

## Knowledge Organization on the Research for Development of Southern Thailand

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**Abstract:** This study aims to create a knowledge structure according to the research for development of Southern Thailand in the past 10 years from 2008-2018. The research data was from 78 Departments of Thai National Research Repository (TNRR) and Thai Library Integrated System (ThaiLIS). Content analysis and classification approach has been applied to this qualitative research. It was found that the knowledge structure consists of 2 domains, 32 classes, 227 concepts and 681 sub-concepts.

**Key words:** Knowledge organization, knowledge structure, research for development, Southern Province group, knowledge domain, TNRR

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### INTRODUCTION

South of Thailand is coastal area along Thai Gulf and Andaman Sea also, it is located near Malaysia border. Therefore, there are advantages on border trade and tourism. Most of the South are forests and wetlands which is valuable for planting and ecotourism (BLS and LUP., 2017). Besides, the Southern economic structure consists of agriculture, industry, trade and tourism, moreover, Southern culture portrays its own identities as uniqueness and diversity which could be conveyed as multiculturalism. In accordance to multiculturalism, the South welcomes all tourists as a hub of diversity (Anonymous, 2011). These mentioned factors are strengths of the South also relate to Thailand 4.0 concept in which government encourages the people to have outstanding innovations along with creative culture and to create services which lead to effective product development and tourism services (Kewsuwun *et al.*, 2019).

Southern development policy and strategic plan and the office of strategy management, Southern Province group focuses on setting up Thailand stability and sustainable development framework under the sufficient economy concept. Moreover, international network has been brought to help on agriculture, food processing industry and tourism development which based on economic expansions as increasing various types of business and employment rate also enhancing competitive manpower as to be ready for industry

investment and marine transportation development like Joint Development Strategic for border area or JDS and Indonesia-Malaysia-Thailand Growth Triangle or IMT- GT (Kewsuwun *et al.*, 2019).

Process on employing strategies into practice and driving the region is based on participation among the people, organizations and departments in province group for the utmost development (Podhisita, 2007). This drive and development pays attention to fundamentals, in other words, the developments on basic structures of economy, society and community along with research and development on inventing innovations, gaining new knowledge and solving problems systematically. In terms of development process and problem-solving, it employs needs and problem analysis as to gain findings which lead to practical research methodology (Podhisita, 2007). Further research has been used as a tool to reach knowledge, answers, explanations and systematic development, to reconfirm whether the knowledge is existing and to see if the knowledge can be applied or solved problems.

Conducting research leads to freshly effective innovations which are used for further development and precise solutions to strengthen the region and the nation. To conduct research for development in the South becomes an essential tool in constructing new knowledge which could lead to innovations, especially, agriculture and fisheries also research on multiculturalism. These 2 research topics included in 5

targets which are encouraged and launched by the government (Chan-o-cha, 2017). Research procedure includes research problem, research statements, literature review, research framework, population and target group, research design, research tools, data analysis, research findings and implement (Prasitrathasin, 1998). Each step needs information to be parts of literature review and to support the working research (Mueanrit, 2013). Gathering related information expands the area of knowledge to be multidisciplinary, yet due to information overload, it causes unreliability and unclear scope of knowledge.

To ease the step of data search, confirmation and support research in the South, there should be systematic knowledge organization as categorization and classification (Chan, 1985) which is easy to access and to search for information. The knowledge has been categorized into tree structure according to relationship of each concept (Panawong, 2015), therefore, it helps on showing clear causes and effects also differentiating relationship in scope of related knowledge (Archint, 2014). Moreover, it helps on making decision, presenting information or conducting further research for development in the South.

Consequently, this research aims to invent research knowledge structure as to continue developing recommender system on research for development of Southern Thailand. The findings in this research will let us see the relationships and trends of knowledge based on research of Southern Thailand by synthesizing fixed data, additionally, it is beneficial in order to reflects gaps on some research points which can be resolved or reused. Further, this could explain more on relationships of information clearly, similarly, the knowledge structure will help researcher scope area of study, search for information, reduce research redundancy, reduce costs on research redundancy and reconfirm knowledge to conduct research and invent innovations.

**Literature review:** Developing knowledge organization according to research for development of Southern Thailand knowledge organization approach was studied along with classifications and categories approach and knowledge structure relationship list as main topics, therefore, it is easy to access and covers all disciplines. The data has been hierarchical stratified and categorized by index. As a result, the system shows relationships, knowledge structure elements and further applications for recommender system or search system (Hjorland, 2017). Related theories, approaches and concepts could be presented as follows:

**Knowledge organization approach:** This approach focuses on knowledge organization as systematic search

and classification (SKOS., 2017) which helps on collecting, building and managing knowledge to share and access easily (Pornanan, 2013; Maitaouthong, 2014). The system employs updating function as differentiating new data based on qualifications (Chan, 1985; Hodge, 2000), combining and identifying differences of the existing knowledge. To create the knowledge organization must scope area of knowledge clearly (Hjorland, 2017). Important components of knowledge organization are:

- Knowledge structure is to classify data into concepts and sub-concepts as a tree structure
- Special attributes of knowledge refers to perspectives and details of knowledge needed to be classified as same as knowledge structure
- Relationship classification aspects refer to defining specific terms which users are able to select the information easily and fast

These 3 components are essential on creating knowledge organization as being effective and efficient for users. Additionally, users are able to operate the system to show structural relationships between classes, search for keywords specifically and extensively. Further, to manage the system depends on various aspects (Taylor, 2004). There are 7 approaches on the procedure of managing the system (Panawong, 2015) as follows: traditional approach is a knowledge organization based on documents which classifies abstract knowledge from various disciplines. This approach is for classification system development by searching for specific knowledge.

Facet-analytical analysis approach explains important issues of each knowledge domain then employs cause and effect concept to explain relationships by classifying into knowledge domains. Information retrieval traditional approach manages knowledge by relating similar attributes and correlating relationships. User oriented approach refers to managing the system which concerns user's needs when operating. Bibliometric approach focuses on reference management by applying interdisciplinary reference guideline. Domain analytical approach is mainly about knowledge organization by using knowledge indicator and epistemology or knowledge theories to classify knowledge domains. Other approaches are employed for very specific purpose research, for instance, semantic approach has been brought to analyze language features and symbols or philology.

Each approach contains different procedures and objectives, yet they are under knowledge organization theories. The approaches provide opportunities for further research, perspectives, languages and structures

differently, therefore, results gained are different too. Attributes and structures are classified into 3 groups (Hjorland, 2017; Hodge, 2000) as follows: term lists are to define terms and definitions and list terms used on specific domains and objectives. The structure is simple, it represents knowledge orderly and links unused lists to glossaries. The term lists refer to words with definitions, specific terms and dictionaries. They contain broader word lists and definitions than glossaries including root words, spelling, morphology, other meanings, synonyms and gazetteer with places and explanations.

Classifications and categories are to set subjects and relationship lists which classified by similar contents including subject headings, word sets which represent lists in subject headings and cover content in all disciplines. The sets are hierarchical stratified as categories, taxonomies and groups which classified according to correlated contents numerically or alphabetically.

Relationship lists are to link between lists and the following concepts, thesauri is to show relationships of words in hierarchical levels and to represent relationships by symbols, semantic networks is to present concepts and word relationships as cause-effect or parent-child on network or web type and ontology is knowledge organization in a specific concept prototype and is a representative of complex relationships between objects and explanations of specific scope of knowledge which links to data mining and management system. Currently, relationship lists have been operated online information retrieval system which links to digital database.

Now a days to manage knowledge organization depends on specific purposes which emphasizes on being as agents for information listing and as keywords for information search to classify groups and materials information along with knowledge classes especially digital platforms. It includes specific knowledge in each discipline for a quick and easy access (Ponnanan, 2013). There are 2 approaches to manage knowledge Organization as follows: enumerative schemes are traditional categorizing method used in library and it covers all information management methods. Analytico-synthetic schemes are modern categorizing method focused on synthesizing concepts and contents rather than distributing hierarchical structures (Chan, 1985; Rowley, 1992).

**Classifications and categories approach:** Each classifications and categories approach is based on different theories, concepts and methods, therefore, it creates many knowledge organization which contain various attributes. Library and information science has been claimed as the most systematic data management

field, especially, theories on classification and category. There are 2 main aspects regarding classification system theory, firstly, knowledge organization management of related concepts, approaches and theories which collects and synthesizes content, then, develops to be approaches and theories for categorizing types and relationships of existing knowledge, secondly, knowledge organization which shows concepts, structures and classifications of knowledge for being guidelines and knowledge organization tools and accessing the existing and other related knowledge (Hjorland, 2017).

Pragmatism was first applied on knowledge organization procedure as inventing tools for retrieval. Later, empiricism had been employed as classification of knowledge, knowledge structure management and knowledge component management.

To manage each knowledge organization designing structure must fit with sets of data and conditions of each discipline. The designed system which illustrates relationship structures of any discipline data meaningfully is called classification structure (SKOS., 2017), since, the structure is to classify data, according to specific attributes as phenomenon or related entity. This could be employed to classify relationship structures of the data as follows: scientific classification and taxonomies is basic structure on classification and categories concerning physical attributes of objects or living creatures which based on taxonomy as to show relationships among organism.

Structure of taxonomy is to explain organism structures by classifying or grouping shared attributes as in tree structure. It shows various relationships in class and sub-class relation or coordinate relation as parent, child and sibling.

Folk classification is to create structure focusing on phenomena. This structure illustrates roles, responsibilities or overviews of things according to social perspectives and conditions as a result, this classification is unstructured and varied. Therefore, its objective depends on users. The 2 structures emphasize on entity only, so, they are named as entity classification or phenomenon classification.

Aspect classification is to emphasize on knowledge classification more than entity classification. This is to concern thoughts, reasons and languages, then to scope the knowledge, according to each discipline or title. It could be classified as history, mathematic, logic and literature.

The aspect classification is divided into 2 types as general structure which employs original classification and specific structure which synthesizes or updates data to suit with each discipline.

The relationships of knowledge structure share semantic structure attributes which indicate relationships among data and help users to access knowledge, retrieval and search system. This could be divided as follows (Panawong, 2015): active relation is to show semantic relationships between concepts explaining how one concept affects another.

Hierarchical relation is to show all relationships deductively in a form of tree structure and to classify in superordinate to subordinate relation or in coordinate relation which is parent-child or sibling. Categorized Relation is to show relationships in terms of category, for instance, categorizing data according to disciplines, further, to manage system. The data needs to be categorized by content's types or alphabets. Generic or taxonomy relation is to show relationships by categorizing types and genetics of, for example, plants, animals, minerals, substances, chemicals, stones and soil horizon. This relation is accurate on defining terms or inventing vocabulary because of clear classifications and categories.

**Research scope:** The knowledge of the study has been scoped to 6 references based on research for development of Southern Thailand as follows: 12 disciplines from National Research Council of Thailand (NRCT) which are physical science and mathematics, medical science, chemical science and pharmacy, agriculture and biology, engineering and industry, philosophy, law, political sciences and public administration, economic, sociology, information technology and communication arts and education. Those disciplines have been grouped by NRCT and brought to be a criterion on granting research scholarships. The 7 strategies from the Ninth National Research Policy and Strategy (2017-2021) formulated by the National Research Council of Thailand are as follows:

**Research strategy 1:** Accelerate the development of integrated national research system to be fortified, sustainable and of unity including creating an appropriate research ecosystem.

**Research strategy 2:** Accelerate the promotion of research and development to achieve the goals and respond to urgent and focused issues according to country strategies, development plans and missions of agencies.

**Research strategy 3:** Promote and support research and development in the private sector.

**Research strategy 4:** Promote mechanisms and activities leading research process, research work, knowledge, innovation and technology gained from research to actual use with all sector's cooperation.

**Research strategy 5:** Develop and fortify research and development infrastructure of the country.

**Research strategy 6:** Increase the number and develop the capacity of research and development personnel to increase the competitiveness of the country.

**Research strategy 7:** Develop the cooperation of national and international research networks. The 10 strategies from the Twelfth National Economic and Social Development Plan (2017-2021) and the 20 years National Strategy framework (2017-2036) formulated by office of the National Economic and Social Development Board are as follows:

- Strategy 1: Strengthening and realizing the potential of human capital
- Strategy 2: Creating a just society and reducing inequality
- Strategy 3: Strengthening the economy and underpinning sustainable competitiveness
- Strategy 4: Environmentally-friendly growth for sustainable development
- Strategy 5: Reinforcing national security for the country's progress towards prosperity and sustainability
- Strategy 6: Public administration, corruption prevention and good governance in Thai society
- Strategy 7: Advancing Infrastructure and logistics
- Strategy 8: Development of science, technology, research and innovation
- Strategy 9: Regional, urban and economic zone development
- Strategy 10: International cooperation for development

The 11 strategies from 3 departments of administration and strategy planning of Southern Province group development framework (2018-2021) are as follows: 3 strategies from the office of strategy management: southern border are as follows:

- Strategy 1: Accelerate and improve natural and cultural tourism
- Strategy 2: Accelerate trade and investment along with support transportation, logistic and disaster prevention system
- Strategy 3: Enhance effectiveness of production and value-added process of rubber and integrated marketing

The 5 strategies from the office of strategy management: Thai Gulf coast are as follows:

- Strategy 1: Accurate production, process and management on economic crops (palm oil, rubber, fruits)
- Strategy 2: Increase produces on inshore fisheries, aquafarming and economic livestock farming
- Strategy 3: Advance international attractions on quality and formats
- Strategy 4: Advance basic infrastructures, transportation and logistic
- Strategy 5: Advance to green city and quality society

The 3 strategies from the office of strategy management: Andaman coast are as follows:

- Strategy 1: Advance tourism standard sustainably
- Strategy 2: Improve system and value-added process on produces of agriculture, fisheries and livestock effectively
- Strategy 3: Accelerate and strengthen the potential of human capital for sustainable development

Synthesis on problems and needs of people in Southern Province group by the office of strategy management which are as follows:

- The office of strategy management: Southern border provinces
- The office of strategy management: Thai Gulf coast provinces
- The Office of strategy management: Andaman coast provinces

Related research on Thai National Research Repository (TNRR) and Thai Library Integrated System (ThaiLIS) in the past 10 years from 2008-2018 then synthesized the data according to 3 aspects of research knowledge structure: research documents, research basic information and other related research information. Those researches were carefully selected in terms of correctness, completeness and conciseness as a result, there were 2,187 titles from 78 departments (Anonymous, 2017).

Referring the scope is used to set research strategies for development of Southern Thailand and to classify research contents as frameworks on developing knowledge structures for development of Southern Thailand.

## **MATERIALS AND METHODS**

Qualitative research has been brought to manage knowledge structure as using content analysis to

generate research contents and relationships also using classification approach to classify data concerning meaning and content then synthesize research key points systematically. The research procedure is as follows:

Creating knowledge structure on research for development of Southern Thailand in accordance to; 12 disciplines from National Research Council of Thailand (NRCT); 7 strategies from the Ninth National Research Policy and Strategy (2017-2021), 10 strategies from the Twelfth National Economic and Social Development Plan (2017-2021) and the 20 years National Strategy Framework (2017-2036) and 11 strategies from 3 Departments of Administration and Strategy Planning of Southern Province group development framework (2018-2021) and problems and needs of people in Southern Province group.

Retrieving researches related to Southern development from Thai National Research Repository (TNRR) and Thai Library Integrated System (ThaiLIS) as there were 2,187 titles in the past 10 years from 2008-2018. Those researches were carefully selected in terms of correctness, completeness and conciseness then classified and categorized as mentioned on 1.

After classifying and categorizing the data was divided into 3 types as research document data, research basic data and other related research data. The research knowledge structures are divided into 2 domains: research aspects domain which refers to knowledge related to the research for development of Southern Thailand and research work domain which refers to knowledge related to scopes of the research for development of Southern Thailand and consists of 3 classes and 112 sub-classes. Grouping the data attributes uses basic search information data on Thai National Research Repository database, literature reviews on database development and other online research access from many organizations (Mueanrit, 2013; Chan, 1985).

Creating knowledge organization uses knowledge organization approach along with classifications and categories approach to set main topics and distribute data relationships into tree structures. Relationships has been done by generating similar contents as subject headings; word sets which represent lists and cover content in all disciplines. The sets are hierarchical stratified in categories, taxonomies and groups which classified according to correlated contents numerically or alphabetically. The data distributed in sub headings by meanings, written formats, time or locations to gain knowledge elements for Southern development (Hjorland, 2017).

Getting the findings confirmed by 28 experts and revising to finalize knowledge structure on the research

for development of Southern Thailand concerning correctness, appropriateness, conciseness and clearness. This could be used to investigate, confirm and link to the existing research knowledge in Southern of Thailand. This knowledge organization could be used as additional sources for developing recommender system database of research for development of Southern Thailand.

## RESULTS AND DISCUSSION

After classifying and categorizing the structure had been revised according to expert's suggestions in index, domain and concept issues. The results are as follows: overview on knowledge structure on research for development of Southern Thailand consists of research aspects domain refers to knowledge related to the research for development of Southern Thailand which consists of 3 knowledge sets: research knowledge on each discipline, research knowledge on policy, strategy and management of Southern Province group and research knowledge on problems and needs of Southern Province people.

Research work domain refers to knowledge related to scopes of the research for development of Southern Thailand which consists of 3 classes as research documents, basic information and other related information.

Data synthesis on 12 disciplines from National Research Council of Thailand (NRCT) which are physical science and mathematics, medical science, chemical science and pharmacy, agriculture and biology, engineering and industry, philosophy, law, political sciences and public administration, economic, sociology, information technology and communication arts and education is classified to 12 classes, 88 concepts and 354 sub-concepts on research aspects domain:

- Education: 8 concepts and 39 sub-concepts
- Agriculture and biology: 14 concepts and 43 sub-concepts
- Information and communication technology: 10 concepts and 31 sub-concepts
- Law: 2 concepts and 3 sub-concepts
- Philosophy: 7 concepts and 26 sub-concepts
- Political sciences and public administration: 7 concepts and 33 sub-concepts
- Physical science: 6 concepts and 13 sub-concepts
- Medical science: 8 concepts and 36 sub-concepts
- Chemical science and pharmacy: 5 concepts and 12 sub-concepts
- Engineering: 3 concepts and 14 sub-concepts
- Economic: 5 concepts and 34 sub-concepts
- Sociology: 13 concepts and 70 sub-concepts

Data synthesis on the Ninth National Research Policy and Strategy (2017-2021), the Twelfth National Economic and Social Development Plan (2017-2021) and the 20-year National Strategy Framework (2017-2036), administration and strategy planning of Southern Province group development framework (2018-2021) is classified to 6 classes, 31 concepts and 95 sub-concepts on research aspects domain:

- Research and development: 2 concepts and 11 sub-concepts
- Infrastructure development: 2 concepts and 8 sub-concepts
- Social development: 9 concepts and 45 sub-concepts
- Economic empowerment: 10 concepts and 20 sub-concepts
- Sustainable development: 6 concepts
- Production development: 2 concepts and 11 sub-concepts

Data synthesis on problems and needs of people in Southern Province groups in the Office of Strategy Management of Southern border provinces: Satun, Songkhla, Pattani, Yala and Narathiwat, the office of Strategy Management of Thai Gulf coast provinces: Chumphon, Suratthani, Nakhon srithammarat and Pattalung and the Office of Strategy Management of Andaman coast provinces: Ranong, Pang-nga, Krabi, Phuket and Tang is classified to 11 classes, 82 concepts and 120 sub-concepts on research aspects domain:

- Safety system and welfare development: 11 concepts
- Education development: 7 concepts
- Career development: 7 concepts
- Business development: 7 concepts
- Tourism development: 17 concepts and 5 sub-concepts
- Natural and environmental resources development: 5 concepts and 28 sub-concepts
- Public health development: 3 concepts and 35 sub-concepts
- Family unit development: 3 concepts
- Agricultural area and innovation system development: 13 concepts and 52 sub-concepts
- Transportation development: 5 concepts
- Solutions on immigrant worker: 4 concepts

Data synthesis on Thai National Research Repository and Thai Library Integrated System is classified to 3 classes, 26 concepts and 112 sub-concepts on research works domain. According to the knowledge organization it could be concluded as in Fig. 1:

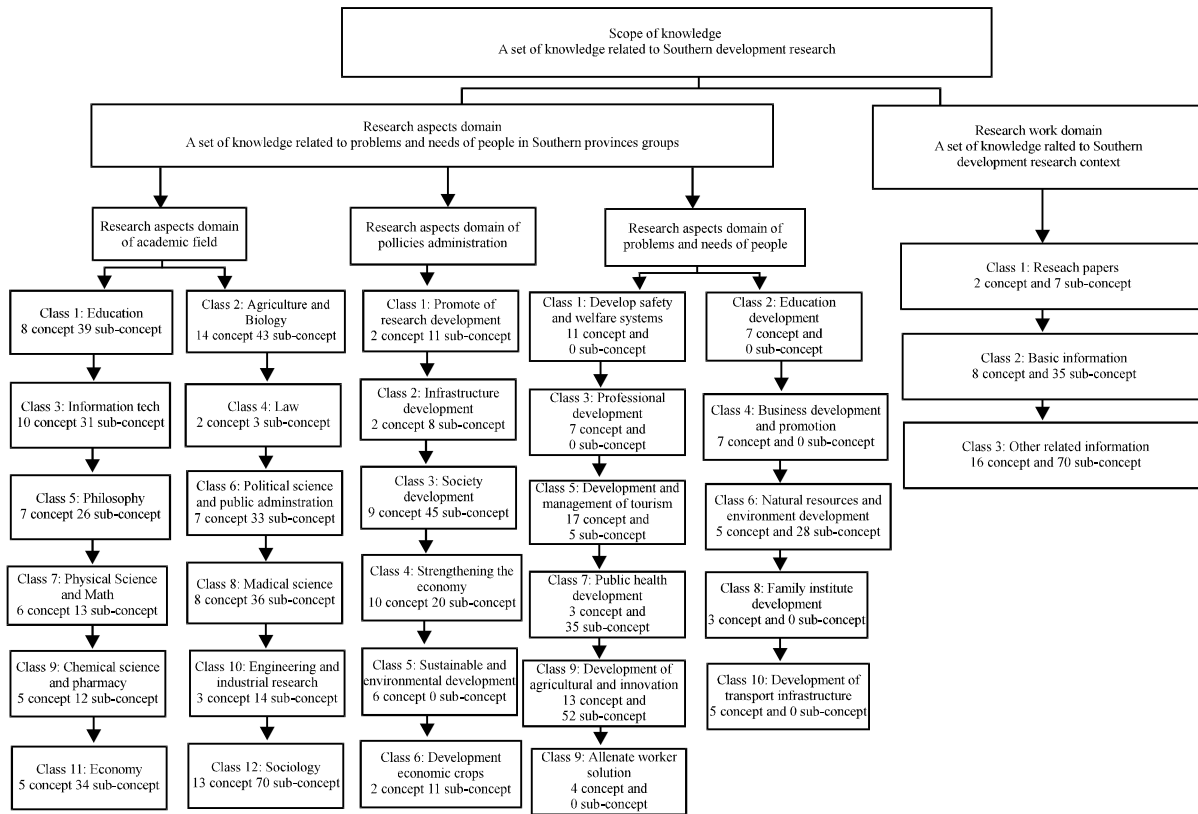


Fig. 1: The overall of knowledge organization on the research for development of Southern Thailand

- Research document: 2 concepts and 7 sub-concepts
- Basic research information: 8 concepts and 35 sub-concepts
- Related information: 16 concepts and 70 sub-concepts

### CONCLUSION

Results of knowledge organization on the Research for Development of Southern Thailand are used to investigate, confirm and link to the existing research knowledge in Southern of Thailand, further to be sources for further studies on research, innovations, national competitions and can be develop to recommender system database of research for development of Southern Thailand for search for information, reduce research redundancy, reduce costs on research redundancy and reconfirm knowledge to conduct research. This could be discussed as follows:

Knowledge structure consists of 2 domains, 32 classes, 227 concepts, 681 sub-concepts. The 2 domains consists of research aspects domain and research work domain. Research aspects domain refers to knowledge

related to the research for development of Southern Thailand which consists of 29 classes each class consists of 201 concepts and each concept consists of 569 sub-concepts.

Research work domain refers to knowledge related to scopes of the research for development of Southern Thailand which consists of 3 classes as research documents basic information and other related information. Each class consists of 26 concepts and each concept consists of 112 sub-concepts.

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## REFERENCES

- Anonymous, 2011. [National economic and social development plan No. 11 2012-2016]. Office of the National Economics and Social Development Board, Bangkok, Thailand. (In Thai)
- Anonymous, 2017. [Research information repository]. National Research Council of Thailand, Bangkok, Thailand (In Thailand) <http://www.rir.nrct.go.th/rir/>
- Archint, N., 2014. [Semantic Web Technologies]. KhonKaen University, Klangnanawitaya, Thailand, (In Thai).
- BLS and LUP., 2017. [Regional data]. Bureau of Land Survey Land Development Department, Bangkok, Thailand. (In Thai)
- Chan, L.M., 1985. [Cataloging and Classification: An Introduction]. McGraw-Hill, New York, USA., ISBN:9780070662292, Pages: 397 (In Thailand).
- Chan-o-cha, P., 2017. [Thailand moving forward]. Government of Thailand, Bangkok, Thailand. (In Thai)
- Hjorland, B., 2017. [Nine principles of knowledge organization]. Master's Thesis, University of Arizona Libraries Main Library, Tucson, Arizona. (In Thailand)
- Hodge, G.M., 2000. [Systems of Knowledge Organization for Digital Libraries: Beyond Traditional Authority Files]. Digital Library Federation, Council on Library and Information Resources, Massachusetts, Washington, D.C. USA., ISBN:9781933645063, (In Thailand).
- Kewsuwun, N., K. Kwicien and C. Sae-Chan, 2019. [The synthesis of problems, needs and strategies of 14 southern province group administrative office in accordance with academic fields of National Research Council (In Thailand)]. Parichart J. Thaksin Univ., 32: 389-423.
- Maitaouthong, T., 2014. [Information seeking behavior of researchers in kasikorn]. Master's Thesis, Center Co., Ltd., Srinakharinwirot University. Bangkok, Thailand. (In Thai)
- Mueanrit, N., 2013. [The information architecture for research information storage and retrieval]. Master's Thesis, KhonKaen University, KhonKaen, Thailand. (In Thai)
- Panawong, J., 2015. [Development of knowledge base system for Northeastern Thailand]. Master's Thesis, KhonKaen University, KhonKaen, Thailand. (In Thai)
- Podhisita, C., 2007. [The science and art of quality research]. MSc Thesis, Institute for Population and Social Research, Mahidol University, Salaya, Bangkok, Thailand (In Thai)
- Pornanan, A., 2013. [System of cultural knowledge (In Thai)]. *Inf. Sci. J.*, 31: 93-122.
- Prasitratthasin, S., 1998. [Research Methodology in Social Sciences]. Fengfah Printing, Bangkok, Thailand, (In Thai).
- Rowley, J.E., 1992. [Organizing Knowledge: An Introduction to Information Retrieval]. 2nd Edn., Arena Publishing Company, Farnham, UK., ISBN-13:978-1857420050, Pages: 510 (In Thai).
- SKOS., 2017. [Knowledge management]. SKOS, The Council on Library and Information Resources Clir, Washington, D.C. USA. (In Thai)
- Taylor, A.G., 2004. [The Organization of Information]. 2nd Edn., Libraries Unlimited, USA., ISBN:9781563089763, Pages: 417 (In Thai).