiwudhipong et al., 1999). Buses for Health Project of Khun Han Hospital Sisaket Province is another project that should be expanded as a policy (hfocus, 2016). But these projects are limited to specific areas and are not being expanded into national policy.

In Thailand, we are so focused solely on having collateral rights that we forget about accessibility. As a result of the use of mobile units and health buses, it can be developed into policies.

In Australia, the IPTAAS is a program to support patients facing travel and accommodation challenges (O'Callaghan, McAllister, & Wilson, 2005). IPTAAS Project covered Australian nationals who hold Medicare cards, referred by a recognized, accredited medical practitioner for specialist treatment, claiming all available benefits through private health insurance, needing to travel more than 100km (one way) from home to treatment or needing to travel more than 200km in total treatment in one week, and a carer who has been certified as being medically necessary by the medical practitioner or specialist (cancercouncil.com.au, N/A). The program also covers accommodation costs for patients traveling long distances.

Scotland developed a transport system in its health system called transport for health and Social care in Scotland (Hine & Mitchell, 2017; Scotland, 2011). The system is part of the health insurance system, which is a work between both public and private sectors. The healthcare transportation system uses three groups of drivers: volunteer drivers, Private Sector, and Voluntary Sector. The service is available in both the National Health Security (NHS) and Scottish Ambulance Patient Transport Service.

In the UK, a Healthcare Travel Cost Scheme is included with the National Health Security. These services provide free transport to and from hospital for: 1) people whose condition means they need additional medical support during their journey; 2) people who find it difficult to walk; 3) parents or guardians of children who are being transported (Corner, 2007; National-Health-Security, 2020; Richards, 2007).

An example of the application of transportation in many of these countries illustrates the possibility and importance of access to healthcare. Especially for the elderly who are vulnerable with specific health needs. To develop transportation systems to promote access to health services, initiatives should be initiated to reduce access disparities. We should push forward policies to promote access as well as improve service quality.

Conclusion

This article reviews the situation of inequality in access to healthcare among the elderly in Thailand. The cause of such inequality comes from 3 main components: 1) Health needs of the elderly in the spatial dimension 2) Changed socioeconomic characteristics, causing the elderly to be left behind, case of the disappearance of public buses, and 3) unplanned distribution of medical resources, improper distribution of health personnel with the proportion of the elderly in the spatial dimension, and lack of planning to deal with the elderly that differ from region to region. These problems will create a higher health disparity among the elderly in Thailand. Reducing access disparities requires integrating technology and physical solutions, but the distribution of doctors is still a matter of concern. We review the public transport systems available internationally developed in use in national health care systems such as Australia, England and Scotland. Examples from such countries could guide the development of policy to promote access to health services in Thailand.

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EMPLOYEE EXPERIENCE ANTECEDENT & CONSEQUENCE

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ABSTRACT

The research purpose is to investigate the theoretical framework of employee experience when the work we know today has been undergoing a transformative phase due to the following driving force; the pandemic, the use of artificial intelligence, the large selection and loose definition of job during gig economy, the fast-paced innovation that has been introduced into the competitive business arena. The theoretical framework of 'experience economy' was developed 20 years ago (Pine, 1999). Yet, the concept has been fully applied through the angle of customer experience. This research examines the 3 environments of employee experience-Workplace, Technology, and culture (Morgan, 2017).

This study contributes to the literature by providing more information about Employee Experience antecedent and the significant consequences that the HR community is focusing on. The result of this research can help employers understand what contributes to employee experience and its effect on employee engagement, referral, and retention.

The research methodology would be carried out using a quantitative research method in the form of survey questionnaires. It is to investigate and see the relationship between employee experience and Employee Net Promoter Score (eNPS), Retention, and Engagement. Employee Engagement was measured using the shortened version of the Utrecht Work Engagement Scale (UWES) (Schaufeli et al., 2006). The survey was distributed among 164 millennial employees from various industries in Thailand. The data were analyzed using SPSS (statistical package for social science) version 26. The statistical tools like Cronbach's Alpha Reliability Test, Correlation, Regression Analysis were employed for the research study.

The author can give a recommendation on how management could invest their resources in designing employee experience that leads to impact of people management, particularly among the young generation.

**KEYWORDS: 1) EMPLOYEE EXPERIENCE 2) EMPLOYEE REFERRAL
3) EMPLOYEE RETENTION 4) EMPLOYEE ENGAGEMENT**

THE GENDER ROLE PORTRAYAL OF DISNEY PRINCESSES AND ITS IMPACT ON THE AUDIENCE

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ABSTRACT

With the voices from past literature and research, this paper explores areas of Disney princess movies over the decades in terms of the transitional female lead characters and the perceived impact of the said change on the audience in terms of their behavior and decision making. Disney as a global corporation has imposed on the psychological development of children in regards to identity management, gender performance, and racial stereotypes, forming an overall structure society has been reduced to confine in. The primary objective of this study therefore, is to find out how the characterization of gender perception of Disney princesses over the decades has left an impact on the audience and how the transition of Disney princesses and the portrayal of gender roles affect the audience. The research for this study has taken a qualitative approach by conducting interviews of exploratory nature consisting of open-ended question among audiences with the core focus on adolescents. This study contributes to assessing whether young adults identify Disney's transition into creating more gender-balanced characters by addressing a gap in previous literature by exploring both areas of the audiences' reaction and the impact of these changes on their behavioral patterns. Results from this study increasingly suggest that young adults themselves can successfully identify and interpret the gendered representations to which they are exposed and they recognize the change that has occurred in such representations over time. It can be argued that by presenting more gender progressive and balanced gender role portrayals of lead characters, the Disney Corporation has the opportunity to contribute to proper gender representations.

KEYWORDS: 1) DISNEY PRINCESS 2) DISNEY MOVIES 3) GENDER ROLE

INTRODUCTION

Gender roles are a perceived set of behavioral “norms” that are usually linked in association to males and females in a social group or construct as Barber (2015) citing Yerby, Baron, and Lee stated. (Gardner 2015) in his study stated that our society tends to draw a structure as to what it means to be a male or a female, and then go on to define which portrayals of normal behavior should be depicted by them. These depictions and traits then get further reinforced through various commodities and the media for what is considered appropriate (Barber, 2015).

In Disney films, gender roles of both males and females are very prominent. Disney films with their 80 years of the franchise have played a huge role in the entertainment industry. They reach out to their audience not only through their movies but through merchandise, toys, games, etc. While looking at Disney princesses, the depiction of their female characters and their gender roles can be described in three ways. The original portrayal of Disney from the time of inception with Snow White, followed by Cinderella, and Sleeping Beauty have seen Disney princesses portrayed as stereotypical damsels-in-distress, domestic avatars. The second wave of characters can be seen played by Ariel, Mulan, and Rapunzel where the characters are seen to be more rebellious and ambitious. The third shift in roles has been played through characters like Merida, Anna, and Elsa where the princesses have been seen to be more independent and free-spirited. (Barber, 2015)

Problem Statement

Children learn about societal norms and structures from many sources but the media have been known to leave a lasting impression on them. Disney movies are quite popular among kids and young adults. That is, they look up to these Disney princesses as not only characters they can dress up as on Halloween but also as role models who shape the functionality of their cognitive thinking abilities. This may further affect the way these children behave in their relationships as adults. Hence, it is important to examine the impact these movies have on the younger generation.

The primary objective of this study therefore, is to find out how the characterization of gender perception of Disney princesses over the decades has left an impact on the audience and how the transition of Disney princesses and the portrayal of gender roles affect the audience. The motivation of the study comes from the researcher’s personal experience growing up with Disney characters and their influence on her life in terms of her romantic endeavors.

LITERATURE REVIEW

Gender roles and its implication have had its footprint on our society for a very long time now. Signorielli (1990) in her research stated that television is a common, constant, and vivid learning environment in today’s world, posing as a storyteller. Her paper indicated that “our children are born into homes in which, for the first time in human history, a centralized commercial institution rather than parents, church, or school, tells most of the stories.” Studies by Aktins and Miller (1975) on the effects of television advertising on children found that children who viewed commercials in which females were cast in typically male occupations were more likely to say that this occupation was appropriate for women. Another study by Pingree (1978) on the effects of non-sexist television commercials and perceptions of reality on children’s attitudes about women found that television commercials influence children’s attitudes about gender-role stereotypes.

Disney princesses and gender

One of the most successful types of media and merchandise in terms of popularity and profit for young girls is the Disney princess line. The franchise in 2012 alone exceeded a booming sum of \$3 billion in profit (Goudreau, 2012). But the line of films has also given birth to some public concerns regarding the effects Disney princesses may have on young girls (e.g., Orenstein, 2011).

Media Effect Theories

Media effects include theories that explain how the mass media influence the attitudes and perceptions of audience members. Media effects represent one of the core ideas of communication research (Neuman & Guggenheim, 2011).

Cultivation theory

The premise of George Gerbner's cultivation theory stated that with the increase in viewership of television and its rising popularity, heavy television viewers are more likely to believe that real life is similar to realities portrayed on television. The amount of violence portrayed on television, for example, makes people think of the world to be a much more violent place to be than it is in reality. This phenomenon is typically referred to as "mean world syndrome" (Gerbner, Gross, Morgan, Signorielli, & Shahnahan, 2002).

Social learning theory

Social learning theory is based on the idea that we learn from our interactions with others in a social context. According to Bandura (1977), people also develop similar behaviors by observing the behaviors of others. People interpret and imitate the behavior after observing the behavior of others, especially if their observational experiences are positive ones or include rewards related to the observed behavior. Bandura stated, imitation involves the actual reproduction of observed motor activities. (Nabavi, 2012)

CONCEPTUAL FRAMEWORK OF GENDER ROLE PORTRAYAL AND EFFECTS

Rubel & Martin (1998, as cited in Lapreore 2016) wrote that children become aware of the existence of gender as early as one year of age and continue to develop their concepts of gender through childhood. Various studies have demonstrated that children can learn from models observed in the media (Lapreore 2016).

In his study, Busby (1975, as cited in Lapreore 2016) concluded that consumers should be concerned about the stereotypical images of men and women in media to which children are heavily exposed. In two consecutive studies, Durkin investigated the relationship between children's television shows and the formation of their sex-role acquiring abilities. Durkin (1985 a, as cited in Lapreore 2016) went on to confirm clear differences are evident in the portrayal of male and female characters. Durkin's (1985b, as cited in Lapreore 2016) second research findings indicated that there is a strong relationship between children's viewing of gender role portrayals on television and their understanding of gender roles.

RESEARCH METHODOLOGY

The research for this study was set to have a qualitative approach. An interview of exploratory nature consisting of open-ended questions was conducted among audiences of both genders in 6 different schools with the core focus on adolescents. The purpose of the interview was to understand the perspective and reactions of the audience towards Disney movies over the decades. This research was conducted based on standard basic knowledge of the Disney movies, especially the three movies this research focused on, to draw an

estimated timeline of the movies throughout the different eras. This research was centered on the impact Disney movies with transitioning female lead roles in terms of their characteristics, gender roles, and goals have on the participants' perception and behavior regarding gender portrayal and also note down their reactions to the themes of the aforementioned movies. Through this interview, the overall thoughts and attitudes towards the Disney movies in terms of their transition of female roles were recorded and analyzed.

RESULTS

Disney being one of the biggest corporations in the world remains to be popular among children and adults in America and all across the world. The influence Disney movies have on the audience therefore is crucial as many children get exposed to the world of Disney in the early stages of their lives. The research results present an analysis of the chosen three movies highlighted in the study and discuss the theories that help explain how the issues mentioned in the study affect the audience. The analysis derived from the study is given below. Analysis of findings based on the background of Aurora, Belle, and Moana Sleeping Beauty (1959). Sleeping Beauty released in the 1950s, precisely 1959 is one of Disney's initial releases after Snow White (1939) and Cinderella (1950). This movie introduces princess Aurora and showcases a handsome prince whom Aurora is seen to have fallen helplessly in love with, and the prince like his predecessor in the previous Disney releases is seen to take upon the responsibility of saving the princess's life who's portrayed as fragile and helpless like the princesses before her. Beauty and the Beast (1991) followed by the first era of Disney characters comes a wave of the rebellious era where Disney introduces an avid reader Belle, who is seen to be different from the girls in her village in terms of the common interests they share and is deemed rather strange by the villagers for her love for reading. We see Belle's character to emit less of the 'damsel in distress' aura in comparison to princesses before her but at the same time, she is seen to have lost her independent persona after she becomes a prisoner to the Beast and is seen to have fallen in love with him. This depiction represents a classic case of the Stockholm syndrome, which is a term used to describe a psychological response that occurs when hostages or prisoners form a bond with their captor or abuser. Moana (2016), in the more independent and free-spirited era, Disney introduces Moana, who is seen to disobey her father to venture beyond the reef, into the open seas, given her adventurous and high-spirited nature. This movie along with some of Disney's recent releases around this time demonstrates strong female characters who, with a refreshing spin on the older characters, do not wait for a 'prince charming' to rescue them from their troubles. Moana shifts focus from the romantic angle, emphasizing more on strength, adventure, and a sense of community.

ANALYSIS OF FINDINGS FROM KEY RESPONDENTS

From the findings, it can be concluded that the transition of Disney in terms of how they portrayed female lead characters in recent times has been positively accepted by the key respondents. The older movies have noticeably left an impact as to how the participants viewed romance in most cases but they are consciously aware of how the characters have been portrayed in the previous movies and they have actively highlighted a lot of the problematic areas displayed in these movies. Disney remains a popular expression of media among children. The older portrayals of women do not hold a strong ground when it comes to young people setting a benchmark for themselves as to how they should behave but the newer movies are more accepted among them as they reflect independence, sense of adventure, and freedom in the recent female characters.

Gerbner's cultivation theory stated that long-term television viewing does not only pose to be a danger because of its ability to form a perception about a specific issue but also has the power to shape one's moral values and general beliefs about the world. The cultivation theory also suggests that the media children consume do have an impact on their views about gender.

Viewing traditional films with gender stereotypes are known to leave psychological imprints on children. Elizabeth England, citing Sherryl Graves, stated, "the constructivist approach and cultivation theory both suggest there may be an effect of viewing gendered stereotypes upon children." England further explained that "constructivist approach proposes children develop their beliefs based on their interpretations of observation and experiences." These observations and experiences can be formed through watching media such as film and television as well as life (Morrison, 2014).

Bandura and Walters' (1963) stated in their social learning theory that children learn gender roles as they are taught by parents, school, and the media. (Lamanna & Riedmann, 1997). Lefkowitz and Huesmann (1980) stated that this theory examines the role of modeling in a child's social development. It posits that viewers, especially children, imitate the behavior of television characters in much the same way that they learn social and cognitive skills by imitating their parents, siblings, and peers (Singer & Singer, 2000).

This study contributes to assessing whether young adults identify Disney's transition into creating more gender-balanced characters by addressing a gap in previous literature by exploring both areas of the audiences' reaction and the impact of these changes on their behavioral patterns. Results from this study increasingly suggest that young adults themselves can successfully identify and interpret the gendered representations to which they are exposed and they recognize the change that has occurred in such representations over time. It can be argued that by presenting more gender progressive and balanced gender role portrayals of lead characters, the Disney Corporation has the opportunity to contribute to proper gender representations.

CONCLUSION

The results obtained from this study indicated that the key respondents were not in favor of the way Disney has portrayed women in the earlier movies. They agreed upon the fact that newer movies had depicted a more ideal representation of female characters and they could relate more to the way they were presented. It was also noted that they did think the older movies left an influence on them in terms of how they viewed romance in the earlier stages of their lives.

The description of female lead characters and the portrayal of romance were in accordance with past research. They did mostly refer to the 'damsel in distress' phenomenon which was more common in the earlier movies but have been shown less in the recent motion pictures. The idea of 'happily ever afters' remains a strongly held belief but the participants do agree that the portrayal of romance is not realistic in the said Disney movies.

Since the beginning of Disney movies with Snow White in 1937, the Disney franchise has gained extreme popularity on a global scale reaching audiences of various cultural and ethnic backgrounds. Disney has made some progress in the characterization of its lead roles but it still has a long way to go. As Disney presents itself as a protector of innocence and holds high values in terms of creating nostalgia with their films, the only party held responsible for the impact their movies may have on children and growing adults should not be limited to them alone. Parents, guardians, and educators should also set an example as to how they present Disney in front of their children, and expose them to these movies responsibly by educating them about stereotypical gender norms and roles. By creating an

open platform for dialogue, parents and caregivers can use the awareness of Disney's lack of proper gender portrayals as an essential tool to educate children so they become more capable decision-makers when it comes to their perceptions of romance and gender as they grow up.

As media continues to play an essential role in our lives, coaching parents and educators regarding the type of content they expose their children should be given more importance. Disney films can be used as a medium for family discussions. Parents can watch the movies with their children and ask questions before, during, and after to increase their children's media literacy and to understand the power media holds in sending the messages it does with the aid of the movies. By asking questions to children regarding their thoughts on gender representation and portrayals, the hope that they will be less influenced by the media and its messages as they mature into adulthood is strengthened. Disney can also be a medium to discuss topics like racism, sexism, and diversity in terms of the characters and their representations which would help raise awareness regarding these issues at an earlier stage of life.

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COMMUNICATION STRATEGIES OF NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION VOLUNTEER (NEV) TO DRIVE LOW CARBON COMMUNITY: A CASE STUDY OF BAN TOR PHAE, KHUN YUAM DISTRICT, MAE HONG SON PROVINCE

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ABSTRACT

This research aims to: 1) examine activities initiated by the NEV, including analyze the amount of carbon storage and greenhouse gases reduction; and 2) raise awareness and analyze the communication strategies. Participatory action research was employed together with in-depth interview and focus group discussion. The results found that the NEV initiated activities following the low carbon city strategy: 1) City of Trees, trees planting and forest ordination; 2) City of Waste Minimization, managing waste from its source, waste sorting, making use of waste and plowing agricultural residues; 3) City of Energy Efficiency, having the idea of using solar energy; and 4) City of sustainable consumption, growing vegetables in the household and producing food ingredients to reduce travel outside the community. From the calculation, 20 square meters of community forest could store 10.373 tCO_{2e}, waste management and sustainable consumption promotion could reduce greenhouse gases by 445.18 KgCO_{2e}. Communication strategies to achieve low carbon community were: 1) creating awareness of the NEV to understand ways to support low carbon community, and clearly communicate benefits to local people for continuous participation; 2) using local language; 3) employing the easily accessible media; and 4) communicating contents that links environmental issues with local health and tourism.

KEYWORDS: 1) COMMUNICATION 2) NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION VOLUNTEER (NEV) 3) GREENHOUSE GASES REDUCTION 4) LOW CARBON COMMUNITY 5) MAE HONG SON

1. Introduction

To mitigate and solve climate change problem, there is a steady stream of relief efforts by reducing greenhouse gases, by adopting the low carbon society principle and awakening in many countries such as the United States, India, China, Japan, and Thailand (Gomi et al., 2010; Su et al., 2013; Sreenonchai et al., 2019). Thailand has been locally driven by promoting and supporting agencies to implement activities that reduce greenhouse gas emissions, such as the “Low Carbon Municipal” project of the Municipal League of Thailand that operates the project. There are four strategies under this project covering City of Trees, City of Waste, City of Energy Efficiency and City of sustainable consumption. In addition, local government organizations have been encouraged to prepare their greenhouse gas accounts using the concept of organizational carbon footprint. Although there were some previous studies regarding greenhouse gas reduction action from various activities, both of the government agencies, local government organizations or the readiness of the community to drive a low carbon city. However, no studies have been conducted on how to drive local environmental volunteer activities that can help support the reduction and sequestration of greenhouse gases, including a lack of cooperative communication practices on scientific knowledge regarding carbon sequestration and greenhouse gas reduction to promote knowledge and behavior at a community level (Sreenonchai et al., 2019).

For these reasons, the study of and activities driving of environmental volunteers that can support a low carbon community is an interesting issue and beneficial practice, especially the role of natural resources and environmental protection volunteers (NEV). NEV as the public volunteer to build public participation in the conservation of natural resources and environmental management according to their own context. Therefore, this research aims to examine activities initiated by the NEV, and inviting local people to participate in and calculate the amount of greenhouse gases, as well as communicating the results of the activities along with scientific data to NEV and stakeholders, including analyze the amount of carbon storage and greenhouse gases reduction, as well as raise awareness and analyze the communication strategies.

2. Literature Review

The driving a low carbon Society at the local level of Thailand

An example of Thailand's low carbon city building efforts is the Thai municipal project aimed at low carbon cities by the League of Thailand Association. The project "Thai municipalities go to a low carbon city in honor of His Majesty 84th Birthday Anniversary", supported by the European Union (EU) budget was initiated to encourage the administrators and the municipalities staff to participate in the project to gain knowledge and understanding of the causes and processes of carbon emissions from various activities, and has the potential to change the direction of development to "Low Carbon Municipality" according to the Sufficiency Economy Royal Initiative. Low carbon cities in the context of this project mean cities that have taken any action to minimize their greenhouse gas emissions under the four strategic frameworks (Kamuang, 2012):

City of Trees: emphasize the city with sustainable green space

City of Waste Minimization: focusing on waste management covering garbage and wastewater, including other types of pollution considering the complete management from its source.

City of Energy Efficiency: actions to promote local people to reduce energy consumption by saving electricity and fuel, including campaigning for alternative energy or renewable energy.

City of Sustainable consumption: actions to promote the adoption of the sufficiency economy principles in making decisions on consumption, including promoting product consumption/services made in or near your home/community to reduce energy consumption and to minimize carbon emissions from production, transportation, post-consumption disposal as little as possible.

3. Research Methodology

This research employs qualitative and quantitative research methods, data was collected in the field research using participatory action research, in-depth interview and focus group discussion, while content analysis was used to analyze the data. Key informants were selected by purposive sampling consisting of: 10 Ban Tor Phae NEV, 30 Ban Tor Phae local people and 4 NEV supporters for environmental protection. There are research steps to answer the objectives as follows:

Objective 1) To examine activities initiated by the NEV, including analyze the amount of carbon storage and greenhouse gases reduction.

1) Assess the knowledge and understanding of the NEV leaders in the issue of climate change, greenhouse gas, low carbon society (low carbon cities / communities), and discuss to the characteristics / patterns of environmental activities initiated and implemented with local people in line with the low carbon urban strategy. How to invite people from your community to join activities, how to communicate during the activity, characteristics of community participation, the results of the activities, what impresses you from the activities, things that you want to develop in the activities , comments and suggestions for actions aimed at low carbon communities, and to promote knowledge and understanding of climate change, greenhouse gas, low carbon society (urban/low carbon community) , and methods for measuring carbon sequestration and greenhouse gas reduction from conservation and tree planting , waste management, energy saving and sustainable consumption. Representatives of the village who were ready and interested in participating in carbon sequestration and greenhouse gas reduction processes.

2) Survey and analyze the activities conducted by the NEV and local people in the area using the low carbon strategy of the Municipal League of Thailand (2012) as a guideline for education and calculating the amount of carbon storage, greenhouse gas reduction from the activities of the NEV and local people, including:

- City of Trees: The study area was Ban Tor Phae community forest with the approximate area of 1,000 rai (1 Rai = 1,600 Square Meters), by placing 10 X 10 meters sample plots and calculating the above-ground biomass using the allometric equation, and evaluated by deciduous dipterocarp forest and mixed deciduous forest.

- City of Waste Minimization: solid waste management in the community by separating the components of municipal solid waste and weighing, calculating the greenhouse gas emissions of municipal solid waste, which was accounted for only the waste to eliminate by other methods instead of landfill, and a carbon footprint assessment in accordance with IPCC 2006 guidelines for conducting waste sorting activities.

- City of Energy and City of sustainable consumption use a carbon footprint assessment according to IPCC 2006 guidelines.

3) In-depth interviews with representatives of internal and external agencies that support the operation of the NEV, including government agencies, private organizations, independent organizations and networks. To about the nature of support for the operation of the NEV, the nature of participation Join the community, the results that arise from the implementation of the activity, what would like to develop in the activity comments and suggestions for actions aimed to low carbon communities.

Objective 2) To raise awareness and analyze communication strategies of the NEV.

4) Assess the knowledge and understanding of the NEV leaders after the issue of climate change and low carbon community were provided, including the calculation of greenhouse gases under the low carbon city strategy.

5) Media planning, designing and producing to communicate information about the calculation of carbon sequestration and greenhouse gas reduction, including basic knowledge about climate change and its impacts on local people, by considering, selecting and designing messages and channels of communication.

6) Communication intervention together with the NEV leaders to enhance the knowledge and understanding of the NEV members and local people (who did not participate in the planning, design and producing the media).

7) Assess the NEV members and local people perception (who did not participate in the planning, design and producing the media process) with small group discussions, by measuring the level of interest and perception, in terms of knowledge, attitudes and trends, or behavioral modifications aimed to low carbon community.

8) Use content analysis to analyze information obtained from group discussions, in-depth interviews, activity data and greenhouse gas assessment, exchanging between communication intervention for enhancing knowledge and understanding, assessing perception and understanding from communication, including analyzing communication strategies aimed to the low carbon community.

4. Results

4.1 Activities for natural resource and environmental management, and calculations of carbon sequestration and greenhouse gas reduction.

Ban Tor Phae NEV has implemented various natural resource and environmental management activities according to the community context. Observing at the problems arising from their livelihoods and awareness of the lack of natural resources in the community, these have caused less and scarce available resources. Moreover, the scenery of the village was not beautiful because of no systematic waste sorting and waste management. The NEV invited their community members to participate in the activities via local media consisting of local broadcasting tower, village meetings and word of mouth. The community involvement process started from understanding the existing problems, figuring out the solutions, taking action along with providing knowledge from training and study tours with pointing out the benefits to occur. The activities were in line with the strategy of low carbon cities as follows:

1) City of Trees: trees planting in areas that have previously been invaded for agriculture, forest ordination to conserve forest areas from being destroyed, and making a fire line to prevent forest fires, by performing every year and once a year;

2) City of Waste: waste management at the source and campaigning for households to sort waste, make benefits from waste, keep the village clean, the campaign to reduce using plastic bags by using wicker baskets produced from the community or cloth bags, and plowed agricultural waste to reduce open burning;

3) City of Energy Efficiency: having an idea to use renewable energy from solar cells; and

4) City of sustainable consumption: growing vegetables in the household, and use wisdom for food ingredients production to reduce travelling outside the community.

From the sampling experiment to calculate carbon sequestration and greenhouse gas reduction, 20 square meters of community forest could store 10.373 tCO_{2e}, waste management and sustainable consumption promotion could reduce greenhouse gases by 445.18 KgCO_{2e}.

4.2 Raising awareness and analyzing communication strategies to drive low carbon community

4.2.1 Raise awareness of climate change and its impact on local people

To raise awareness of local people, a review of the knowledge understanding that has been communicated and jointly analyzed with the NEV leaders should be started covering: climate change, greenhouse gas, carbon storage and greenhouse gas reduction from activities of the NEV and local people together with communication planning and designing. The communication to create awareness among local people are:

- Sender was the NEV leader, who has been trusted and accepted by the local people, to communicate with local people together with the researcher. Local language to communicate the content to be easier to understand was also employed, while the rest of NEV leaders observed and provided further information.

- Channels were brochures and publicity board, which were easily accessible by local people. Additionally, the media were disseminated to local people via the village meeting.

- Messages included definitions and causes of global warming and climate change, sources of greenhouse gases and the impacts occurring near the community including pictures and statistics to present changes from past to present, as well as carbon storage data and greenhouse gas reduction from the community activities (Figure 1).

- Communication interventions included pre-communication knowledge assessment and information communication after having been co-designed with the NEV leaders. The NEV leader tried to point out about their surrounded situations, and the community activities that could help carbon sequestration and reduced greenhouse gas emissions, along with simple methods to reduce global warming. After that, post-communication knowledge was assessed and found that 80 percent of the local people who participated in the communication intervention had better understanding comparing with the period of no communication.



Figure 1: Publicity board co-designed by the NEV leaders and researcher to communicate with local people

4.2.2 Analyze communication strategies to drive low carbon community

From the above communication of NEV to drive low carbon communities, communication strategies could be analyzed as follows:

1) **Communication process:** Raising awareness and understanding of local people is an important starting step because most of them lack knowledge of global warming and climate change

and facing no direct impacts from climate change (Leknoi, 2017). Meanwhile, the message broadcasted on the media have employed technical language which was difficult to understand. Therefore, the communication process should begin with understanding creation with the NEV leaders and local people on the impacts of greenhouse gas emissions, which have affected local livelihoods such as hotter weather, drought, more difficult to find local herbs, advantages and disadvantages of natural resource and environmental management activities that affect the reduction and sequestration of greenhouse gases. In order to enable the NEV leaders to understand and be able to communicate with people in the community, take part in conducting activities and changing behavior.

2) Sender: Key sender should be a community leader who is recognized by local people and has frequently communicated various information with local people (Sreenonchai et al., 2019). The leader selected to communicate in this study is well-known and respected by local people. He is also a hospitable, dedicated and self-sacrificing headman including develop the community in economic, social and environmental aspects, starting from the community until having the agencies to support. He has also persuaded and done activities for the community to realize the positive effects, such as waste sorting and throwing it into the bin, etc.

3) Media/channels of communication: The easily accessible media chosen by the NEV to communicate with local people were brochure and publicity board, which could understand by local people afterwards. After the NEV leaders have jointly produced the media to distribute through village meeting, which are organized every month and most people in the community gathered in this forum. In addition, the publicity board communication through the learning center, use of voice lines which is often employed in the community, and use of line group to communicate with groups of people outside the community.

4) Language use: Words that are easy to understand and local language can lead to behavior change and to take part in activities that support global warming reduction because the community is familiar with the local language. This finding is in line with Sreenonchai et al (2019) mentioned that using language that local people can easily understand, particularly local language which could reflect the sociability and readiness to help create or adjust for better community.

5) Message: The messages or content to communicate with local people should be highlighted as follows:

- Ask the questions for though provoking, such as asking if the weather is getting warmer today compared to the past, then link to its cause and point out the impacts happening near the community.

- Use a comparison method to visualize clearer picture by comparing the situation closed to local people, such as declining agricultural productivity and harder forest finding due to fluctuating weather conditions.

- Communicate current national actions linked to greenhouse gas reductions, and practices that local people have seen through various media, such as the announcement of free plastic bags ban from convenience stores, etc., and how the activities that they have participated with the NEV have helped to reduce global warming.

5. Conclusions

The implementation of natural resources and environmental management activities of the NEV and people in the community arise from realizing the problems, impacts, jointly plan and take action, jointly communicate through channels that the people can easily access, such as, voice along the line for people in the community to continually participate including agencies to support. The activities carried out are in line with the low carbon city strategy: 1) City of Trees, trees planting and forest ordination; 2) City of Waste Minimization, waste management at the source and campaigning for households to sort waste, make benefits of waste, keep the village clean, the campaign to reduce plastic bags usage and using wicker baskets produced by

the community or cloth bags, and plowed agricultural waste to reduce open burning; 3) City of Energy Efficiency, having the idea of using solar energy; and 4) City of sustainable consumption, growing vegetables in the household and producing food ingredients to reduce travelling to outside community. Communication strategies that promote the NEV's role to support a low carbon community include:

1) Raising awareness of the NEV to understand the activities and ways that support low carbon community, to be able to analyze greenhouse gas data and compare it into value or the benefits that local people will receive clearly, as well as communicating information to the community to understand and participate in activities continuously.

2) Communication techniques focusing on language use to be easily understand, especially local language in order for local people to be familiar and dare to exchange ideas, gain understanding and lead to behavioral change including to take part in global warming reduction activities.

3) Use media that is easily accessible to local people, such as publicity board, brochure, through voice lines, village meeting, learning center and line group to create learning, understanding and stimulating actions.

4) Communicate messages with thought provoking, comparing present and past weather experiences, and the current actions for global warming reduction.

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SOCIAL MEDIA OVERCOMING IMPEDIMENTS FOR SUCCESSFUL STRATEGY FORMULATION BY SMALL AND MEDIUM ENTERPRISES (SMES)

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ABSTRACT

The purpose of this study is to explore the impediments of Small and Medium Enterprises (SMEs) on their current Social Media (SM) adoption and implementation at Central Business District (CBD) located at Phitsanulok, using a data sample of 398 surveys, incorporating with 21 interviews from ownerships and top executives that already adopted and implemented SM. The quantitative survey was used to gain a broad understanding of crucial impediments of SM adoption. The qualitative semi-structured interviews were used to gain deeper insight into top executive that encountered obstacles of such implementation. The descriptive and inferential analysis was conducted for surveys, while the applied thematic approach was selected for interview analysis to describe insight situation. The finding reveals that lack of time and knowledge, top management support together with unclear SM practical plan and uncertainty of technology change, are critical hurdles for the successful implementation and development SM, while security breach and privacy issues are not considered as major important obstacles. The novel contributions of this study is to propose solutions feasible for SMEs based on their existing resources and capabilities to cope with such impediments by using theoretical resource based view to describe situation.

KEYWORDS: 1) SOCIAL MEDIA 2) IMPEDIMENTS 3) MIXED METHOD 4) SMES 5) RBV

Introduction

Thailand SMEs have been recognized as engines of economic growth, development and employment in the country. With the pandemic of COVID-19, the economic impact of COVID-19 has been severe leading to the contribution of SMEs to gross domestic product (GDP) is still low. To support Thailand's economy, the government has stepped in with sizable stimulus packages for businesses, as well as the service sector, which contributes to a significant proportion of Thailand's economy. Meanwhile, SMEs themselves recognize that it is crucial for them to adapt the new conditions brought about by the rapid technological changes to stay competitive. Thus, the adoption of SM usage practices is to fit a company's culture and its customer appeal. However, not all SM platforms are appropriate for all business types and also not all SMEs can develop operational and managerial capabilities since some of those could not possess those unique characteristics that are unable to deploy such characteristics advantageously, or may be heavily constrained by resources in order to cope with issues of SM adoption (Beier & Wagner, 2016; Grant, 1991).

Even though there have a growing number of research studies on the obstacles of SM adoption and implementation in different context of countries and types of business, so far there has been little empirically based and rigorous academic research reported on how to handle with the challenges faced with by SMEs. With lack of a business plan and unclear to implement the plan as obstacles arise can create structural problems for SMEs that are ultimately insurmountable. The use of SM presence by SMEs have relatively superficial with a lack of planning, unconventional and unsophisticated in its use, this resulting in a lack of business case study and practices related to reasons for unwillingness, abandonment or rejections of SM adoption among SMEs, are as yet unknown. Consequences, SMEs overlook the importance of effective business planning incorporating SM usage prior to opening their doors.

Research objectives

The objectives of this research includes 1) exploring the impediments of successful SM adoption by SMEs from ownership perspectives located at Central Business District (CBD), Phitsanulok. 2) Proposing a practicable approach to overcome of such impediments for SMEs using resource-based approach (i.e. Resource based View theory) to describe resources and capabilities that SMEs should have to steer SM usage to remove impediments faced by them.

Literature Review

Implications of Small and Medium Enterprises (SMEs) and SM usage

Previous research reveals that SM implementation could not be equally beneficial to all business sizes and sectors due to resources constraints in foundation (Dahnil, Marzuki, Langgat, & Fabeil, 2014, p. 120). Different size classes of business faces a unique set of obstacles and challenges stemming from SM usage; consequently, they tend to follow different paths based on different sets of resource endowments and business characteristics used to generate their managerial and operational capabilities (Eldin, Elnour, & Hassan, 2020, p. 341; Trainor, Andzulis, Rapp, & Agnihotri, 2014). Recent research suggesting that the barrier of SM implementation includes:

Lack of knowledge and time: SM encompass a diverse number of platforms, each specializing in the delivery of different media. Over time, such platforms have extended to smartphone and all gadgets and electronic devices. Businesses have opportunities to conduct with consumers and prospects across a broad range of platforms and to interact two-way symmetrical communication between the business and customer vice versa. However, some businesses are eager to adopt new technologies whereas others are lagging behind. Thus, knowledge on how to utilize SM for business purposes, skills and time contribution for such SM activities, are critically required. In the same vein, a lack of such ability acts could be considered as impediments to adopt and implement SM effectively (Dahnil et al., 2014, p. 123). The combination of technical knowledge, skills, abilities, and other valuable characteristics among the workforce that determine its SM usage potential, is required (Roberts, Piller, & Lüttgens, 2016, p. 119).

Lack of SM sophistication as a strategy: SM could be considered as a part of marketing tools or even corporate strategy. Although as recently reported by the Digital 2020 Global Overview, the uptake of SM by Thai businesses has continually increased over the years with 48 per cent of SMEs and 79 per cent of large businesses being present on SM (Kemp, 2020), there were not yet any standard approaches for SM strategic formulation. This implies that a lack of alignment of business and SM strategy might be causing issues to fully SM adoption (Hassan Zadeh & Jeyaraj, 2018, p. 125). Lack of alignment may stem from an unclear existing marketing strategy or simply use it without having priorities which creates inappropriate tactics leading to short-term vision that results from the common practice of advertising, selling and pulling campaigns or content rather than focusing in details of SM platforms or formulating channel strategy. Consequently, once businesses have a number of SM platforms leading to a method of complexity used by SMEs (Roengtam, 2020, p. 221). Also, without sophisticated system measurement of SM usage (Dahnil et al., 2014, p. 123) could lead to unidentified target and customers (Genç & Öksüz, 2015, p. 298)

Top management support

Research indicating that top executive support has been identified as one of the most important factors in the success of SM adoption and implementation (Bogea & Brito, 2018, p. 12; Trainor et al., 2014, p. 5). Ownership/leaders who are well informed about emerging technologies can encourage their staff to consider their use (Naeem, 2020, pp. 1979-1998). Ownerships/leaders who are positively disposed towards SM deployment encourage and support the new technology and innovation (Lin & McDonough, 2011, p. 497). Therefore, owners facilitate employee empowerment and provide commitment to ensure the required resources for adoption and to signal support to internal stakeholders (e.g. top executives/managers and employees) of the importance of adopting such new SM platforms (Oliveira, Thomas, & Espadanal, 2014, pp. 497-510). However, research reveals that business can work well without the use of SM (Pesonen, Mikkonen, Makkonen, & Honkanen, 2013, p. 728) if leaders have ability through the creation of a knowledge sharing organizational culture (Lin & McDonough, 2011, p. 500). This implies that leaders who may not have a technical knowledge aspects in IT, Marketing and Innovation, but having a vision, setting goals, and providing a supportive training system in SMEs that will allow the transfer of knowledge required to make use of the new tools at the same time modify the employees' attitude towards technological change.

Changes of technology

Research suggesting that the changes of technology impacts on the decision making of SM adoption (Beier & Wagner, 2016, pp. 1-18). This results from the change in customer's behavior via SM platform. Research from Beier and Wagner (2016, p. 11) indicating that age of executives and business size (in terms of revenues) impacts on the adoption of SM. New technology change has direct impact on the environment, function, process and performance of business lead to achieve goal—change resistances and barriers will be appeared due the results of reactions and behaving based on different interpretations. This imply that, from owner perspectives, SM landscape will definitely change in a near future as a result it seems they preference to wait and postpone their future investment in fully SM implementation until new better technologies have been developed.

Security breach and privacy issues

Recent research demonstrated initial SM effects on the job security in terms of time wasting, security breaches, transparency, risks, privacy issues and other specific negative aspects (Beier & Wagner, 2016; Bhimani, Mention, & Barlatier, 2019, p. 760; Ghobakhloo & Tang Sai, 2013; Pesonen et al., 2013) that make SM platform not suitable for all types of business, particularly those dealing with the personal privacy information of customers where the use of SM (if can potentially lead to the disclosure of confidential information and damage the brand and reputation of companies.

Methodology

The data comprises survey and semi-structured theme interviews in SMEs among 21 top executives and 398 survey respondents in CBD, Phitsanulok. This research method chosen is a mixed methods based on concurrent approaches as its research strategy (Teddlie & Tashakkori, 2009). The main focus is not on generalizations but on obtaining in-depth knowledge of a certain phenomenon. This approach enables the development of a rich, comprehensive view of SM that describes and explains the current patterns of SM adoption and implementation by SMEs in Phitsanulok's CBD.

Both the quantitative and qualitative data were conducted concurrently and collected data at the same period of time. Such approach is intended to merge and compare the outcomes of both types of data analysis that is mutually complement each other (Teddlie and Tashakkori, 2009). The target participants were SMEs owners, top executives/managers and those who is a key drivers of SM adoption. Even though the empirical data were collected concurrently but were analysed separately based on the mixed method design proposed by Teddlie & Tashakkori (2009). The quantitative data from the surveys were analysed using descriptive and inferential statistics. Meanwhile, the qualitative data from the semi-structured interviews analysed using thematic analysis by applying the principles of grounded theory to support thematic coding (Strauss & Corbin, 1994).

For qualitative data collection conducted a total of 21 semi-structured theme interviews in SMEs with 18 owners and 3 managers (see Table 1). The case companies were selected using purposive sampling since the purpose was to investigate businesses who already had adopted SM and faced with the barriers for such initiatives adoption. The data in the form of audio recordings derived from the individual interviews of participants were initially created as a transcript. Thematic analysis was conducted by using grounded theory approach to process open coding, categorizing, and creating sub-themes of similar phenomena leading to a main 4 main themes. The quality of qualitative data analysis depends on repeated, systematic searching of the data. Finally, quantitative findings from the surveys was used to investigate and describe the

impediments of SM adoption and implementation. Qualitative findings from semi-structured interviews themes were used to explore in depth, the insight details which is problems and challenges associated with such initiatives. Both of findings were integrated and described about phenomena at the end.

Findings

Table 1.1 below provides descriptive results for the impediments variable included in the analyses from survey. The results indicate that lack of knowledge and time coupled with top management support were the three most common impediments to SM adoption reported by SMEs as of high or very high importance (the mean scores of 3.68, 3.47 and 3.22 respectively). Almost 90 % of the 398 respondents reported indicating that SM adoption and implementation were conducted by themselves by owners or either managers, not using external third-party for implementation. This result suggests, not surprisingly, on the context of resource-constrain situation by SMEs. Further analyzed reported, business sized class have significant impacts on knowledge, time and top executive support for SM adoption, also age of business operation impacted on the technological change ($df=4, \chi^2=9.289^*$) that make them reluctant to fully invest on SM. Meanwhile, the restriction of SM knowledge ($df=4, \chi^2=9.265^*$) and executives support ($df=4, \chi^2=9.414^*$) are both still perceived as a major barriers for SM adoption based on age of operation (See Table 2).

Table 1: Descriptive results for the analyzed variables of impediments associated with business size

Impediments	Mean	S.D.	Min	Max	All	1-50	50-99	Sig.
					employees	employees	employees	
Knowledge-related impediments	3.68	0.921	1	5	3.86	3.50	4.18	.000***
Time-related impediments	3.47	0.944	1	5	3.75	3.50	4.07	.004**
Top management-related impediments	3.22	0.981	1	5	3.63	3.42	3.87	.002**
Unclear business strategy-related impediments	2.64	1.060	1	5	2.71	2.58	2.96	.863
Change of technology -related impediments	2.57	1.074	1	5	2.81	2.65	3.01	.622
Privacy leaks-related impediments	2.42	1.094	1	5	2.56	2.31	2.73	.337
Security breaches-related impediments	2.26	1.114	1	5	2.43	2.38	2.54	.448

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Table 2 : Descriptive results for the analyzed impediments associated with age of business

	N	Knowledge	Time	Executive support	Technology change	Unclear strategy	Security Privacy
Less than 1 year	45	94.33	91.11	89.12	93.33	89.10	84.44
1 to 3 years	71	91.44	95.77	91.44	92.96	90.45	91.55
3 to 5 years	109	92.75	91.74	93.71	96.25	87.97	91.74
5 to 10 years	95	90.65	86.32	94.55	87.37	82.64	89.47
10 years or more	78	89.12	91.84	98.73	90.82	92.86	93.88
Chi-square ($df = 4$)	398	9.265**	7.675	9.414*	9.289*	6.879	7.145

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Further findings from qualitative semi-interview can also give a meaningful insight into the stumbling block of current SM implementation which leads to 4 main themes described below. At this stage, of 21 respondents (from interviews) had SM at least one platform. Most of them is owner of business (N= 18). Over half of the respondents (76 %, N= 16 cases) were from small business size class employing not greater than 50 people and 43 % (N=9 cases) operated in the industry of food and beverages. Business operating period is mostly between 1 to 3 years (N=9 cases). Over of 50 % respondents have at least two official SM sites but 80 % of them do not have official SM strategy as shown in Table 3.

Table 3: demonstrates a sample of respondents characteristic from interviews

Case	Position	*Size	Industry sector	Age of operation	*SM sites	Strategy	Knowledge required*
Case 1	Manager	1-50	Food and beverages	< 1 year	1	Informal	Marketing
Case 2	Owner	1-50	Food and beverages	< 1 year	1	Informal	IT/Marketing
Case 3	Owner	1-50	Automobiles	>10 years	2	Informal	Innovative
Case 4	Owner	1-50	Food and beverages	1-3 years	2	Informal	IT/Marketing
Case 5	Owner	1-50	Commercial	1-3 years	3	Informal	Innovative
Case 6	Owner	1-50	Appliances	1-3 years	2	Informal	Innovative
Case 7	Manager	1-50	Appliances	>10 years	2	Informal	Innovative
Case 8	Owner	1-50	Food and beverages	< 1 year	2	Informal	Marketing
Case 9	Owner	1-50	Food and beverages	< 1 year	2	Informal	Marketing
Case 10	Owner	1-50	Food and beverages	1-3 years	2	Informal	Marketing
Case 11	Owner	1-50	Commercial	1-3 years	3	Informal	Marketing
Case 12	Owner	1-50	Tourism	1-3 years	2	Informal	Marketing
Case 13	Owner	1-50	Food and beverages	1-3 years	3	Informal	IT
Case 14	Owner	1-50	Tourism	1-3 years	2	Informal	Innovative
Case 15	Owner	1-50	Food and beverages	1-3 years	3	Informal	Innovative
Case 16	Manager	1-50	Food and beverages	5-10 years	1	Informal	IT/Marketing
Case 17	Owner	50-99	Tourism	>10 years	3	Informal	IT/Marketing
Case 18	Owner	50-99	Commercial	>10 years	3	Formal	IT/Marketing
Case 19	Owner	50-99	Appliances	>10 years	2	Formal	IT/Marketing
Case 20	Owner	50-99	Commercial	>10 years	2	Formal	IT/Marketing
Case 21	Owner	50-99	Automobiles	>10 years	5	Formal	IT/Marketing

Note* Size= Number of employees, SM sites= Number of SM platforms, Biz=business

There are four main themes derived from the 21 respondents related to impediments factor of SM implantation including; (i) Knowledge is a key, (ii) Ready for changes, (iii) Integrated capabilities, and (iv) Uncertainty management.

The ‘**Knowledge is a key**’ theme—related to the awareness and recognition of the importance of knowledge as a necessary condition for SM implementation. Subthemes including leaders knowledge, IT and marketing knowledge, technical knowledge on how to effectively implement SM, share vision across business and employees training. A number of respondent’s states that the implementation of their SM initiative was still a

learning process and believed that person who possess IT and marketing knowledge and those understanding of new technologies associated with SM were critical.

Well, we need someone working around that...and those who come up with some like ground-breaking things..[Case 15]

Someone can do both front and back-office processes and working on creating a content plan for future posts or activities coupled with dealing with technical platform of SM. might be IT and marketing people..[Case 19]

The **‘Ready for changes’** theme—related to the business capabilities to embed effectively unpredictable new changes of technology and environment. A subthemes include doing a research, observing rivals, steep learning curve, adaptable and applied practices. Most of respondents admitted that they do their own research by observing through publicly available information and imitating rivals by subsequently adapting the best practices that are most relevant to their business or that most fit their culture, resources and customer base.

A lot of it just watching of they do and trying do better and more suitable for us. [Case 11]

Yeah count me in...small business like us have limits the ability to create ground. Watch others and try to improve make us moving forward. [Case 5]

No, I won't ...not change the current successful ones (strategy).... To me SM, could develop in-house through observation and adaptation [Case 7]

The **‘Integrated capabilities’** theme— related to the firm's ability to integrate existing resources and capabilities to expand and deepen the SM approach. A subtheme includes commitment of top management and support of stakeholder, operational and managerial capabilities. Indeed, for SM, evolving affordances enabled by a diverse IT infrastructure together with executing outsources employment supports firm knowledge management. A number of respondents stating that lack of support from top management due to unclear benefits of SM is major factor which results in a lack of commitment to cooperation which may be due to the absence of strategic long-term goals

So, I think it in term of move technique to the next step would really require commitment of resources to be able to update on a regular basis. Yes I wouldn't get it is still in doubt. [Case 6]

Some companies are also able to afford the cost of using an outsourced for operated and responsible of SM instead of business, but finally they are disappointed with them as is not the actual return on investment of SM initiative.

I'm really quite not happy with outsource performance that employed by us. It's such a long time without any things return back..searching for someone else manipulate it in. [Case 17]

The **‘Uncertainty management’** theme related to doubts, concerns and uncertainty about SM adoption expressed by respondents which had led to their reluctance to fully embrace and invest SM. This theme comprised three associated subthemes including: concerns, SM failure, and technological change. There was a general agreement among respondents that the use of multiple SM platform was not appropriate and risky.

It's only me take care of it, I don't want a large number of social media channels, lack of knowledge about on how to use it, controlling and putting more efforts into it. I can only use basic functions, we expand our business, I still do not consider to adopt more though. Case 2]

If leaders and managers could not adhere to balance using of applications by a significant business strategy and technology, SM could lead business to failure

It's nice to have... it helps keep in touch, but it's not central to the growth of the business... they will have changed that very much... Line, FB, IG are probably the most questionable for us. As to whether it really fits? [Case 17]

Discussion and implications for practice

As found from the research results, four major impediments to SM implementation are: time-consuming; demand specialized technical skills and knowledge such as marketing and IT; lack of commitment support from leaders; a lack of integrated business resources and capabilities, and uncertainty management. All such findings correspondingly with previous research reported indicating a common barriers for SM adoption including insufficient of knowledge (Dahnil et al., 2014), time, top management support (Bogea & Brito, 2018), unclear business marketing strategy (Hassan Zadeh & Jeyaraj, 2018), technological change (Beier & Wagner, 2016) and uncertainty (Roengtam, 2020). All such impediment are often associated with the simple centralized business structure characteristic of SMEs. This research also suggests that given their limited resource base for SMEs, they must develop 'Managerial' and 'Operational' and 'Change management' capabilities based on their unique characteristics; such characteristics that can provide a distinct basis for their strategic advantage over their larger counterparts. Such capabilities proposed by this research is underpinned by RBV theory based on resource-based approach for a practical framework developed by Grant (1991, p. 115).

For 'Managerial capabilities'— in coping with knowledge and time impediments. The owner-manager with a managerial capability is a key generator in supporting organizational learning and change, and in aiding the development of an operational capability required for the successful implementation for SMEs. The often limited number of skilled managerial staff within SMEs typically results in the owner-manager being responsible for numerous aspects of management and including a broad range of SM-related functional activities. For acquiring new knowledge training owner-managers should create an informal plan for the SM project and assigns suitable staff to particular tasks. Marketing staff are typically responsible for planning related SM activities, while IT staff are responsible for developing and monitoring technological platforms or applications that are built to support those activities. Training courses and events developed by academic and practitioners from third-party consulting, government agencies and private/public educational institution should be provided to staff.

For 'Operational capabilities'— in coping with top management support and unclear SM plans is ability of business to set a specific skills and routines work developed from existing resource used in solving its problems through configuring its operational resources. At this point, top executives play a crucial role in supporting and helping their staff with a clear SM strategic direction plans. The short, long term SM-related objectives must be created, the role of responsibility for staff must be assigned with specific tasks; for example, who is fully responsible for – (i) posting and creating contents, (ii) dealing and responding to customers, (iii) daily monitoring SM activities, (iv) evaluating or measuring SM usage related to business goals and (v) developing and integrating business program (e.g. CRM and customer database) into SM system. These requires a deep commitment by executives to harnessing the necessary resources for implementing SM-related processes for successful adoption and implementation in the SME context.

For ‘Change management capabilities’ — in coping with uncertainty related to the change of technology and culture. Owner-manager role is primary to support and assist staff to gain a better understanding of the benefits of SM technology and to most utilise them in the company’s operations. The concerns about complexity are attributable to a lack of knowledge about the new technology and resistance to changes in established business processes. This research suggests that managers considering SM technology investments should focus on how these technologies integrate with existing systems to support their firm’s capabilities. Thus, creating a shared vision among business members, as well as identifying ‘resource gaps’ that need to be filled for capability improvement. A business case of SM implementation should be created, the culture of a learning steep curve must be considered. This could be a measurable task for staff learning to operate a new SM functions/platforms that requires specific and repeatable steps.

Conclusion

This paper has reported research that explored the impediments of successful SM adoption by SMEs from ownership perspectives. The study found that lack of time and knowledge, top management support, unclear SM practical plan and uncertainty of technology change, are vital impediments for the successful implementation and adoption of SM. This study also provides a practical solutions feasible for SMEs based on their existing resources and capabilities to cope with such impediments by using theoretical resource based view to describe situation.

Limitations and future research directions

Given this research is limited by its focus only on SMEs that adopted SM, which focus on a single national economic context, the generalizability of this findings and the identification of causality is limited. Apart from replication of this exploratory study in other economies, future research could examine in greater depth, using multiple sources of data based on a longitudinal research design. A strategic framework of SM adoption and implementation for SMEs to remove and manage impediments of such initiative adoption is recommended.

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