



## APPLYING THEMATIC ANALYSIS IN DISCOVERING PUBLIC E-SERVICE SUSTAINABILITY CRITERIA

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### ABSTRACT

Thematic analysis is lack of attention, yet widely used qualitative analytic method within information systems study. It is a process of sifting and arranging data obtained from interview transcripts, field notes and other material collected to increase the understanding of the data to enable the presentation of what have been discovered. In this paper, the investigators outline what thematic analysis is and provide clear guidelines to those wanting to start thematic analysis or conduct it in a more deliberate and rigorous way. Memoing was also discussed where it serves to assist the investigators in making conceptual leaps from raw data to those abstractions that explain research phenomena in the context of study. The analysis concludes with fourteen elements identified within three major dimensions: institutional; technological; and environmental. Apart from that, this paper also concludes by supporting thematic analysis as a useful and flexible method for qualitative research in and beyond information systems study.

**Keywords:** thematic analysis, inductive data analysis, e-service sustainability.

### INTRODUCTION

Interpretive research has become an important strand in information systems (IS) research [1]. Interpretive research can help IS researchers to understand human thought and action in social and organizational contexts. It attempt to find meaning of the data gathered. Among approaches to qualitative analysis were content analysis, thematic analysis, comparative analysis and the narrative analysis. Although thematic analysis is widely used, there are very few numbers of clear with guided steps and detail description on how researchers should go about conducting it in IS. As oppose to articles from psychology and education journals, detail description and guidelines on how to conduct this method are furnished for example work by Braun and Clarke, and Daniel [2, 3]. Therefore, it can be concluded that this approach have not been widely described in IS literature. Thematic analysis allows the researcher to determine precisely the relationship between concepts and compare them with replicated data collected separately at different times [4]. It means, using this technique there is the possibility to link various concepts and opinions of the researchers and compare these with the data that has been gathered in different situation (or case study) at different times during the study.

In summary, this study applied thematic analysis, a widely used approach in many interpretive researches to gain a better understanding of the experiences of the informants. Data were analyzed with a focus on the following main research question: What are the element and dimension of public e-service sustainability and how it influences its sustainability? This paper aim is to detail out the process and application of thematic analysis applied in discovering e-service sustainability of Malaysian public sector.

The remainder of this paper proceeds as follows. The next section elaborates thematic analysis and how it is applied to the study. The subsequent section presents the research method. The findings are presented and discussed in the following section. The paper concludes with a summary of the findings and outlook for future research.

### E-SERVICE SUSTAINABILITY

During the last decade, the public sector globally has embarked on a wide range of reforms and witnessed a growth in the number of digital government that contributed to government transformation. The implementation of public e-service brings benefits to the public, businesses and the government itself. As for the public, saving time and money are the primary reasons to use the e-service. In this study, public e-service sustainability is defined as “a system that is capable of being maintained over a long span of time independent of shifts in both hardware and software, and has the ability to become institutionalized at government agencies”.

The role of ICT in the transformation of Malaysian public service delivery is well understood to be central. It is a must for Malaysian government to decrease the rate for public e-service projects failures and increase the sustainability of its implementation. However, according to The Star Online recently, at least half of the Malaysian public sector's 1,500 websites will be shut down by the end of 2015 [5]. It means, at least 50% of e-service delivery projects in the context of Malaysian public sector are difficult and fail to sustain. In the perspective of Malaysian government ICT projects initiative, their sustainability becomes a critical issue with the increased rate of failure of these projects.

The thorough understanding about current scenario of public e-service sustainability initiatives in



Malaysia plus the interactions among its stakeholders are difficult to capture with numerical measures, and these measures may not be sensitive to issues such as individual differences. It is important to provide rich descriptions of this complex scenario to generate ideas and uncover potential strategic improvements of public e-service sustainability. The thematic data analysis strategy adopted in this study enables the investigators to understand and have deep understanding of the reality of public e-service sustainability from the stakeholders own experience and perspective. Such deep understanding, in turn, enables the investigators to understand much about what will never be extracted via other data analysis strategies.

### THEMATIC ANALYSIS

Thematic analysis is a method for identifying and analyzing patterns of data set [3] that illustrates which themes are important in the phenomenon under study. The data set was a type of qualitative data collected from interviews, focus groups, surveys, photo-voice or participant observation. It takes raw data and presents it in words, symbols, pictures etc., based on themes or comparisons, or to tell a story. Supporting others researchers, Braun and Clarke considered thematic analysis as a most appropriate for any study that seeks to discover using interpretations [3]. It provides a systematic element to data analysis. It allows the researcher to associate an analysis of the frequency of a theme with one of the whole content.

In thematic analysis the themes emerge from the data and are not imposed by the researcher. The data collection and analysis take place simultaneously. Even background reading can form part of the analysis process, especially if it can help to explain an emerging theme. The researcher examines the data collected from the interviews, observation, document analysis and identified themes (label them as codes or categories) as they emerge when examining the data. As the same themes continue to emerge the researcher groups the data together. The major difference between content analysis and thematic analysis is that in thematic analysis, the categories are not predetermined but rather emerge as the researcher reviews the data. The themes / categories are not set, and the number of themes is not predetermined. All new themes will be included.

The basic analytic strategy used in thematic analysis is coding, a process of closely inspecting text to look for recurrent themes, topics, or relationships, and marking similar passages with a code or label to categorize them for later retrieval and theory-building. Identification of themes can be done deductively, on the basis of theoretical constructs that the case study researcher wishes to investigate. Researchers might use their research questions, interview questions, or theory-derived categories as a start list of a priori themes for coding data documents, an approach that can facilitate within or cross-case comparisons. However, an inductive approach to

coding is more typical of thematic analysis [6]. Inductive thematic analysis avoids the rigidity and premature closure that are risks of a deductive approach.

### METHOD AND APPLICATIONS

This section describes on the method use in identifying e-service sustainability elements using thematic analysis. Face-to-face, semi-structured interviews were conducted with key informants from Companies Commission of Malaysia (CCM). CCM is a statutory body formed as a result of a merger between the Registrar of Companies (ROC) and the Registrar of Businesses (ROB) in Malaysia which regulates companies and businesses. CCM came into operation on 16 April 2002. The main activity of CCM is to serve as an agency to incorporate companies and register businesses as well as to provide company and business information to the public.

In face-to-face meetings, informants were asked to discuss the issues and strategy of e-filing implementation and operations. The informants were identified through contact with the human resources department. Overall a total of nine people were interviewed in five interview sessions. Web sites and available documents (such as yearly report) were reviewed and an observation was done.

This section furthermore provides an overview of how the data analysis processes employed in this research. Thematic analysis was conducted on the interview transcriptions and notes. Table-1 show the steps of thematic analysis applied in this study.

**Table-1.** Steps in thematic analysis [3].

Phase	Description of the process
1.Familiarising yourself with your data:	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2.Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3.Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4.Reviewing themes:	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5.Defining and naming themes:	On-going analysis to refine the specifics of each theme, and the overall story the analysis tells; generating clear definitions and names for each theme.
6.Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.



The first phase is to organize the data set to make it easy to use for analysis. It involves transcribing the data and then labeling it so that we know where it came from and how it was collected. Data from five interview sessions and observations were transcribed verbatim by the principal investigator. During this process the initial thoughts and ideas were noted down. All data was tagged with at least basic information such as informant code, date and time it was captured. For example in this research, each transcript is tagged for identification (see Column: Transcript) using a coding system as follows: Example: 'CCM-U3, 10/8/2013, 3.30pm'

- 'CCM-U3' - the respondent cited this statement when discussing e-service sustainability.
- '10/8/2013' - date the session conducted.
- '3.30pm' - time the session conducted.

Among crucial step in thematic analysis is that of familiarization with the data. This cannot be skipped without great risks to validity of the analysis, and there is no shortcut to reading the data transcripts, possibly a number of times. According to Mason, there are three kinds of reading: literal; interpretive; and reflexive [7].

- Literal reading concerns itself with the structure of transcript, document or other data; simply focusing on how it is constituted for example, that document is written for internal consumption within an organization and takes the form of a confidential report.
- Interpretive reading will '... involve you in constructing or documenting a version of what you think the data mean or represent, or what you think you can infer from them.' [7]. The researcher may focus on the respondent's own interpretations or impose his own meanings, depending on his epistemological stance and his research question.
- Reflexive reading '... will locate you as part of the data you have generated, and will seek to explore your role and perspective in the process of generation and interpretation of data' [7].

This research uses interpretive reading approach because the principal investigator try to understand the respondents meaning and then imposed his own meaning based on the research scope.

In Phase 2, data set from interviews that already transcribed was read by the principal investigator. The whole data set was given equal attention so that full consideration could be given to repeated patterns within the data. During the reading, the researcher writes a note known as memo. Memo is short notes about two lines long. They are not formal themes but more general insights into what is being said. The memo can be helpful in identifying the main codes for a piece of data analysis (i.e. education, gender etc.). Coding and memoing are iterative processes. In the coding process, a read through to all transcripts were performed, and statements or memos were then identified as possibly being related to

sustainability criteria. For example, in Table-2 the first sentence listed in column Memo was researcher understanding of the transcript while the second sentence was the interpretation of the transcript within a context. Early code was then identified from the memo as shown in column Early Code. After all transcripts had been interpreted and assigned with an early code, a peer review took place.

In Phase 3, the early codes emerged from the transcripts were categorized. Similar meaning of the early codes will be grouped together and they were assigned a new code name and description of each code was provided. Coding helps the principal investigator to begin the process of systematically analyzing it, working out what the data is telling us and the relationships and patterns in the data. Later the principal investigator starts collating the codes to a potential theme and for a second time, a peer review took place. As explained, category generation process involves noting patterns in the data, perhaps relating to the topics described by interviewees, or in how they describe aspects of what they are describing. For example, as you read an interview, you are reminded by something said by another interviewee, or a recurrent theme in what one interviewee has to say. Example of the processes is depicted in Table-3.

In Phase 4, the principal investigator checked if the themes work in relation to the coded extracts and then generated a thematic map of the analysis as in Figure-1. The map helped the researcher to visualize and consider the links and relationships between themes. Refinement of the themes took place at two levels, first with the coded data ensuring they formed a coherent pattern, secondly once a coherent pattern was formed the themes were considered in relation to the data set as a whole. This stage lasted until a clear idea of the various themes and how they fitted together emerged.

Later in the fifth phase, the principal investigator finalized the theme (in our case it's called dimension), draw upon the concepts / groups and associated literature, and include any specific literature references identified as explicitly relevant to the assigned transcript dimension. Entries with identical or nearly identical transcript theme were grouped or merged. Later a description of each dimension was provided. It was highly important to develop short but appropriate names that conveyed an immediate indication of the essence of the elements or the dimension.

Finally an expert review by an independent reviewer was conducted and if needed earlier steps were retraced to re-categorize and redefine the code and dimension. The main purpose of this procedure is to build reliability in themes analysis coding. In addition to this, a statistical method is used to evaluate the level of consistency between the raters' coding, thus generating a formal assessment of the data's reliability. Cohen's kappa is one of the more robust and relatively conservative measures of inter-rater reliability, an index with a value



between 1 (perfect consensus between raters) and 0 (agreement is no better than chance) [8]. The investigators

tested for inter-rater reliability using Cohen's kappa and achieved a value of 0.823.

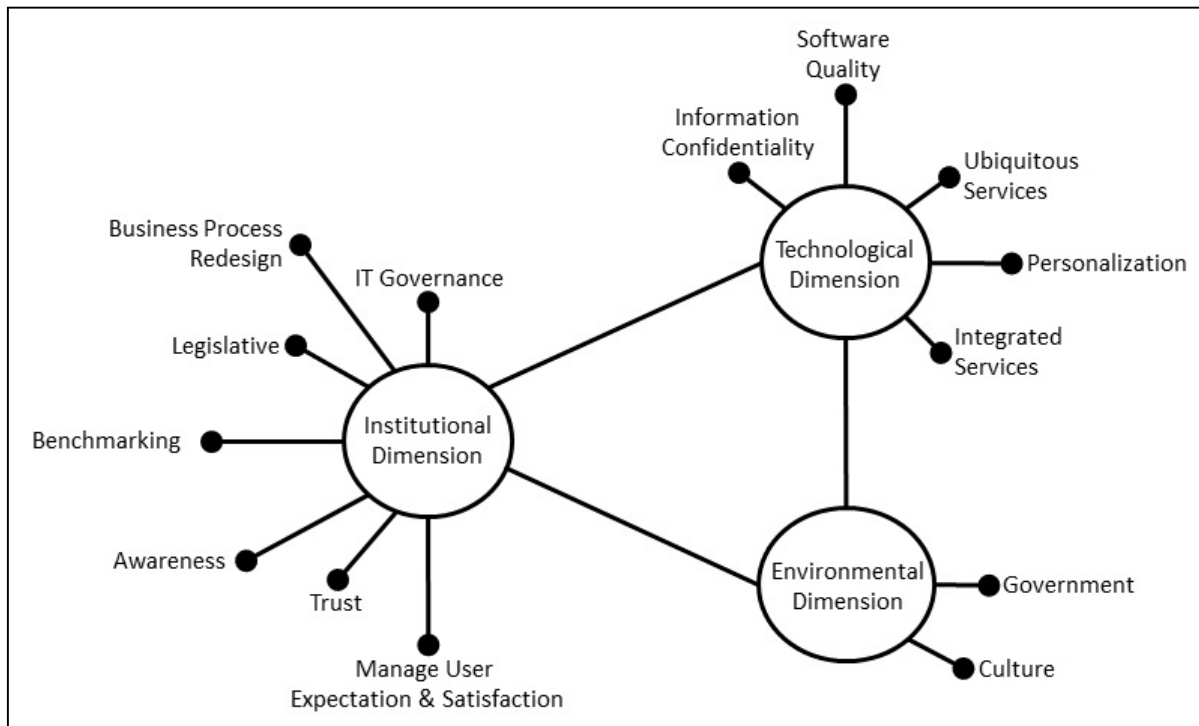
**Table-2.** Initial codes generating process.

Types of data	Transcript	Memo / Early code	Code
Interview	I feel comfortable using e-service because it is easier, no travelling and no need to go to the counter just to get a few information to monitor a company. Audit Trail: (CCM-U3, 10/8/2013, 3:30pm)	Flexibility in term of time and place. Availability.	Reliability
Interview	I can search for companies' details with a click of mouse and keyboard without moving out of my office. Audit Trail: (CCM-U2, 10/8/2013, 3:30pm)	Have the flexibility to do transaction. Present anywhere any time	Reliability
Interview	Have excellent skill in ICT was the prerequisite for obtaining a job in our company. Most of staffs here are fluent online. They know how to perform their work using computer systems. That's why we don't have any problem to interact with government's electronic services. Audit Trail: (CCM-U1, 17/7/2013, 11:30am)	Staffs have skills in ICT and had no problem using public e-services. Personal characteristic.	Computer self-efficacy
Observation	E-CBID was accessible online 24 hours every day and it give flexibility to the public to accesses related information on company in Malaysia. Audit Trail: (CCM-Observe2, 10/8/2013, 4pm)	Accessible constantly everywhere and any time. Present anywhere any time	Reliability
Interview	Need to change the public mind setting which put too much trust towards the counter service. The take up rate is low and slow. Proceed with the e-service as usual. Audit Trail: (CCM-O1, 1/2/2013, 11am)	To change public's culture that like to use counter services. Awareness program	Awareness
Observation	All staffs at CCM are IT literate and all of them are using computer systems to perform their duties. Audit Trail: (CCM-Observe1, 12/3/2013, 11am)	Staff using IT to perform their duties. Computer self-efficacy	Computer self-efficacy
Interview	There are changes in the company act (based on the act of transaction over the counter). We have one clause which is clause 11a; section 11a in the act stated that registrar can use any methods to make it online, and it will be troublesome if we do not have it, and according to the original act, everything need to have a signature. The act was changed in 2007 (sort of) before we want to rollout the e-lodgment. Audit Trail: (CCM-O1, 1/2/2013, 11am)	Changed CCM act to fit e-services. Legislative.	Legislative

**Table-3.** Searching for theme process.

Interview	Observation	Early code	Code	Theme
I can search for companies' details with a click of mouse and keyboard without moving out of my office. Audit Trail: (CCM-U2, 10/8/2013, 3:30pm)	E-CBID was accessible online 24 hours every day and it give flexibility to the public to accesses related information on company in Malaysia. Audit Trail: (CCM-Observe2, 10/8/2013, 4pm)	Present anywhere any time	Reliability	Technological
I feel comfortable using e-service because it is easier, no travelling and no need to go to the counter just to get a few information to monitor a company. Audit Trail: (CCM-U3, 10/8/2013, 3:30pm)		Availability		
Need to change the public mind setting which put too much trust towards the counter service. The take up rate is low and slow. Proceed with the e-service as usual. Audit Trail: (CCM-O1, 1/2/2013, 11am)		Awareness program	Awareness	Institutional
There are changes in the company act (based on the act of transaction over the counter). We have one clause which is clause 11a; section 11a in the act stated that registrar can use any methods to make it online, and it will be troublesome if we do not have it, and according to the original act, everything need to have a signature. The act was changed in 2007 (sort of) before we want to rollout the e-lodgment. Audit Trail: (CCM-O1, 1/2/2013, 11am)		Legislative	Legislative	
Have excellent skill in ICT was the prerequisite for obtaining a job in our company. Most of staffs here are fluent online. They know how to perform their work using computer systems. That's why we don't have any problem to interact with government's electronic services. Audit Trail: (CCM-U1, 17/7/2013, 11:30am)	All staffs at CCM are IT literate and all of them are using computer systems to perform their duties. Audit Trail: (CCM-Observe1, 12/3/2013, 11am)	Computer self-efficacy	Culture	Environmental





**Figure-1.** Thematic map of CCM's sustainability criteria.

## RESULTS AND DISCUSSIONS

Fourteen elements within three dimensions related to e-service sustainability: technological; institutional; and environmental emerged (see Figure-1) and discussed in detail below.

### IT governance

The alignment of IT with the overall strategy of the organization requires full and active involvement from many levels and activities within the organization. According to IT Governance Institute (ITGI), "IT Governance is the board's ability to direct and control the enterprise's use of IT resources in line with strategic goals. Leadership, organizational structure and processes are used to leverage IT resources and drive alignment, the delivery of value, management of risk, optimization of resources and performance measurement" [9].

CCM realizes that IT could stimulate innovation in their services to the public and at the same time, facilitate the management of their administrative costs. That's why they implemented a well-defined roles and structure of their e-service implementation. For example as highlighted by the respondents where they mentioned "Other than MAMPU's guideline, CCM had a dedicated policy and guideline on how to use the e-service. For example, we had developed a protocol for e-lodgment." Audit Trail: (CCM-O2, 12/3/2013, 9:30am). Furthermore by having IT governance in e-service implementation, all stakeholders in CCM are required to participate in the

decision making process. They ensure resources are used wisely and effectively on e-service projects and conducted to professional standards. The interviews revealed that IT governance is needed to ensure that the investments in IT (in our case is e-service) generate value-reward and mitigate IT-associated risks and avoiding failure. The following are typical comments:

"Tracking performance of service delivery transformation is crucial for its sustainability. The implementing agencies should monitor progress and make necessary adjustments to be more effectively and efficiently sustainable. Based from my experience, it requires us to develop a standard set of service environment metrics that consider 3 perspectives; strategic, operational, and tactical." Audit Trail: (CCM-OA2, 6/6/2013, 9:00am)

"We give the development to vendor; they developed it from start to finish and maintained it also. So we do not need a lot of IT people, just to monitor, maintain and protect the applications." Audit Trail: (CCM-O3, 12/3/2013, 9:30am)

### Business process redesign

With e-service transformation, the agencies need to redesign their business process as a means to enable services done electronically. In addition to that the respondents in the interview session agreed that business process redesign help CCM to differentiate processes, isolate and optimize the complexity in them through e-



service applications. In other words, it helps to sustain the e-service operations. One of the respondents concluded that, the process redesign can unfold more flexibility and rapidly meet the ever-changing requirements of an increasingly diverse customer base. For instance:

“CCM is planning to change a few act. When an act is change, the work flow will also be change; hence we are taking this opportunity to make the work flow in line with the electronic services. As a huge example, current act required us to use a form while with the new act; there will be no more physical form. The work flow will be changed, the current system will be changed and at the same time the user’s mind set has to change also.” Audit Trail: (CCM-O2, 12/3/2013, 9:30am)

### Legislative

E-service implementation intersects many legislative issues, including privacy, digital divide (the lack of equal access to computers, whether due to a lack of financial resources or necessary skills), public access to government information, service delivery, and information security. The implementing agency should consolidate legislation. In this context would mean adding rule relating to e-service systems and processes to an existing administrative law in the form of special provisions is a must at CCM. Such example would be provisions of the act on the disclosure of information by CCM and no signature on the physical form as mentioned by this respondent:

“There are changes in the company act (based on the act of transaction over the counter). We have one clause which is clause 11a; section 11a in the act stated that registrar can use any methods to make it online, and it will be troublesome if we do not have it, and according to the original act, everything need to have a signature. The act was changed in 2007 (sort of) before we want to rollout the e-lodgment.” Audit Trail: (CCM-O1, 1/2/2013, 11am)

“CCM is planning to change a few act. When an act is changed, the work flow will also be changed; hence we are taking this opportunity to make the work flow in line with the electronic services. As a huge example, current act required us to use a form while with the new act; there will be no more physical form. The work flow will be changed, the current system will be changed and at the same time the users mind set have to change also.” Audit Trail: (CCM-O2, 12/3/2013, 9:30am)

### Benchmarking

Benchmark is a point of reference by which something can be measured or compared. It could give an idea as to ‘what’ and ‘how’ the functions, performance and ability of entire information systems have as it was developed. IEEE defines benchmark as a procedure, problem, or test that can be used to compare systems or components to each other or to a standard [10]. According to Gordon, best practice benchmarking is the

identification, and potentially the adoption, of best practices or techniques for performing common tasks or project [11], while benchmark tests is a method used to evaluate the performance of information systems and to test their compliance with user requirements [12]. In early project phases benchmark tests help to make build-or-buy decisions and to estimate the acceptance and performance an information system can achieve in a given environment. Main reason to benchmark information system functions include justifying organization’s investment in IS initiatives, evaluating the performance of information system group and its management, and improving the information system functions within the organization [11]. Best practice benchmark is a form of learning from others who had succeeded in implementing information systems while a benchmark test is to justify the proposed information systems. CCM had done several visits to benchmark their e-service. This benchmarking process is a fundamental in implementing and sustaining their e-services as mentioned by this respondent:

“When I was doing a study visit in Belgium (on SPRL submission financial statement though SPRL), the Belgian government already reducing the fee for those who are using the online service. That is why their take up rate is high and there are no mandatory. I think they reduce more than half of the fee for those who submit it through online.” Audit Trail: (CCM-O2, 12/3/2013, 9:30am)

### Awareness

The goal of any awareness program is to educate the intended audience on their role within the specific program (in this case is e-service usage). A good awareness program will not only educate on the importance of effective policies and practices of the e-services usage, but also teach the three basic elements of its usage, benefits and practicality. According to one of the respondent, “*we educate the user through a series of awareness program*”. A successful awareness program of e-service implementation will result in user’s ability to use the e-service application and increase take up rate that lead to its sustainability [13, 14]. According to CCM officer, during the awareness programs, government officials, and citizen were briefed about their e-service launched. Video clips and presentations were used during the awareness programs. Live demonstration was also given on how to use the e-service together with explanation on how it is going to help the citizen in saving their cost and time. For instance:

“When government rolled out an initiative including ICT initiatives or e-service to be specific, the implementing agency should promote their e-service application to aware the users. We at MAMPU helped by promoting those e-services, for example at SureHeboh, at the crawler (bottom of the TV screen) during Buletin Utama news, even though it is expensive, we do get an airtime for promoting it. Other than that, the government



also created Rural Transformation Center (RTC) and Urban Transformation Center (UTC). First, RTC was launched in Melaka by the Prime Minister and later in Gopeng, Perak and Puduraya, Kuala Lumpur, where all government services were gathered for the people to use it. Here we promote existing e-service to government agencies. We do the promotion to make people aware and have knowledge about it. Then they will be motivated and start using the e-service. We will continue to promote it and making it as a part of our culture to use the e-service. Once it is successful, the e-service can be sustained.” Audit Trail: (CCM-OA1, 11/7/2013, 9:30am).

“For me, it need to have clear information about how to use the e-service and informed us how easy it is and we do not have to go to the counter anymore for CCM matters. Actually, many of my friends still have not use the e-service. I think they just do not know about it.” Audit Trail: (CCM-U3, 10/8/2013, 3:30pm)

### Trust

Trust is widely accepted as a major component of human social relationships. In general, trust is a measure of confidence that an entity or entities will behave in an expected manner despite the lack of ability to monitor or control the environment in which it operates [15]. For adopting e-Government services, citizens must have intention to ‘engage in e-Government’ which encompasses the intentions to receive and provide information through on-line channels [16]. Furthermore, [16] posit that trust in the agency has a strong impact on the adoption of a technology. Previous study shows that citizen confidence and trust are the two main elements affecting willingness to engage with e-services application [13, 17]. Below are the examples of the respond associated with trust:

“To sustain any e-service basically we need a buy-in from the user, in our case, the public. We have to make the public have confident to use our e-service, make them feel it is easy to use and it is secure.” Audit Trail: (CCM-O2, 12/3/2013, 9:30am)

“I’ve started using it when they (the CCM officer) said ‘use the e-services, this electronic services is guarantee safe and reliable’.” Audit Trail: (CCM-U3, 10/8/2013, 3:30pm)

### Meeting user expectation and satisfaction

User requirement communicates the ‘what’ in black and white manner, structured in a form of functional and non-functional requirements between the users and the developers. IEEE defines requirement as a specification of condition or capability needed by a user to solve a problem or achieve an objective. It also a condition or capability that must be made or possessed by a system to satisfy a contract, standard, specification or other formally imposed document. While user expectation is a needs or expected things that should be in the new system as it was defined by [18]. It is concerning of what is needed and required in the new system to meet user satisfaction.

Among highlighted in the discussion with the respondents, they agreed that the e-services must be designed to be robust and easy to use so that it can easily adapt to unexpected future changes. It is also must be able to recover and function properly after some unforeseen failure event. What is important is that they just want a system that’s easy to use and that works the way it’s supposed to. This is supported by statements made by the respondents for example by CCM-02, CCM-U1, CCM-U3, and CCM-03:

“Before we develop the system, we had a discussion with the stakeholders on what actually they want. We took the input and use it during the system development. We conduct a survey and asked users their opinion about the system which can be used to update or enhance the system. For example, the e-lodgment did receive a few comments and suggestions, and when we develop the MyCoID, we used those comments and suggestions to enhance the system.” Audit Trail: (CCM-O2, 12/3/2013, 9:30am)

“What so good about e-service in CCM is, it fulfill our needs. For example, e-CBID, it can be customized to our needs. I can request any foreign company’s director in Malaysia and the system will generate the statistics. We can request information and the e-service will prepare the information according to our queries.” Audit Trail: (CCM-U1, 17/7/2013, 11:30am)

“What we expect are a systems that is easy logins, have a responsive user interface and no surprises, I mean thing that I don’t expect.” Audit Trail: (CCM-U3, 10/8/2013, 3:30pm)

“Another thing, it is how you manage the complaint from the public. Systems do have glitches, sometimes payment already been made and has been deducted from the user’s account, but here the payment shows nothing; and how you manage the problem, that will build up the user’s confidence. I think that is one of the important criteria and also how you manage client’s expectation and complaint.” Audit Trail: (CCM-O3, 12/3/2013, 9:30am)

### Government

The government through its agency, Malaysian Administrative Modernization and Management Planning Unit (MAMPU), has entrusted to plan, implement and monitor the e-government initiative. According to the findings from MAMPU officers in CCM interview series, the government leader commitment toward e-government implementation is very high. For example, the government ensured that all public servants related to this implementation are being trained. Other than that, the government had reduced the fee of e-service usage by giving incentive and subsidy. This is among the strategy done to attract public to use e-service provided. Malaysian government also had aligned existing cyber laws in Malaysia to cover e-government implementation. For instance:





“Public servants at all levels face a unique set of challenges over the coming years, and success depends on more than just reskilling and reorganization. For many staff, commitment to professional standards and to the public service ethos is a key factor in their motivation. In my opinions, translating plans into action depends on engaging the commitment and enthusiasm of front-line staff. This could be achieved by ensuring performance management becomes part of everyone’s day job.” Audit Trail: (CCM-OA2, 6/6/2013, 9:00am)

“During online payment via credit card, there are charges when using the FPX, but CCM absorb those charges and bear the cost. Actually there should be an extra 50 cents charge; we did not charge the bank.” Audit Trail: (CCM-O2, 12/3/2013, 9:30am)

“For me, another factor which can raise the take up rate is when the fee was reduced.” Audit Trail: (CCM-U1, 17/7/2013, 11:30am)

### Culture

MAMPU Officer believes that computer self-efficacy was found to be an important element in molding the culture of ICT usage among the citizen in Malaysia. It is a belief of one’s capability to use the computer [19] and attitudes toward computer technologies [20]. From our observation; “staffs at CCM are IT literate and all of them are using computer systems to perform their duties”. Audit Trail: (CCM-Observe1, 12/3/2013, 11am). They know how to use ICT tools and what to do with them. It seems that they are comfortable with ICT when they use the tools to achieve their desired outcome. In other word, this situation applies to the ability to use digital technologies to have intended positive effect on people and situations [21]. Staffs in CCM have this ability where it was mentioned that “Have an excellent skill in ICT was the prerequisite for obtaining a job in our company. Most of staffs here are fluent online. They know how to perform their work using computer systems. That’s why we don’t have any problem to interact with government’s electronic services.” Audit Trail: (CCM-U1, 17/7/2013, 11:30am). Another respondent reported to have intention to start using the e-service when he mentioned “Now when I know how to use the systems, I believe that my work become easier, I feel ‘modern’, somehow.” Audit Trail: (CCM-U3, 10/8/2013, 3:30pm)

In addition to computer self-efficacy of the stakeholders, organizational culture also considered the ‘glue’ that holds an organization together. It is a company’s prevailing ideas, values, attitudes, and beliefs guide the way in which its employees think, feel, and act—quite often unconsciously [22]. These shared values have a strong influence on the people in the organization and dictate how they dress, act, and perform their jobs. The observation notes from the observation activity made at CCM’s helpdesk office is put forward as an example of public agency’s culture is a critical variable in explaining how service user groups interact with computer systems.

The following are the excerpt captured associated to organizational culture:

“A friendly and comfortable working environment was observed at CCM’s helpdesk. A friendly atmosphere, where everyone gets along and people are welcoming and approachable. They use appropriate greetings that are warm and welcoming when dealing with the user. They are helping each other when the systems get down and at the same time communicating with IT Department to solve the technical problem.” Audit Trail: (CCM-Observe1, 12/3/2013, 11am).

### Information confidentiality

ISO/IEC 17799:2000 Information Technology - Code of Practice for Information Security Management defines information security as the preservation of information confidentiality, integrity and availability [23]. Confidentiality, integrity and availability, also known as the C-I-A triad, is a model designed to guide policies for information security within an organization. The model is also sometimes referred to as the AIC triad (availability, integrity and confidentiality) to avoid confusion with the Central Intelligence Agency. The elements of the triad are considered the three most crucial components of security. In this context, confidentiality is a set of rules that limits access to information, integrity is the assurance that the information is trustworthy and accurate, and availability is a guarantee of reliable access to the information by authorized people. In the case of CCM, the users concern on the unauthorized disclosure of their business’s confidential information. The following excerpt indicated this element:

“We linked the MyCoID with 5 other agencies such as Inland Revenue Board of Malaysia (IRBM) and the Employees Provident Fund (KWSP) (to name a few). Among the reason why the take up rate is low is because company owners feel uncomfortable when their data/information can directly reached LHDN, and that is why they do not want to use the e-service.” Audit Trail: (CCM-O2, 12/3/2013, 9:30am)

### Software quality

ISO 25000 standards determines the quality characteristics of a software product. Among characteristics listed was reliability and usability of a software product. Reliability are the degree to which a system, product or component performs specified functions under specified conditions for a specified period of time [24]. In a simple way, it means computer related component consistently performs according to its specifications. A reliable computer product is totally free of technical errors and can be trusted. It composes of: maturity; availability; fault tolerance; and recoverability [24]. In our study at CCM, the user highlighted that a secured and trusted computer systems are important for them while handling electronic transaction (the e-service) between the public and the government agencies because



it involves private documents. The following are typical comments:

"I can search for companies' details with a click of mouse and keyboard without moving out of my office." Audit Trail: (CCM-U2, 10/8/2013, 3:30pm)

"I feel comfortable using e-service because it is easier, no travelling and no need to go to the counter just to get a few information to monitor a company." Audit Trail: (CCM-U3, 10/8/2013, 3:30pm)

While usability is a degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use [24]. In our case, usability is more towards learnability, operability and user interface aesthetics. For example:

"The e-service must be user friendly and easy to use. Otherwise nobody wants to use it." Audit Trail: (CCM-O1, 1/2/2013, 11am)

"More needs to be done to encourage older people to use government e-services. From my observation most government websites still do not incorporate design features that would make it easier for older people to use them. Ensure that the requirements of those with disabilities are taken into account in any further development of government e-service or information kiosk services." Audit Trail: (CCM-U1, 17/7/2013, 11:30am)

### Ubiquitous services

Ubiquitous technology is defined as the technology that weaved into the fabric of everyday life. It is the method of enhancing computer use by making many computers available throughout the physical environment, but making them effectively invisible to the user [25]. The interviews reveal that ubiquitous services are indeed an element of e-service sustainability. CCM's users believe that ubiquitous technologies could provide them with information and services that are appropriate to their circumstances, as well as on technologies that support their activities by flexibly coordinating their smart devices and peripheral equipment. This is supported by statement made by the respondent for example:

"The government agencies who have implemented the e-service should pay attention to support on mobile operating systems and browsers. Currently most people are using e-services on mobile devices, such as smartphones, iPads or other tablets." Audit Trail: (CCM-U2, 10/8/2013, 3:30pm)

### Personalization

Citizen centric approach is considered as an appropriate approach to improve the e-services provided by governments to their citizens [26]. It is based on user centric approach that was adopted in commercial websites such as Amazon [27] and others. In CCM case, the e-services provided to the citizens have the ability to deliver a tailored environment to the user that can contain customized information they need to perform their task

and make business decision. It generates information according to user's needs. According to CCM Officer, it increase user satisfaction and allow CCM to understand of their users' needs and expectations. Below are quotes emerged from this theme:

"e-CBID provided us a fabricated set of data and statistics that form strategic information for business decision making. Once, it helps us in making decision. At that time we need lists of company by demographic, list of company sort by sector together with financial information. We requested at CCM and they provide us the information and this really help us in making business decision." Audit Trail: (CCM-U2, 10/8/2013, 3:30pm)

"One of our e-service functions is e-info. E-info contains company profile, business profile, company charges (list of properties in the bank which can be mortgaged, provided by a company when they need money), a 2 years financial comparison. All this are public documents. Public can access it with a fee. We also have an e-info image function, where documents will be converted into an image file. Company Watch is another product from e-info. Let say you are interested to monitor certain company, you can subscribe with Company Watch. You will be notified if there is any change such as business partners and shareholders. This is subscribed by a lot of banks to get the latest information about companies. So, the e-service is actually helping CCM in providing an efficient and effective service to our customers." Audit Trail: (CCM-O1, 1/2/2013, 11am)

### Integrated services

Portals provide an inherently 'dynamic' environment that makes them well-suited to delivering more interactive capabilities. The direct integration with back-office systems at CCM helps the citizen and other public agencies to exchange all related information necessary to support a transaction of any kind such as registering complaints, paying tax or registering businesses. This is reflected by the statement made by them:

"Through e-info, we can interact with other government agencies system such as BLES system license which was developed by ICU, a department under the Prime Minister's Department, for company's registration. Example: if someone wants to set up a factory, he/she needs to get an approval form the fire department (Bomba), local authorities' council (PBT), and the system developed by the ICU will have direct access to SSM, making it convenience to apply for a factory license." Audit Trail: (CCM-O2, 12/3/2013, 9:30am)

"To achieve e-services sustainability, the quality of public service delivery through the use of ICT should be prioritized. It also includes systems quality and information quality." Audit Trail: (CCM-U2, 10/8/2013, 3:30pm)

Another respond related to this also pointed out; the single point of access element. The e-services



applications at CCM are expected to be available to its user (the citizen, private enterprise or other public administration) through a single point of access, even if these services are delivered by different public authorities or private service providers. Such associated excerpt is:

“The e-lodgment uses MAMPU platform and MAMPU has and is the one who developed MyGovernment and we are only as a part of the services offered in it. That is why we collaborated with MAMPU to support MyGovernment portal and to make it easier to users where they only have to go to one portal only.”  
Audit Trail: (CCM-O3, 12/3/2013, 9:30am)

## CONCLUSIONS

Thematic analysis provides a comprehensive process for a researcher to identify numerous cross-references between the evolving themes and the entire data [28]. It involves the search for and identification of common threads that extend across an entire interview or set of interviews. In this study, the investigators believe that thematic analysis was flexible where data analysis starts at any time during the study. It provides a rich and detailed account of data where it helps the investigators identify patterns of meaning across the dataset that provide an answer to the research question being addressed. Furthermore, the investigators feel that this method is entirely based around the ability of an individual researcher in interpretation. The investigators experienced that interpretation is a combination of intuitive, imaginative, creativity and subjectivity. There are no specific guidelines for the use of interpretation. Furthermore from this analysis, the investigators linked various concepts and opinions of e-service stakeholders at CCM and compare them with the data that has been gathered in different situation at different times from other stakeholders in another agency during the study. By doing this, it seems that the potential for interpretation becomes infinite.

Several recommendations could be implemented after evaluating the findings of this study. Firstly, public e-service applications should be built by considering these fourteen elements emerged: institutional dimension (IT governance, business process redesign, legislative, benchmarking, awareness, trust, manages user expectation and satisfaction); technological dimension (information confidentiality, software quality, ubiquitous services, personalization, integrated services); and environmental dimension (government, culture). The investigators believe that public e-service sustainability can be achieved by coordinating all elements in the three major sustainability dimensions. Secondly, since the conduct of this study is within the government agency, they are several limitation faced by the investigators. It is recommended that future study on this subject should be done by group of researchers in collaboration with MAMPU. Third, future work of the study should focus on

finding a method to measure which element(s) influence public e-service sustainability the most.

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