

Islamic finance taxonomy development: the INCEIF KMC's experience

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ABSTRACT

Knowledge organization is a very crucial activity in libraries. Knowledge in INCEIF KMC is available in the form of printed and digital collection. The limitation of Library of Congress Classification (LCC) in describing Islamic finance topics and insufficient coverage topics for Islamic finance in previously developed taxonomy, motivate the team to embark the development of INCEIF Islamic Finance Taxonomy. The taxonomy development aiming to showcase INCEIF thought leadership and improve previously developed INCEIF Digital Library Taxonomy. The taxonomy development adopted content modelling approach. The approach consists of 1) identify key users; 2) develop use case scenario; 3) extract user, content, and standard warrant; 4) model ecosystem and content types; and 5) design and test. This paper presents the INCEIF Islamic Finance Taxonomy structure comprises of Topics, Document Types, and Content Models (Person, Organization, and Event). The taxonomy has been operationalized into INCEIF Knowledge Repository (IKR) since June 2016.

Keywords: Islamic finance; Taxonomy; Knowledge organization; Academic libraries; Knowledge Management Centre (KMC); INCEIF

INTRODUCTION

Organizing knowledge in libraries is a very challenging and critical activity. The activities include describing a document, performing classification, and indexing. The key reason for organizing knowledge is to ensure the specific knowledge is discovered and accessible by the knowledge seekers quickly. Knowledge is regarded as a valuable asset in institutions of higher learning. Primarily two types of knowledge are attached to institutions of higher learning which are tacit knowledge and explicit knowledge. Institutions of higher learning are connected to knowledge where the institutions are the business of producing, disseminating, and transferring knowledge (Fullwood, Rowley and Delbridge 2012). Knowledge which is available in printed and digital formats required the libraries to employ the techniques in organizing knowledge such as subject classification schemes, taxonomies, ontologies, concept maps, and thesauri (Lambe 2007; Abbas 2010; Hedden 2010; Bhat and Shafi 2014; Milton and Lambe 2016).

Application of taxonomy attempts as a searching tool across an organization, to map tacit knowledge embedded in staff (Basaruddin, Haron and Noordin 2013), and to manage internal knowledge resources within an organization (Malafsky 2008). Since knowledge is created and produced every single second, knowledge organization is essential for the librarians and information specialists to communicate and retrieve knowledge.

Hjorland, a Professor in Knowledge Organization defines knowledge organization (KO) as activities which involve describing, indexing, classifying, and organizing within libraries, databases, and archives performed by librarians, information specialists, and computer algorithm (Hjorland 2008; 2016). Knowledge organization functions as a bridge between the user's information need and material in the collection (CLIR n.d.)

The Hammurabi's Code (the first set of codified laws of society set down on stone sculptures), the clay tablets listing titles of first books, and the Quipu or "talking strings" of ancient Incan messengers in Peru (served as a repository of the laws or other information of this early society) are the earliest known forms of organizing knowledge (Abbas, 2010).

Knowledge organization in libraries began in the late eighteenth century with the development of cataloging codes by Anthony Panizzi – "91 Rules" in 1893 and Charles Cutter – "Rules for a Printed Dictionary Catalog" in 1876 (Abbas, 2010; Bhat and Shafi 2014). Cataloging codes such as the Anglo-American Cataloguing Rules (AACR), the second edition of AACR (AACR2), and Resource Description and Access (RDA) are developed to act as guidance to catalogers for descriptive aspects of cataloging, developing access points, or authorized headings for names and titles.

The majority of libraries and knowledge management centers have been using library classification schemes and controlled vocabularies for organizing knowledge. Sayers describes library classification as "the arrangement of book shelves or description of them, in the manner which is most useful to those who read" (as cited in Md. Ashikuzzaman 2016). Libraries classification is used in libraries where the books are arranged according to the subjects. The most widely used library classification schemes are Dewey Decimal Classification (DDC), Library of Congress Classification (LCC), Universal Decimal Classification (UDC), and National Library of Medicine Classification (NLM). Controlled vocabularies are defined as "list of words and/or phrases that are used to index and/or retrieve content" (Library of Congress 2015). Examples of controlled vocabularies are Library of Congress Subject Heading (LCSH) and Sears List of Subject Headings (Sears).

The literature on taxonomy proposes vast definition of the term. The word taxonomy originates from the Greek *taxis* and *nomos*. *Taxis* means 'order' and 'arrangement', while *nomos* means law and custom (Lambe 2007; Hedden 2010). Garshol (2004) defines taxonomy as a subject-based classification that arranges the terms from a controlled vocabulary into a hierarchy without doing anything further. Morville and Rosenfeld (2007) argue that there is no single accepted definition of a taxonomy either within information architecture or information science. Lambe (2007) describes taxonomy in its basic definition as a structured set of names and description used to

organize information and documents in a consistent way. He further describes taxonomy as navigation for knowledge discovery using a controlled vocabulary (Lambe 2015). The term taxonomy used by Whittaker and Breininger (2008) as a controlled vocabulary which show hierarchical and synonymous relationships.

According to Corcoran (2002), taxonomy is widely recognized at a higher and broader level in library and information science field. Taxonomy provides the libraries with huge benefits such as:

- i. Make explicit knowledge embedded in documents available at the right point (Lambe 2007; Hedden 2008)
- ii. Improve the effectiveness in searching and retrieving relevant information (Corcoran 2002; Hawkins, Larson and Caton 2003; Cisco and Jackson 2005)
- iii. Improve information sharing (Wood 2004; Lambe 2007)

TAXONOMY DEVELOPMENT BY INCEIF KNOWLEDGE MANAGEMENT CENTRE

Organizational Background

International Centre for Education in Islamic Finance (INCEIF) is a private university set up by the Central Bank of Malaysia in 2005 and offers postgraduate level courses in Islamic finance. It is established to serve the need to develop and nurture talents and experts in the Islamic finance industry.

INCEIF Knowledge Management Centre (KMC) envisions to be the reference point for Islamic finance knowledge. It is a powerhouse in supporting INCEIF's vision to be the knowledge leader in Islamic finance. The KMC has over 16, 000 collection of printed and digital format knowledge resources in Islamic and conventional finance. The KMC team found the difficulty to classify its collection as there is extensive knowledge related to Islamic finance. The Islamic finance field encompasses knowledge of Shari'ah (Qur'an and Sunnah), knowledge of mu'amalat, technical finance knowledge (economics, finance, accounting, laws and others) and practical knowledge from reasoning and industry practices (leadership and management).

Motivation of the Taxonomy Project

Since its establishment in 2005, the KMC is using library classification scheme, the Library of Congress Classification (LCC) to classify and categorize its printed collection. A huge number of research works produced in the field of Islamic finance cannot be classified using LCC because LCC provides a very general and limited classification when describing Islamic finance topics. For example, two topics such as Islamic capital market and capital markets are sharing the same call number, but in actual these topics are different in their scope. In 2011, the KMC developed INCEIF Digital Library Taxonomy to classify and categorize Islamic finance topics specifically for its digital collection. However, the coverage of the topics for Islamic finance is not comprehensive, making the task to be harder than it should be.

The issues and limitation highlighted motivate the team to embark into the development of INCEIF Islamic Finance Taxonomic in 2015. The taxonomy is expected to provide specific categorization because the key topics in Islamic finance are presented without excluding conventional finance.

The main objective of this taxonomy development is to showcase INCEIF thought leadership. By developing INCEIF Islamic Finance Taxonomy, KMC could systematically organize the tacit knowledge (experience) of Islamic finance that was captured through various forms as part of our initiative in showcasing INCEIF thought leadership in Islamic finance knowledge. The second objective of taxonomy development is to improve the previously developed INCEIF Digital Library Taxonomy, which has limitation to organize and describing topics in Islamic finance and its document types.

METHODOLOGY

Towards achieving the objectives above, this study adopted a content modelling approach in developing INCEIF Islamic Finance Taxonomy as illustrated in Figure 1. Content modelling approach is a representation of the topics, document types, and content models and their inter-relationships (Lambe 2015). Before we embarked on the journey to develop the taxonomy, we determined two purposes: (1) to showcase INCEIF thought leadership and (2) to improve the previously developed INCEIF Digital Library Taxonomy. This approach is well suited to INCEIF KMC since we tend to focus on the knowledge which resides at INCEIF and our scope is content management.

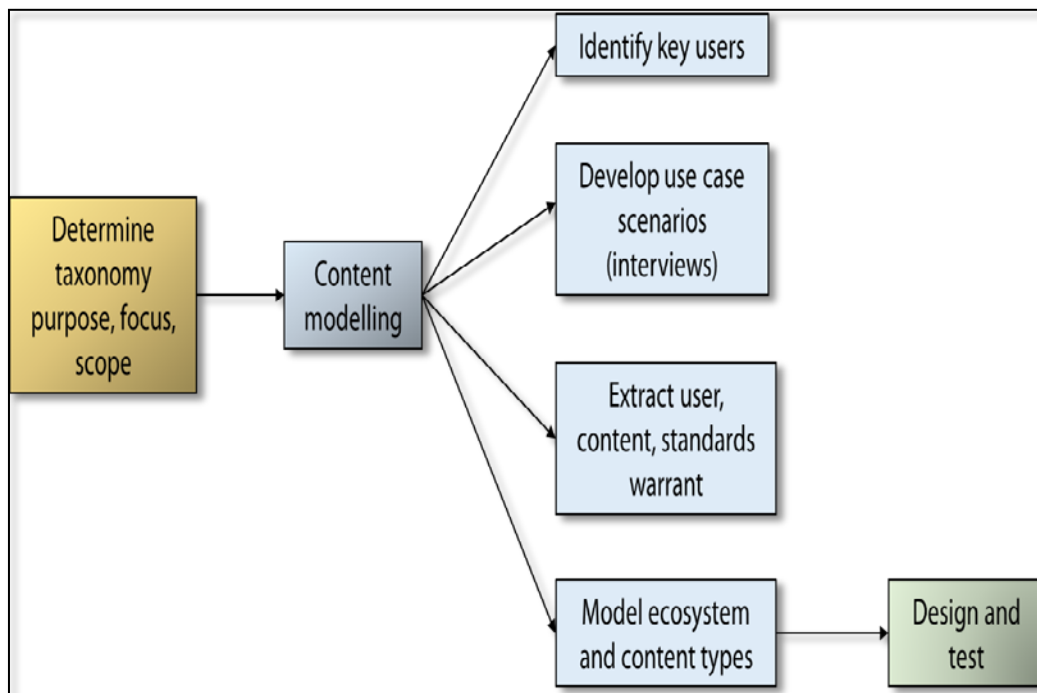


Figure 1: Stages of development INCEIF Islamic finance taxonomy

The steps in the development of INCEIF Islamic Finance Taxonomy are as follows:

- i. **Identify key users**
The stakeholders of INCEIF KMC are regarded as the key users, which include faculty members, students, and researchers. These are the main users who uses KMC resources for their teaching, learning and research activities.
- ii. **Develop use case scenario (interview)**
Use case scenarios for each user group was developed to investigate the main activities performed by each user group. The team conducted a series of semi-structured interviews. The faculty member user group described that they are involved with four main activities – teaching and learning, research development, writing publications, and providing training. The student user group responded that they are involved with writing publications and research proposals, producing project papers, and organizing industry talks. Lastly, the researcher user group informed that they are involved with research development. For each activities described, the specific tasks and information resources used in completing the activities were identified.
- iii. **Extract user, content, and standard warrant**
The development of taxonomy involves three main types of warrant – user, content and standard warrant. User warrant is a level of understanding on how, when and why people use the information resources. For content warrant, the team needs to understand the language of the information resources that will be organized by the taxonomy. The standards warrant is where an organisation needs to exchange information regularly with external partners or with official agencies. At this stage, the main goal is to collect abundant Islamic finance vocabularies and illustrate the vocabularies into the facets and topics. The team searched from different types and sources of documents, for instance, books, Islamic finance websites and online databases related to Islamic finance mentioned by the faculty members and students during the interviews.
- iv. **Model ecosystem and content types**
From the vocabularies related to Islamic finance that were collected, the team then modelled the facets (structure) of the taxonomy, which consists of Topics, Document Types, and Content Models – Person, Organisation, and Event.
- v. **Design and test**
The team engaged in face-to-face interviews with 11 subject-matter-experts (SMEs) to achieve consensus from the SMEs on facets and topics which were designed and developed by the team. During the interview session, discussion and validation were done on the developed facets, specifically the Topics facet. The team also conducted focus group syndication sessions involving all the faculty members, which were divided into 5 groups. The intention was to get feedback from the faculty members on the operationalization of INCEIF Islamic Finance Taxonomy into INCEIF Knowledge Repository (IKR). The team modified

the taxonomy based on the feedback received from the focus groups wherever applicable.

FINDINGS AND THE IMPACTS

In this section, the findings of the development of Islamic Finance Taxonomy are presented, followed by the management of taxonomy and the impact of developing a taxonomy.

INCEIF Islamic Finance Taxonomy Structure

The structure for INCEIF Islamic Finance Taxonomy comprises of Topics, Document Types, and Content Models (Person, Organisation, and Event) as illustrated in Figure 2. The Topics and Document Types are arranged in two levels of hierarchical structure, while the arrangement for Content Models is in a tree structure. The category names for each Topics, Document Types and Content Models were drawn from the activities that were carried out using the content modelling approach.

Topics

The Topics facet is the most important structure in INCEIF Islamic Finance Taxonomy to organize and categorize the Islamic finance collection. Limitation of Islamic finance vocabularies' structure in LCSH and the structure issue of INCEIF Digital Library Taxonomy were the major reasons that inspired the team to develop the Topics facet. Identification of the Topics was based on a collection of vocabularies from various sources – printed sources, websites and online databases related to Islamic finance – and observation on how these sources organize/categorize the Islamic finance-related resources.

The team has identified 13 topics to represent INCEIF Islamic Finance Taxonomy without neglecting Conventional Finance (Figure 2). For each topic, the sub-topics (2nd level hierarchy) were identified which expresses more specific terms related to the main topic.

Islamic Finance	Islamic Banking	Islamic Economics	Islamic Capital Markets	Islamic Accounting	Islamic Micro-finance	Takaful
Islamic Wealth Management	Muamalat Contracts	Shariah	Management and Leadership	General Islamic Knowledge	Conventional Finance	

Figure 2: Islamic finance topics

Document Types

The Document Types facet was developed based on the document inventory (types of documents that are available in INCEIF KMC) and user case scenario activities. The Document Types facet allows the Islamic finance collection to be organized and categorized according to distinct types of document. In INCEIF Islamic Finance Taxonomy, the Document Types is classified into 6 types – Scholarly works; Expert insights; Learning materials; Reports; Regulations and supervisions; and Theses. Figure 3 shows the 6 main categories of Document Types and its 2nd level hierarchy of each category. At the moment, INCEIF KMC is using only 4 of the Document Types for INCEIF Knowledge Repository (IKR), namely Scholarly works, Expert insights, Learning materials, and Theses.

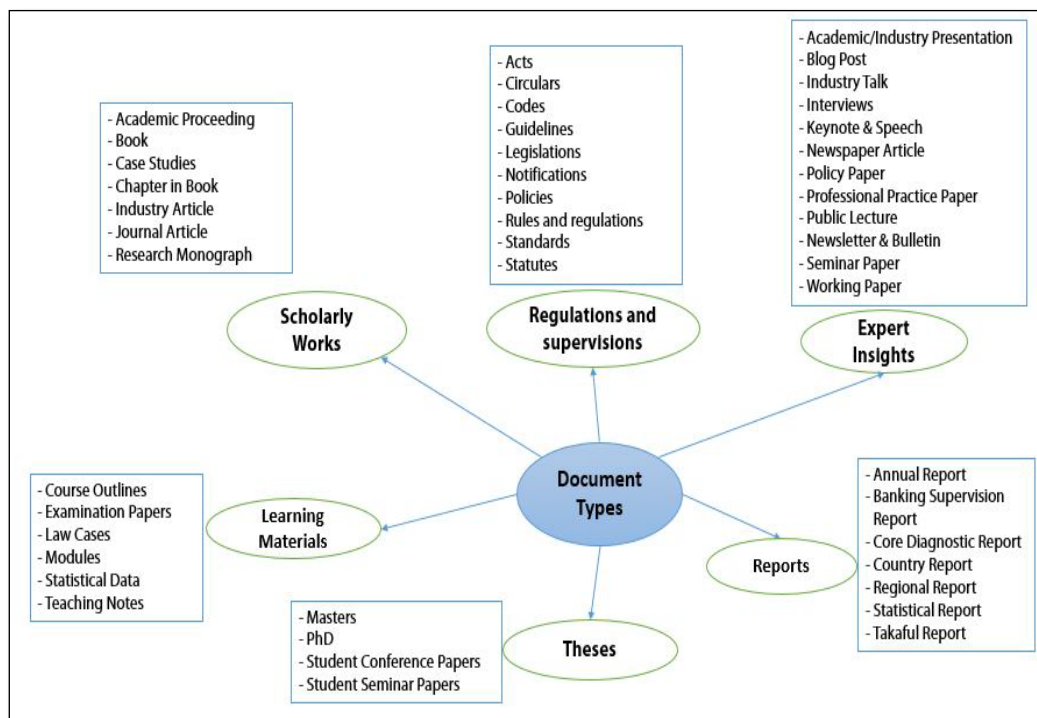


Figure 3: Document types

Content Models

The Content Model is used to design the relevant entities as part of implementing content strategy and content management system and process. Each Content Model describes the key attributes for the specified entity. The team constructed Content Model for 3 identified entities – Person, Organization and Event, based on the collection of document inventory and user case scenario activities.

- i. Content Model – Person

The Content Model – Person was developed in the taxonomy to describe the information about an author or individual faculty member. The key attributes for Content Model – Person are person’s name, designation, qualification, professional membership, working experience, courses taught, and contact information.

This Content Model is also linked to other facets such as Topics, Document Type, Content Model – Organization and Content Model – Event. These linkages might help the users to identify research areas of an author, the organization that the author belongs to and the events that the author has attended (such as conference, seminars, and exhibition). The Content Model – Person is illustrated in Figure 4.

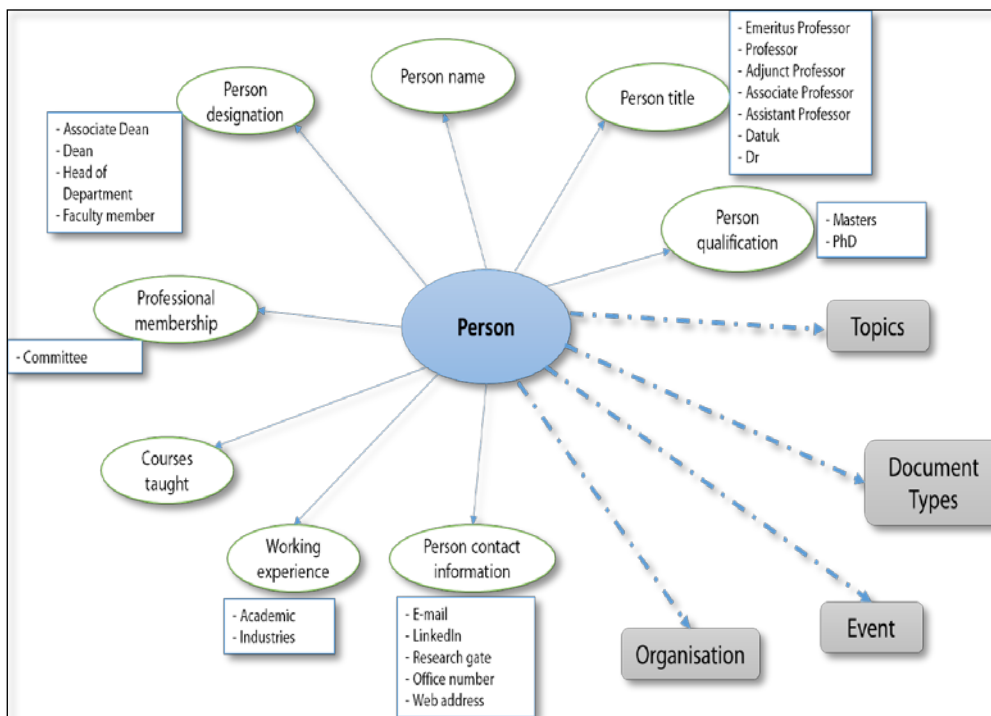


Figure 4: Content model - Person

ii. Content Model – Organization

The Content Model – Organization was constructed in INCEIF Islamic Finance Taxonomy to represent the key information related to an organization or institution as well as the relationships of that an organization with other Content Models (Person and Event). The key attributes of the model are organization’s name, acronym, type, description, URL, address, and location.

This Content Model is also associated with other facets such as Content Model – Person and Content Model – Event. These connections could benefit the users in identifying the events that the author has attended (such as conference and

seminar) and the author(s) associated with a particular organization. Figure 5 portrayed Content Model – Organization.

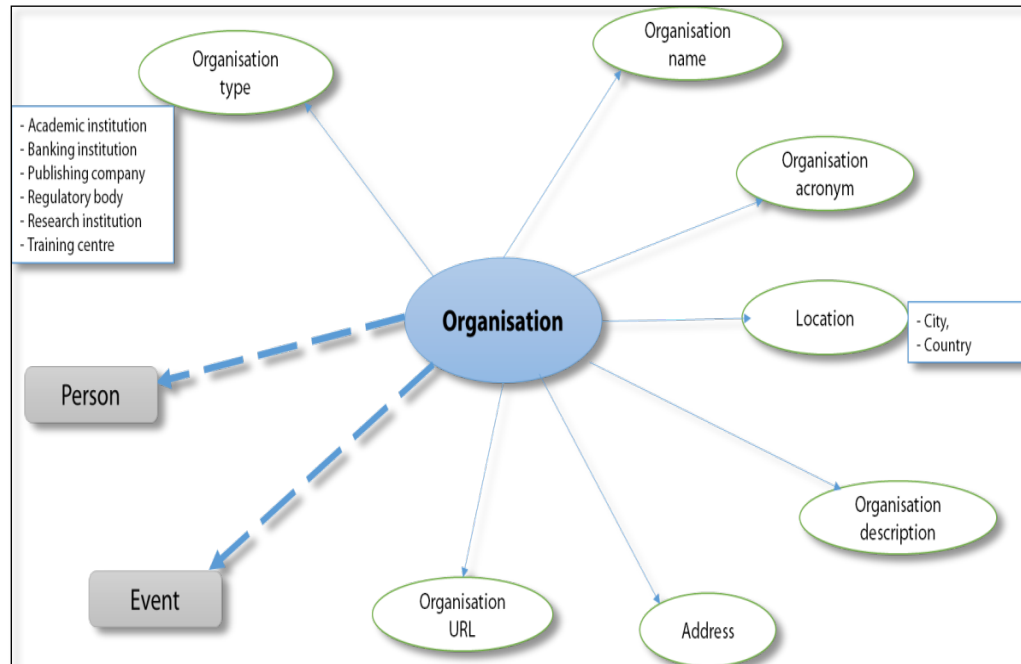


Figure 5: Content model – Organization

iii. Content Model – Event

The key attributes for Content Model – Event are event name, event description, event type, event date, event venue, event contact, and event URL.

Content Model – Event was constructed to describe the information regarding events that have been attended by the author. This Content Model has a connection with other facets such as Topics, Content Model – Person and Content Model – Organization. These connections provide advantages to the users in discovering the information about an author or individual faculty member, the research areas or themes related to the events, and organization or institution that organized/associated to the events. The Content Model – Event is illustrated in Figure 6.

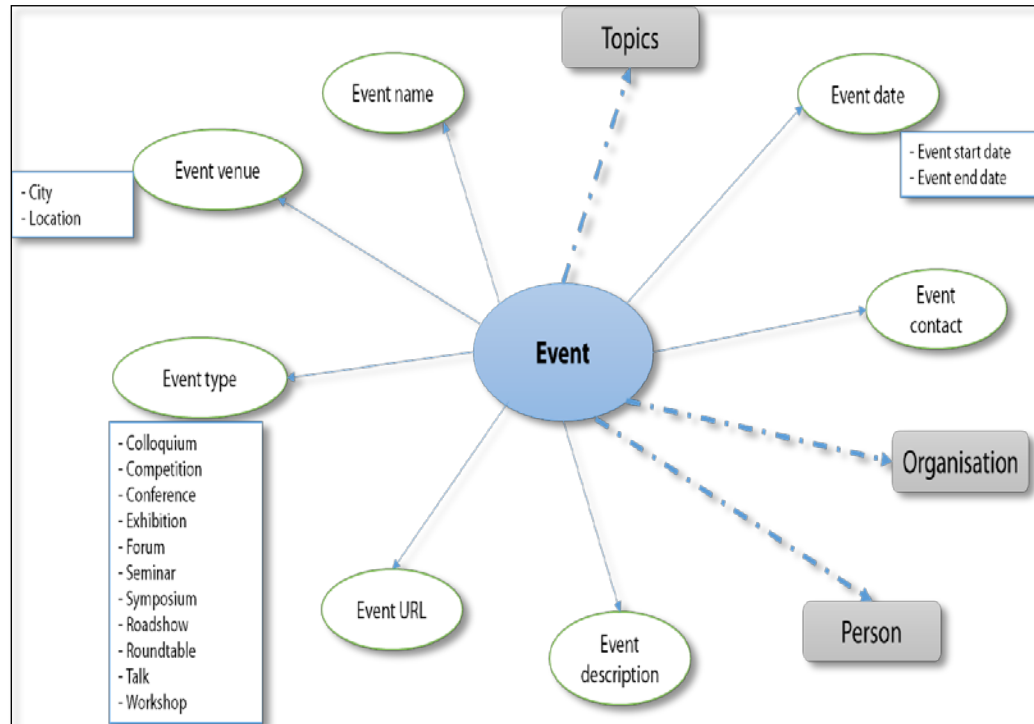


Figure 6: Content model - Event

Taxonomy Management

INCEIF Islamic Finance Taxonomy terms are organized following the relationships such as broader term (BT), narrower term (NT), related term (RT), use (USE), and used for (UF). Scope note (SN) is also included to provide a description for the terms that are difficult to understand. Table 1 depicted a brief explanation for each type of relationships.

Table 1: Category of Term Used in INCEIF Islamic Finance Taxonomy

Types of Relationship	Description
Broader Term (BT)	The superordinate term in a hierarchical relation
Narrower Term (NT)	The subordinate term in a hierarchical relation
Related Term (RT)	A term that is associated with BT and NT
Use (USED)	A term that is used as a controlled vocabulary
Used For (UF)	A term that is used as an alternate term
Scope Note (SN)	To explain and clarify the meaning or use of a term

INCEIF Islamic Finance Taxonomy has been documented and managed using a taxonomy management tool called MultiTes Pro. This tool runs on Windows and serves as a tool for creating, editing, updating and managing the vocabularies. Some of the features of MultiTes Pro include:

- Manage thesaurus files (create, open, copy, delete, and display thesaurus)
- Define codes and preferences (relationships, categories, languages, preferences, and controlling access)
- Manage terms (add, search, display, edit, and remove terms)
- Manage term relationships (create relationships, manage notes, manage categories by terms)
- Report and export data

In MultiTes Pro, the taxonomy list displays the entire window width, thus allow a taxonomist to view or edit a term. A taxonomist can click on the desired term and a pop-up window will be opened, as illustrated in Figure 7.

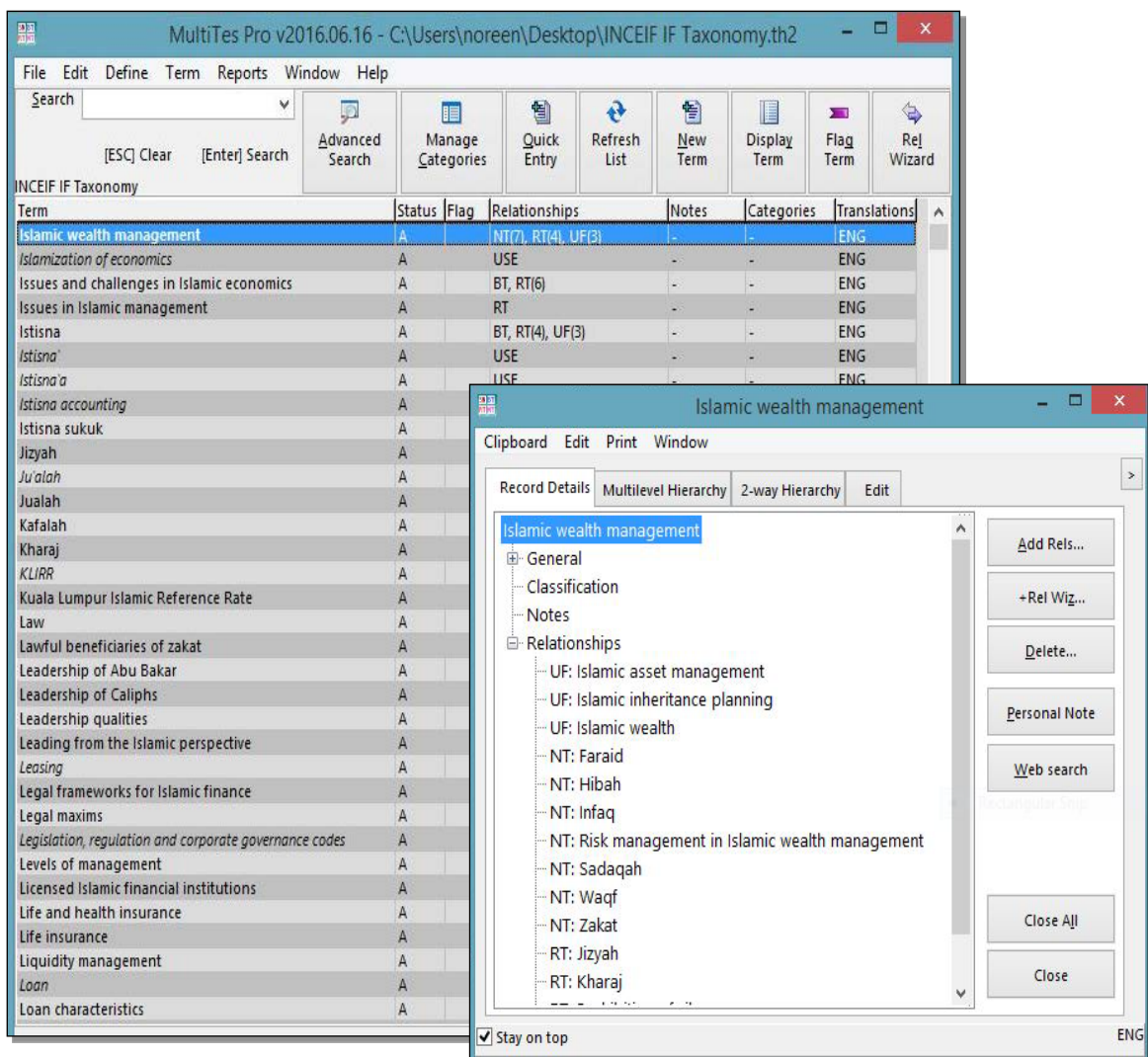


Figure 7: MultiTes Pro taxonomy display with selected term details

The advantages of using MultiTes Pro are:

- Support for ANSI/NISO standard relationships (for examples: USE, UF, BT, NT, RT, Scope Note)

- Unlimited number of terms, relationships, categories and hierarchies, as allowed by your system's resources
- Quick data entry window allows typing of terms and relationships in free text mode
- Allow for editing of multiple thesauri at the same time, the same computer
- Standard reports such as Alphabetical, Top Term, Hierarchical, Classified & Rotated Index

Figure 8 illustrates the hierarchical level of structure and category of terms on the selected topic of Islamic Wealth Management.

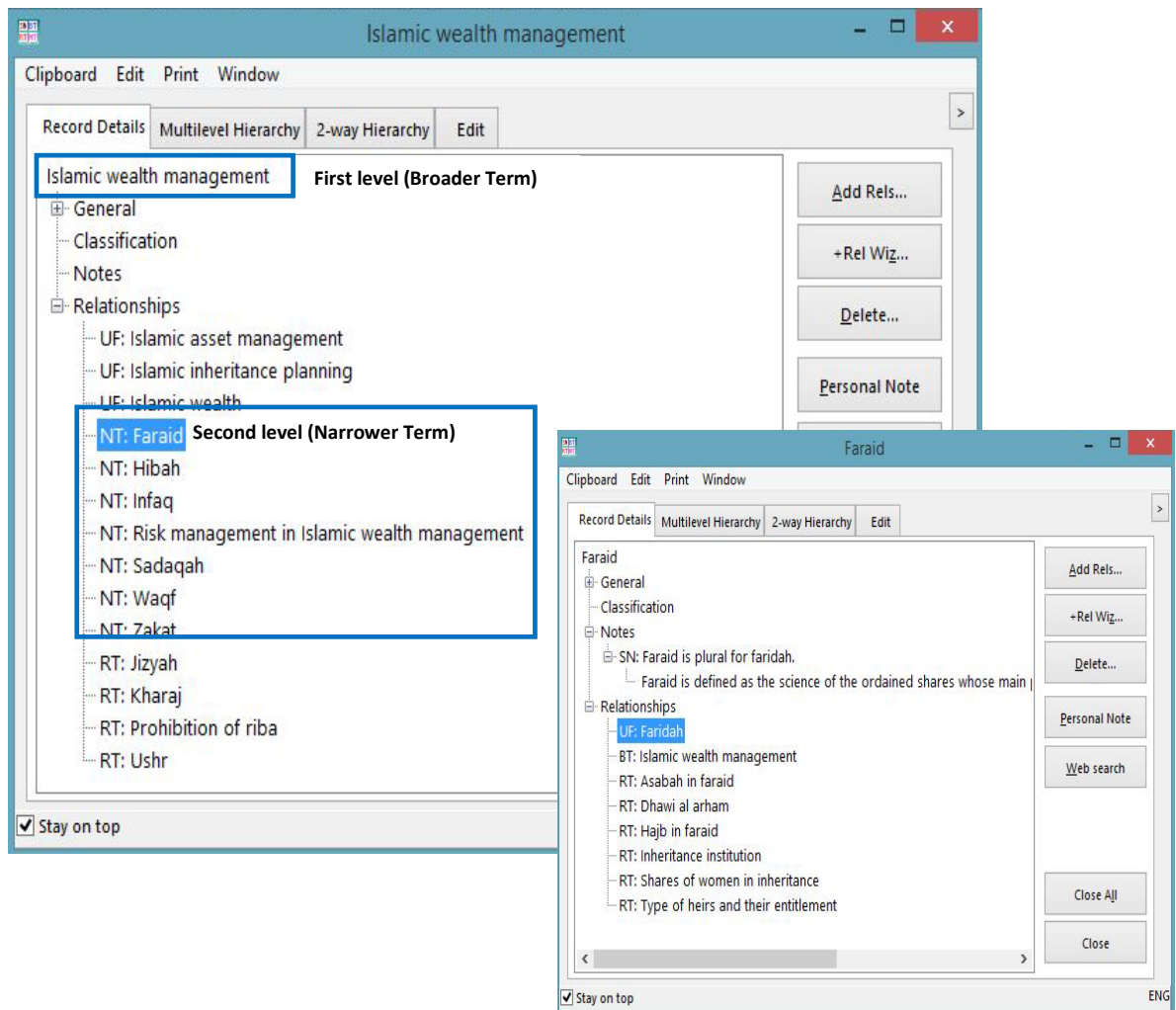


Figure 8: Hierarchical level of structure and category terms on selected topic of Islamic Wealth Management

The Impacts

INCEIF Islamic Finance Taxonomy has been operationalized and incorporated into INCEIF Knowledge Repository (IKR). IKR is an institutional repository which supports INCEIF's knowledge community by collecting, managing, preserving, showcasing and sharing

thought leadership and intellectual contributions such as journal articles, conference papers, research reports, dissertations and other scholarly and research output by INCEIF's faculty, staff and students - and of their collaborators from around the world. IKR can be visited via <https://ikr.inceif.org>.

The topics, document types and content model for person were included as the metadata element in the IKR as illustrated in Figure 9. This will empower our key user groups and stakeholders (especially students, faculty members, alumni and researchers) to access Islamic finance knowledge that resides at INCEIF. The taxonomy speed up the process of searching and retrieving documents because our key user groups can choose from the topics, document types, and content model for person, facilitating them to narrow down the search field.

In support of INCEIF's vision to be the knowledge leader in Islamic finance, the taxonomy acts as a focal point that direct audience to the topics of Islamic and conventional finance. The audience may identify the 13 topics that represents Islamic finance. The taxonomy that is incorporated in the IKR platform offers potential topics in Islamic finance to be explored by the students, faculty members, and researchers. The taxonomy can reduce the amount of time spent on duplication and reinvention. The findings from the researches on Islamic finance can contribute to the body of knowledge practically.

It is worth to mention that INCEIF Islamic Finance Taxonomy acts as a bridge where the entire organization speak the same language when describing topics and document types. This finding echoes that taxonomy provides a shared language for different parts of an organization.

The development of INCEIF Islamic Finance Taxonomy also helps to build internal capability of the information professionals (capacity building). Skillsets such as library skills (metadata, index, and subject classification), information management, content management and writing skills (Milton and Lambe 2016) have been applied during the taxonomy development journey.



Figure 9: INCEIF Islamic Finance Taxonomy operationalized and incorporated into IKR

CONCLUSION AND FUTURE WORK

In this study, we present our experience on development of INCEIF Islamic Finance Taxonomy which comprises of Topics, Document Types and Content Models (Persons, Organization, and Event). The team has completed INCEIF Islamic Finance Taxonomy in December 2016 after a series of taxonomy development activities, which began since October 2015. The INCEIF Islamic Finance Taxonomy has been operationalized in INCEIF Knowledge Repository (IKR) since June 2016. The taxonomy acts as a navigator for discovering Islamic finance knowledge.

The team is dedicated to continue improving the quality of INCEIF Islamic Finance Taxonomy and plans to conduct educational outreach activity outside INCEIF. The taxonomy can also be enhanced to be used by other department at INCEIF. Finally, the team aims to review and revise the taxonomy on yearly basis.

ACKNOWLEDGEMENT

The authors wish to thank the subject matter expert (SMEs) consulted, from INCEIF and ISRA for their valuable support and insights. The authors are grateful to INCEIF KMC team for all needed support to complete the project. The study acknowledges the support received from INCEIF.

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