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An Analysis of System Design Determinants Based on System Users Need

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***Abstract*—When most information system researchers' studies indicated that users' behavior is determined by intention, our study provides a rare exception to explain users' behavior from human side of system design. The purpose of this study is to explore how users' concerns influence system design and usage. The research adopted two methods to conduct the research. First, the Interactive Qualitative Analysis (IQA) approach was used to create a group mindmap, which represented users' concerns when they use systems in study 1. Then, a case study was provided in study 2 to understand users' behavior from system usage. Base on Pareto analysis and case study, the research has three important results: (1) users' habit plays an important role in system design and usage, (2) system function has influence on interface design and affects system implementation, and (3) users experience has impact on system continued usage. Finally, implications for system usage are discussed. New research opportunities emerging from the findings of this paper are outlined at the end.**

Keywords—Schema; Mental Models, Information System Design, User Need Analysis, Information System usage, Human-Computer Interaction

I. INTRODUCTION

Information systems (IS) usage has a critical impact on system, and plays a dominant role in organizational competitive advantages [1]. In recent years, due to the development of cloud computing and portable devices, a new mobility era is starting. The Enterprise Resource Planning (ERP) systems companies have discovered this trend and want to provide more convenient services and develop more integrated functions for their ERP systems in which practitioners can operate and access company information through various mobile devices anywhere, anytime [2]. Thus, the ERP systems company want to provide more up-to-date information than typical ERP systems with a more convenient and rapider service interface in order to quickly respond to customers' needs in which practitioners still can access or update their collected information wherever they are world-wide.

The technology acceptance model (TAM) is the central theories in technology adoption research [3], however, Plewa, Troshani, Francis and Rampersad [4] indicated the TAM constructs do not fully reflect the usage-context factors that may alter acceptance patterns. Many researchers proposed system usage is determined by intentions [5, 6], which in turn predicts actual behavior [3, 7-9]. However, to date, some researches argue that behavior intention is not a good surrogate for usage in today's environments [10, 11]. Use intention is too broadly to explain and represent user behavior, in addition, users' intentions may suffer from job goals and management needs [12]. In contrast, Dishaw and Strong's study [13] indicated that no significant relationships between use intention and actual IS behavior, but there is a relationship between habit and continuous usage behavior, especially when habits are strong [14, 15].

Norman and Draper [16] emphasized the importance of a good understanding of users in order to meet their requirements and expectations. The objects of this research try to find out critical factors affect system use from users' perceptions. Since Burton-Jones and Gallivan [17] suggested research examine IS usage should in multiple levels, in order to have a high-fidelity analysis, this paper using two studies to provide a deeper understanding what factors determine users behavior in system usage.

Few studies have been conducted to understand the antecedents for using mobile ERP systems in Taiwan. The study aims to understand users' concern in system usage from users' mental models. We used 2 scenarios including focus groups [18] and case to investigate the motivations toward ERP use antecedents.

Section 2 presents a literature review on habitual domains theory and mental model related researches. Section 3 presents the research methodology. Section 4 is the analysis and discussion. Section 5 presents our conclusions and suggestions for future work.

II. LITERATURE REVIEW

A. Habitual domains theory

Limayem, Hirt and Cheung [19] described that "continued IS usage is not a consequence of intention, but habit". James [20] pointed out habit as a special kind of mind-set that enhances perceptual readiness,

also it is a mental process [21]. Limayem and Hirt [22] argue that habit plays an important role in explaining IS usage. Verplanken [21] proposed habit is a repetitive behavior, automatic response, but lack of intention. When past behavior and experience create deeply rooted habit concept, users' behavior becomes routine and their usage processes become "habitual" [23, 24]. Every individual within their organization performing a variety of functions also have their own habitual domain; furthermore, to match these habitual domains are important for considering career success and happiness [25].

In contrast to the behavioral intentions, IS habit limits the predictive ability of use intentions, but leads users' behavior automatically [19, 26]. Specially, when users are already familiar with some particular IS functionalities and form automatic habitual behavior. Once a habit is established, user behavior as a kind of mind-set in individual decision-making [27].

B. The theory of mental models

Craik [28] first described mental models as the workings of the mind; the mind creates the reality of effective action, decision-making, and internal representations of phenomena. Norman [29] defined mental models as "what people really have in their heads and what guides their use of things". Meanwhile, users' mental models provide prediction and explanatory of human-computer interaction. Individuals with accurate mental models could enhance their performance and increase system usage [30].

Mental models are a very useful tool to analyses and represent an individual or a group of people's perceptions on a particular issue [31]. In addition, people's mental models provide the explanation of actual behavior and causal representations [30, 32]. González, Calderón and González [31] examine managers' mental models to accelerate an understanding of the causal links between the essential components of firm's strategy. Since mental models represent the causal relationships among various components or events [33, 34], thus, mental models are useful to help understand personal activities and behavior decision making.

III. METHODOLOGY

A. Study 1

The purpose of Study 1 is to create users mental models in system usage concern. Study 1 adopted the Interactive Qualitative Analysis (IQA) approach to gather data and analyze users' mental models. The IQA approach is a structured qualitative research method, which grounded in systems theory to represent the meaning of a phenomenon in terms of affinities and inter-relationships among them. Most importantly, the IQA approach provides the greatest assistance in interpretation phenomenon [35]. The approach has been applied in different disciplines including IS user-analyst divergence [36] and education [37, 38].

(A) Design and process

This IQA study begins with a focus group. The first step is to help focus group members organize their thoughts into affinities— the building blocks of mental model. Morgan [39] defines a focus group as "a research technique that collects data through group interaction on a topic determined by the researcher." Focus groups are a tool for participants who are homogeneous in some respects, have similar perceptions, attitudes, and experiences in life [40]. In the IQA approach, the focus group captures the perception of a phenomenon by a group of people who have something important in common about the phenomenon. The following is a summary of the IQA research flow, as shown in Figure 1.

1) *Identification of Affinities (Open/Inductive/Axial Coding):* Focus group members agree on card grouping and clarify their meaning, referred to as inductive coding or *affinity*.
2) *Identifying Relationships among Affinities (Theoretical Coding):* Focus group members are asked to analyze relationships between each of the *affinities*, then to record their response in an Affinity Relationship Table (ART).
3) *Constructing the Interrelationship Diagram (IRD):* IRD is a table representing all the relationships among the *affinities*.
4) *Constructing the System Influence Diagram (SID):* SID also called a mental model. It is a visual representation of an entire system of influences and outcomes.

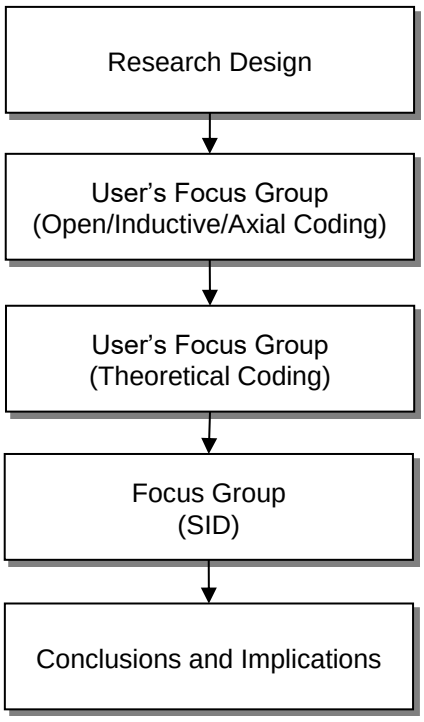

FIG I. RESEARCH FLOW (BASED ON NORTHCUTT & MCCOY)

(B) Participants

This study recruited six information system users as a focus group and all members volunteered to participate. Six to ten participants in a focus group forms a "moderate sized" group [41]. Of the six IS users all had at least 2 years of experience in IS usage and three of them had used the system for over 6 years. Including five males and one female, all of them had two-year college or postgraduate degree. The usage of IS included financial accounting information systems, ERP systems, computer numeric control (CNC), computer aided design (CAD), and school administration systems.

Focus groups members should have the following characteristics:

1) Rich information about the issue,
2) The ability to reflect on the question and to transfer those thoughts into words or sentence,
3) The ability to respect and practice group dynamics,
4) The inclination of participate in the study.

(C) Data analysis and results

After a group facilitator explains the process, the IQA focus group proceeds to the first step - silent brainstorm. One question was developed for the focus group members: "What are users' concerns when they use systems?" The second step, the facilitator guides participants to write their experiences about the subject on note cards. Each focus group participant is given approximately 25 note cards, and then asked them to write down one thought or sentence per card, producing as many cards as they can. Then, the facilitator reads each card and asks the focus group members silently organize the cards into groups of meaning. This process continues until a consensus is reached. During this process, several affinities are created and participants will give titles accurately reflect on the meaning of each *affinity*.

During previous process, there were seven *affinities* conducted and names as (1) System function, (2) Management function, (3) User perception, (4) System design, (5) User habit, (6) System efficiency, (7) Interface design. After that, the Representative Theoretical Coding is calculated by Power and MinMax analysis, as described in the following section.

1) *Power analysis*: Power is an index of the degree of optimization to minimize the number of affinities relationships. Power analysis is based on the Pareto Principle, with the MinMax Criterion to determine the cutoff point.
2) *The Pareto Principle*: The Pareto is a statistical method and represents the consensus of the group's analysis of relationships. The Pareto Principle is a minority of the relationships in any system and account for a majority of the variation within the system. There are two reasons to use the Pareto protocol: (a) to determine the optimal number of relationships, (b) to help resolve ambiguous relationships. A Pareto table is the key to deciding which relationships should be included or excluded from the group Interrelationship Diagram (IRD).

TABLE I. AFFINITIES IN DESCENDING ORDER OF FREQUENCY WITH PARETO AND POWER ANALYSIS

Affinity pair relationship	Freq. Sorted (Descend)	Cumu. Freq. [a]	Cumu. %[b] (Rel.)	Cumu. % [c] (Fre.)	Power[d]
1 UH ← UP	5	5	2.4	5.1	2.7
2 ID ← UP	5	10	4.8	10.1	5.3
3 SF → MF	5	15	7.1	15.2	8.0
4 SF → UP	5	20	9.5	20.2	10.7
5 SF → SF	5	25	11.9	25.3	13.3
6 SDs ← MF	4	29	14.3	29.3	15.0
7 ID ← MF	4	33	16.7	33.3	16.7
8 SDs ← UP	4	37	19.0	37.4	18.3
9 ID ← UH	4	41	21.4	41.4	20.0
10 SF ← SDs	4	45	23.8	45.5	21.6
11 SF ← SDs	4	49	26.2	49.5	23.3
12 ID ← SF	4	53	28.6	53.5	25.0
13 SF → MF	4	57	31.0	57.6	26.6
14 ID → SF	4	61	33.3	61.6	28.3
15 UH ← MF	3	64	35.7	64.6	28.9
16 SDs ← UH	3	67	38.1	67.7	29.6
17 ID ← SDs	3	70	40.5	70.7	30.2
18 SF → UP	3	73	42.9	73.7	30.9
19 SF ← UH	2	75	45.2	75.8	30.5
20 UP → MF	2	77	47.6	77.8	30.2
21 SDs → MF	2	79	50.0	79.8	29.8
22 ID → MF	2	81	52.4	81.8	29.4
23 SF → UH	2	83	54.8	83.8	29.1
24 SF → UH	2	85	57.1	85.9	28.7
25 ID → UH	2	87	59.5	87.9	28.4
26 SF → SDs	2	89	61.9	89.9	28.0
27 ID → SF	2	91	64.3	91.9	27.6
28 SF ← MF	1	92	66.7	92.9	26.3
29 SF ← SF	1	93	69.0	93.9	24.9
30 UH → MF	1	94	71.4	94.9	23.5
31 SDs → UP	1	95	73.8	96.0	22.2
32 ID → UP	1	96	76.2	97.0	20.8
33 SDs → UH	1	97	78.6	98.0	19.4
34 SF → SDs	1	98	81.0	99.0	18.0
35 ID → SDs	1	99	83.3	100.0	16.7
36 UP ← MF	0	99	85.7	100.0	14.3
37 SF ← MF	0	99	88.1	100.0	11.9
38 SF ← UP	0	99	90.5	100.0	9.5
39 SF ← UP	0	99	92.9	100.0	7.1
40 SF ← UH	0	99	95.2	100.0	4.8
41 ID ← SF	0	99	97.6	100.0	2.4
42 UH → UP	0	99	100.0	100.0	0.0

[a] The running total of votes for each affinity pair.
[b] Based on the number of possible relationships (90), each relationship represents 1/90 or 1.1% of the total.
[c] Cumulative percentage based on the percentage of the number of votes cast (4989).

[d] Index of the degree of optimization of the system (Northcutt & McCoy, 2004) and calculated as the difference between the previous two columns.

3) The MinMax Criterion: Because all the relationships are displayed in decreasing order of frequency, it is necessary to decide the cutoff point. This decision involves a trade-off between two criteria: (a) maximum variation (cumulative percent based on frequency), (b) minimizing the number of relationships in the interest of parsimony (cumulative percent based on relations).

The third step was to sort the relationships in descending order of total influence and relationships (Table 1). Table 1 shown when Power reaches a maximum value of 30.9 at 18 relationships, the cutoff point of 18 relationships would be a defensible choice for inclusion in the IRD, due to its optimal value with regard to MinMax criterion. Choosing the minimum number of relationships for the construction of a mental model is the most representative way to express the feelings of the entire constituency of IS users' concern.

(D) Drawing System influence diagram (SID) and findings

Using arrows drawing connections between each affinity in the direction of the relationships represented in the IRD (Table 2) to complete the cluttered tentative system influence diagram (SID) (Figure 2).

TABLE II. FOCUS GROUP TABULAR IRD

	MF	UP	UH	SDs	SE	SF	ID	Out	In	Δ
SF	↑	↑		←	↑		↑	4	1	3
MF			↑	↑	←	←	↑	3	2	1
UP			↑	↑	←	←	↑	3	2	1
SDs	←	←	←		↑	↑	↑	3	3	0
UH	←	←		↑			↑	2	2	0
SE	↑	↑		←		←	←	2	3	-1
ID	←	←	←	←	↑	←		1	5	-4

- Count the number of up arrows (↑) or Outs.
- Count the number of left arrows (←) or Ins.
- Subtract the number of Ins from the Outs to determine the (△) deltas.
- △ = Out –In.

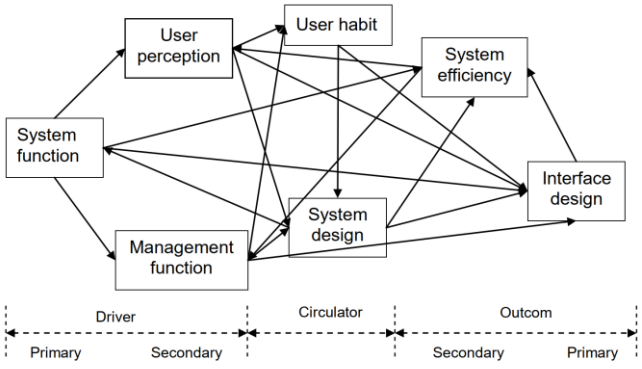

FIG 2. FOCUS GROUP CLUTTERED SID

All of the affinities were arranged according to the tentative SID chart (Table 3) to identify the position of affinities, primary drivers to the left of the screen and the primary outcomes to the right, and secondary drivers and secondary outcomes placed between the primaries. The SID diagram represents the cause-effect relationships and reveals how drivers influenced its outcomes.

TABLE III. TENTATIVE FOCUS GROUP SID ASSIGNMENTS CHART

Affinity Name	Determinant
System function	Primary Driver
Management function	Secondary Driver
User perception	Secondary Driver
System design	Circulator
User habit	Circulator
System efficiency	Secondary Outcome
Interface design	Primary Outcome

However, it became evident that the cluttered SID (Figure 2) was too complex to be meaningful. As a result, a redundancy eliminating procedure was used to remove redundant links according to their delta value (△). Redundant links are those between two affinities in which a path from the driver to the outcome can be achieved through an intermediary affinity. In other words, if there is an intervening affinity between two affinities, it remains, and the direct link is removed, as it is redundant. If there is any path between the highest positive delta and the next highest negative delta other than direct link, that link can be removed [35]. In the current study, the elimination of redundant links resulted in a cleaner representation of mental models as presented in Figure 3.

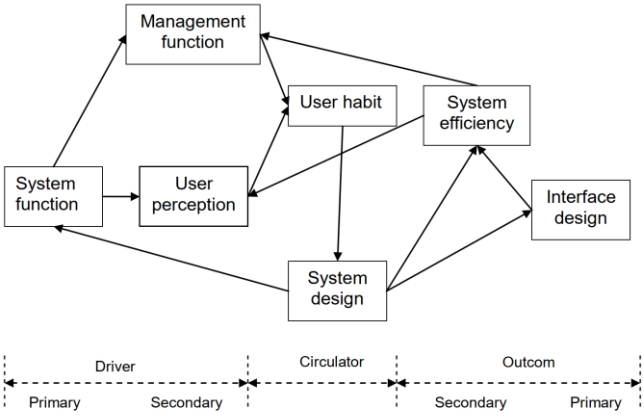

FIG 3. FOCUS GROUP UNCLUTTERED SID

Users' mental models reflect individual's internal perception of systems usage. According to users' SID, we conclude three important findings, including: (1) system function has influence on interface design, (2) users' habit has influence on interface design, (3) users' habit has influence on system design.

B. Study 2

Previous users' mental model has shown users' concerns when they use systems. In study 2, we adopted case study to deeply understand system

users' behavior. Case study approach is suitable for addressing problems [42] since it covers events over time and evidence in chronological order. Therefore, case study method plays an important role in causal sequence analysis [43]. In the case study, participants would be free to explain why they use systems. All informants were carefully selected in order to ensure the quality of the collected data.

(A) Case background

The CCT (a pseudonym) is a fast-growing international technological manufacturer corporation in Taiwan. The CCT Company produces high-precision plastic injection molding for communications, computer, electro-optics, consumer electronics, and automotive use. The company initiated in 1979 and began operation in 1981 with an initial capital outlay of US$30 million, and worth US$80 million in 2008 with over 15% global market share with more than 30,000 employees among five countries.

In 1985, the CCT first time designed its own system. The CCT assigned a group of experienced engineers to develop their own systems. However, this self-development system could not systematically integrate financial information from different overseas subsidiaries. Each subsidiary retained its own database. After 2004, when the amount of business revenue is increased (US$220 million in 2003), the CCT has extended another two overseas subsidiaries-Malaysia and China. However, due to insufficient system integration and management problems, the CCT's systems always slow down during periods of heavy workload. Thus, most staff must work overtime to integrate the financial reports from different subsidiaries.

Unfortunately, the CCT company has encountered different system usage problem at different stage (see Table 4). The CCT worldwide subsidiaries include United States, China, Malaysia, India, and Taiwan. Accompany with the sale growth quickly (up to US$350 million), thus some IS executive managers had worked in Hsinchu Science Park (North Taiwan) recommended should have international ERP systems to integrate all information and automate business processes with a comprehensive view of the entire corporation. At the time, the project manager was in charge to implement the case of ERP implementation. ERP system is a critical investment that can significantly affect future competitiveness and performance of a company. In order to implement an ERP project successfully in a company, it is vital to select a suitable ERP system.

Today, the CCT has 8,000 employees and wants a cloud -based ERP for the market needs. However, the trend of new era for Cloud-Based ERP [44] remains in a state of information isolated island [45]. The CCT company needs to aid of better understanding and decision-making prior the migration. Therefore, the case study can provide a critical insight for adopting Cloud ERP systems from previous system adoption experience.

TABLE IV. CCT' IS USAGE HISTORY

Stage	Information systems usage problem	Proposed actions	Implementation/ IS characteristic
1	Fast-growing business requiring IS usage	Self-develop IS	DOS OS, Clipper database, and Novel network
2	Y2K problem	Adopt IBM system	English interface in IBM system
3	1. IBM information system implementation fail 2. Domestic IS vendor closes down	Domestic IS	Window 2000, GUI, and Distributed Database Systems
4	1. Existing IS can not integrate different subsidiary financial information on time. 2. IS slow down due to heavy load 3. Lack data integration	Investigate new ERP systems	International ERP systems

(B) Data collection

We used interviews and archives materials as the primary source of data [46]. In this respect, a descriptive case study methodology [43] was carried out based on in-depth interviews with essential participants, document archives, and on-site observations. Three major interview questions were established, and we also used some probing questions for ambiguous answers.

1) *What systems have your organization ever used, and why CCT choose these systems?*
2) *Describing how your user's response from these systems usage.*

Six interviewees were recruited, including system users, Taiwan district senior manager, project managers, and information system engineers. All informants in this case study were experienced and qualified, ensuring the quality of the collected data. Importantly, the senior IS manager from Taiwan district was chosen as an informant due to his 20 years of work experience at CCT and involved most system implementation. The senior system manager's work is to implement new systems and copy to another subsidiary. Hence, the senior IS manager is actually a system user in CCT. Information system (IS) engineers were included due to their substantial experience and two of them involved in CCT's systems adoption over 10 years. Other IS users were interviewed from

different departments for diverse IS use comments. Face-to-face, unstructured, and tape-recorded interviews were conducted. The interviewer also took notes to allow a deeper insight for further grounded interpretation. In addition, a triangulation method was used to enhance reliability.

(C) General discussion

The CCT self-developed system (at stage 1) only was a monochrome DOS interface, and difficult to change its functions. However, as sale revenue was growing fast and overseas subsidiaries were established, the self-developed system cannot integrate all data systematically and automatically. The following are some quotes from users describing their experience, saying:

> *"In the beginning years, CCT' sale revenue is not very huge and only a general manager assistant in charged system development...At the time, system development is only focus on production management." (Taiwan district senior manager)*

> *"In this period of years, financial reports were done by Excel spreadsheet for data integration...However, the self-written system has been used for over 10 years and it is very difficult to add new functions." (System user)*

But with the Y2K coming, the CCT was afraid of the Y2K problem. Under this circumstance, they first adopted and implemented an IBM system. Unfortunately, the IBM system did not operate successfully due to its English interface. Users were uncomfortable with the English interface and they resisted to use the system seriously. Because the English interface did not meet users' expectation, the IBM system carried on only half year. Finally, the CCT decided to adopt another new system, which was designed in Chinese interface (stage 3). The primary reason for adopting this domestically-designed system because its Chinese interface. At the beginning, system users were more satisfied with the Chinese interface. But, after two years, system users required to add more accounting functions. However, the domestic vendor rejected CCT's requests due to system functions are pre-programmed modules, which are CCT selected. The only way to deal with the problem is to upgrade a new system, but there would be major costs associated with changing the business processes.

However, users need a powerful system to complete their task successfully. They have to integrate all financial data to conduct accurate financial reports. The following are some quotes from interviewees:

> *"Since our database is separate and independent in different subsidiaries, the main problem here is how to integrate all data. It always takes long time to deal with every month reports." (System user)*

> *"The existing system could not offer our heavy data load; we need to change our system to have better functions." (System user)*

These quotes highlighted users' function concern. Finally, the CCT decided to have international ERP solution (stage 4). The ERP systems has centralized database, proper control, and provides one-time data entry to a single facet of information. Importantly, ERP systems can eliminate duplicate and redundant data maintained, thereby ensuring data integrity and quality. Therefore, the CCT started to evaluate a comprehensive international ERP system to improve its business activities effectively and efficiently in the competitive business environment. Now, there are two ERP vendors under considered: one is SAP and another one is Oracle. Like project manager mentioned:

> *"In the complex and dynamic environment, it is necessary to have ERP system as aids to integrate all amount of work…. ERP can pull all the financial figures together to produce financial reports from independent business units." (Taiwan district senior manager)*

> *"If we don't adopt ERP systems today, then business is gone tomorrow." (System user)*

IV. MANAGERIAL IMPLICATIONS

A. The role of habit toward users' behavior

Hong, Kim and Lee [47] noted that the incorporation of habit is salient when users' behavior follows their own habit. In the study, user habit has a significant impact on system adoption decision. On the other hand, user experience also has impact on continued usage. The following are some quotes from users describing their experience, saying:

> *"Essentially, it is difficult to know and familiar with all the functions of system in a limited time, therefore, the best choice is to work with what we already know in order to match our habit." (System user)*

> *"We have many managers are from Hsinchu Science Park (in North Taiwan) and they are used to use Oracle and SAP modules…Due to their previous usage experience, they believe Oracle or SAP is suitable for organizational future development…. Now, our project manager is planning to talk with these two solution vendors…"*

In sum, the power of habit heavily influences what will happen in users' usage behavior. The quotes above show that user habit clearly provides a reasonable explanation in users' behavior and subsequent continuance usage. In addition, prior experiences are correlated with actual system usage, such as CCT managers' usage habit with certain ERP systems. Importantly, users' prior experienced not only directly affects use intentions and actual system

usage, but also related to habit development [22], especially when users are "power users" [48]. Presumably, this is because users already have the confidence to use certain systems for some specially, critically, or useful functionality [3]. Therefore, satisfactory usage experiences will increase users' tendency to repeat and affect IS continuance usage [19].

B. Need-pull to be derived

Brown, Massey, Montoya-weiss and Burkman [49] stated behavior is more complex than only "technology use". Researchers have proposed the "technology-push" and "need-pull" concepts in system usage [50]. Meyers and Marquis [51] reported that innovation is leaded by "need-pull", and the "need-pull" has been characterized with higher probabilities of success than "technology-push".

The "need-pull" concept also emerges in study 1 and study 2. In the paper result, we found system function and management function are users' "need-pull" toward system usage. The results are consistent with Brown, Massey, Montoya-weiss and Burkman [49] contended that job functions are highly correlated with system use, and not necessarily with users' attitude in mandated environment.

In addition, our results were consistent with Jasperson, Cater and Zmud [52] study that system usage must emphasize at the function or feature level. Our study revealed that system function and system efficiency take on heightened importance and consideration in users' perception. System functions play an important role because end-user productivity is tied directly to functionality [53]. As shown in Study 2 that the perceived benefits of new ERP systems will contribute and enhance economic organizational value-added and gaining competitive advantages.

C. Ease of use is not really in users' behavior

Lee, Kozar and Larsen [10] argued that perceived ease of use is not a stable measure for predicting behavioral intention, and Gefen and Straub [11] have discussed the controversy of the role of perceived ease of use in TAM. Our study results also did not show ease of use is users concerns in system usage. We found the influence of IS usage determinants may change, specifically when users have knowledge gained from past experienced. When systems adoption occurs are mandated, system users are more or less in the mandatory circumstances, in which, they have no possibility to switch to another system at their will [54]. In mandatory environment, attitude and intention are likely unrelated to system usage. Therefore, if users are in mandated situations to perform job tasks and job function, ease of use is not a strong predictor for use intention.

V. CONCLUSION

To date, when most IS researchers concern user behavior are determined by user intention and attitudes [24], we emphasized the importance of having a good understanding of the users behavior from the needs of users. It is consistence with Norman (1986) mentioned the needs of users will dominate the design of the interface. Study 1, the IQA approach appears to be a promising way to obtain rich insights into users' perception in system interface design. Study 1 showed that system function and users' habit have influence on interface design. Study 2 provides a explaining the critical role of user habit and experience. If user experience is hedonic, affective or experiential aspects of technology use, it will have influence on continuance usage. Additionally, users' behavior not only was influenced by their habit and experience; in turn, that will affect system design, and correlative with continuance usage.

To summarize the above discussion, we believe that users' overall satisfaction with system function not only affects IS development and implementation, but also affects system usage. It is hoped that the findings reported in this study will not only provide an initial understanding users behavior, but can also provide useful insights of system design and those who are interested to know how users' habits link to post-adoption of IS usage.

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