Seeking Better IT Value Conceptualization: Some Meta-Theoretical Considerations

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Abstract

Information Technology (IT) value is amongst the most important concepts in the Information Systems (IS) research field. Yet, a clear, well-formulated conceptualization of IT value, cumulatively built upon, is lacking. Drawing from the Facet Theory literature, this paper broaches several meta-theoretical considerations addressing an "ideal" conceptualization of IT value. We argue these considerations may shed light on the advancement of IT value conceptualization methodology.

1. Introduction

There is little disagreement that the concept of Information Technology (IT) value[1] is one of the most important, widely employed concepts in Information Systems (IS) and its related research fields. In making decisions and recommendations, managers must substantiate the realized and expected value from IT investments. Behavioral research concerned with the implementation and use of IT often employs IT value as a dependent variable. Studies addressing issues related to IT value have been extensively published over the decades. Many have reported a positive influence on firms' economic and business value attributable to IT investment (e.g. Dedrick et al. 2003; Im et al. 2001; Rai et al. 1997; Hitt et al. 2002). Others have considered evaluating IT value as overall success or effectiveness gained from implementing a particular IT (e.g. DeLone and McLean 1992; 2003).

Extensive and continuing interest in the concept has generated diverse theoretical and empirical approaches to its study (c.f. Kohli and Grover 2008; Dedrick et al. 2003; DeLone and McLean 1992; 2003). For instance, IT value is investigated at different levels of analysis [e.g., individual level vis-à-vis organizational level (Chan 2000; Petter et al. 2008)], with various intents [e.g., predicting empirical relationships (Devaraj and Kohli 2003) vis-à-vis

[1] We consistently employ the term *IT value* to broadly refer to the consequences of IT or IS, subsuming similar concepts across the entire research area. For example, IT value is considered to subsume both IT business value (Kohli and Grover 2008; Melville et al. 2004) and IS effectiveness (Grover et al. 1996).

explaining theoretical phenomena (Rai et al. 2002)], and using various data collection designs [e.g., panel data (Hitt et al. 2002) vis-à-vis perceptual data (Gable et al. 2008)]. Although such diversity affords a multifaceted understanding thereby creating opportunities to triangulate research findings, it concomitantly complicates comparability across IT value studies, such incomparability hindering knowledge accumulation (Melville et al. 2004; Wade and Hulland 2004).

Several frameworks have been proposed that contribute to clarity across diverse IT value studies (e.g. Grover et al. 1996; Seddon et al. 1999) through identifying differentiating aspects of these studies (e.g. type of IT and level of analysis). However, new emerging types of IT challenge the extent to which existing IT value concepts continue to apply – e.g. Enterprise Systems that blend previously distinct applications and technologies, and mobile devices that address tasks quite different from simple traditional information processing (e.g. applications for entertaining and socializing). Further 'kinds' of IT value are suggested by scenarios where multiple firms co-develop IT and share the co-created IT value through partnerships (Kohli and Grover 2008). As the IS research area continues to broaden and deepen, differentiating aspects of IT value thus far identified appear increasingly inadequate and somewhat piecemeal.

We argue that researchers face growing frustration with the adaptation and appropriation of IT value conceptualization in attention to emerging and increasingly diverse and nuanced technologies and contexts. While such frustration is inherent in scientific research generally, efficiencies and effectiveness are possible through continuously seeking a deeper understanding of how we should appropriately conceptualize IT value.

So as not to encourage unrealistic expectations (or premature skepticism), we acknowledge that the necessary ongoing inquiry into better IT value conceptualization practices in particular, and conceptualization methodologies in general, demands a larger effort than is reported herein. A holistic, comprehensive solution to the problem is not the intent of this paper.

Rather, this paper offers several preliminary considerations regarding what an "ideal" IT value conceptualization ought to look like. We thus set aside the question of how to better conceptualize IT value (or other concepts), and instead move up to a more abstract level, asking the meta-theoretical question "What do we mean by 'better conceptualization'?" Answering this meta-theoretical question should clarify the intended goals of conceptualizing, thereby informing more targeted, mindful development of methodological theories of conceptualizing IT value (i.e. in terms of offering more specific prescriptive guidelines). In other words, our rationale for this exploration is, that a better understanding of what kinds of conceptualization are good, will inform how to better conceptualize, thereby suggesting how to better conceptualize IT value. And this paper addresses the first and foremost inquiry of this chain of understanding.

Though confusion and complexity regarding IT value conceptualization is the main driver behind this work and we extensively draw from the IT value literature to instantiate our thinking, we believe ideas presented have broader relevance to conceptualization more generally. We hope however, that our reference to IT value specifically, will enliven issues addressed for our IS readership, as well as encourage improved IT value conceptualization into the future. Henceforth, though we refer specifically to IT value, often ideas presented will also have relevance to other complex, often ill-understood concepts.

Given previously raised concerns regarding IT value conceptualization, this paper particularly focuses on the role of construct clarity in IT value conceptualization, arguing that construct clarity should be an essential criterion for better conceptualizing IT value. Achieving this criterion may help to establish a research ecosystem supportive of effective and efficient knowledge accumulation within IS. Drawing from the Facet Theory literature, we formulate a set of principles that encourage construct clarity, these principles embodying conceptualization 'ideals'.

The rest of this paper is organized as follows. In the subsequent section, we discuss the importance of construct clarity in achieving knowledge accumulation of IT value research and the perceived difficulties in attaining clear IT value conceptualization. Next, we present an overview of relevant Facet Theory literature, arguing the narrative usefulness of the logic derived from the Facet Theory Methodology, in informing the consideration of how to better conceptualize IT value. We conclude with a summary of this paper.

2. Construct Clarity of IT Value

We argue that construct clarity is an essential criterion for judging good IT value conceptualization[2]. Constructs are conceptual abstractions of phenomena that are invented by researchers (Suddaby 2010). They are building blocks of a theory; a clearly defined construct is able to delineate the boundary conditions of what phenomena are included and what are not in a theory (Weber 2012). As such, constructs should be precisely defined, otherwise it is not possible to conscribe the lawfulness of a theory, which distinguishes empirical phenomena to which the theory can or cannot apply (Weber 2012). Thus, vaguely conceptualized constructs can jeopardize the validity of a theory. Such views on construct clarity are amplified in several recent articles (e.g., Klein and Delery 2012; Locke 2012; Suddaby 2010; Skilton 2011). A 2010 editorial in *Academy of Management Review* highlighted the criticality of construct clarity in theories (Suddaby 2010), suggesting lack of construct clarity is a common reason that reviewers and editors reject a manuscript.

Unlike issues with measurement and statistical analysis, issues regarding conceptualization of IT value have received little attention in the literature. Yet, the clarity of IT value conceptions in IS research is a concern, with few studies being explicit and precise with its articulation. IT value is variously labeled as “benefits”, “perceived value”, “impact”, and/or “business value” derived from the IT artifact or IS (DeLone and McLean 2003). Further, the studies conceptualizing IT value might potentially dismiss important distinctions such as “who perceives the value”, “value for whom”, and “what kinds of value are business value” (cf. Grover et al. 1996; Seddon et al. 1999).

The IT value research domain appears more fractured than perhaps generally appreciated. Similar IT value concepts are employed at both the individual and organizational levels of analysis (Chan 2000) with research at different levels of analysis rarely interrelated or harmonized. Given that explicit comparison and contrasting of IT value concepts across these streams of research is absent, each stream may have its own underlying theoretical logic for IT value creation, thereby implying unique conceptualization of IT value.

We posit that the suggested diversity of potentially overlapping, confused and incomparable conceptions of IT value may be attributable to several factors. First, the emphasis of IT value research changes over time with researchers in different time periods subjectively favoring some aspects of IT value over another (Petter et al. 2012). For instance, in the early computing-intensive age, IT was primarily used as a calculator to complete computing tasks. Thus, the accuracy of calculating results was the primary concern when conceptualizing IT value. As IT functionality expanded and human-computer interaction became more prevalent, other aspects of IT value, such as usefulness and user satisfaction, gradually came to the fore.

Second, the social psychological IT environment is in flux, which can complicate the conceptualization of IT value. Along with emerging new technology, how users perceive IT and how users interact with each other are changing. For instance, the prevalence of mobile devices has shifted the primary interface from PC to smart phones. The meaning of IT value in the social psychological environment of the PC may be different from and inappropriate for the context of smart phones. In addition to technology innovation, new ways of using IT may

[2] Our assumptive view is that conceptualization precedes operationalization and statistical analysis, and thus, construct validity is only relevant following a conceptualization stage.

also contribute to the changing social psychological environment. For example, firms that collectively leverage IT to co-create IT value (Kohli and Grover 2008), may create a different social environment (e.g., collaborative instead of aggressive), which can also redefine the social dimensions of value resulting from IT.

Lastly, extant IT value dimensions rarely disappear in conjunction with the emergence of new aspects of IT value. As we accumulate new aspects of IT value in response to changing IT and IT environments, there is onus on the researcher to consider the continuing relevance of extant dimensions, thereby further complicating the conceptualization effort. For example, although new value dimensions for mobile devices need to be captured, decades-old aspects such as system quality and information quality (DeLone and McLean 1992) may still remain fundamental and relevant for conceptualizing IT value. That is, “undying” IT value dimensions can accumulate as new research outcomes emerge, thereby exponentially increasing the complexity of appropriately conceptualizing IT value.

In conclusion, our concern is that clearly conceptualizing IT value is becoming increasingly complex and difficult. For any single study or project, clear conceptualization, if achievable, is demanding, costly, and error prone. Given those concerns, greater effort to advance methodological theories regarding how to clearly conceptualize IT value, should be made.

However, before relevant actions could be effectively taken, a basic question regarding, what kinds of conceptualization should be considered as clearly formulated (i.e. implementing the higher-order criterion of construct clarity), must be addressed. As such, we move down to a lower level to consider another question, what clear IT value conceptualization ought to look like. Towards this aim, we draw from the Facet Theory literature to further elaborate some tentative, relatively lower-order ideas.

3. Theoretical Foundation

To illustrate how the Facet Theory literature is relevant, we provide a brief summary of the original proposition of Facet Theory and then evaluate the historical contribution of Facet Theory to various disciplines and subject areas, delineating its key strengths and weaknesses. Then, we explain our selective focus on the philosophical imagery from Facet Theory and its derived theoretical logic.

3.1. Origin of Facet Theory

Facet Theory (FT) and its related concepts such as *Facet*, *Facet Analysis*, and *Facet Design* were first introduced by Louis Guttman (Guttman 1954a; 1954b) in the discipline of Psychology, or more precisely, its sub-discipline Psychometrics. The original proposition of *Facet Theory* intended to provide “a systematic approach to facilitating theory construction, research design, and data analysis for complex studies, that is particularly appropriate to the behavioral and social sciences” (Guttman and Greenbaum 1998, p. 13). Note that, like many social scientists, Guttman has his own use of the term “theory”, which is different from more mainstream views[3] in the disciplines of Management and Information Systems. According to Guttman (1954a), a “theory” mainly consists of three parts: (1) a definitional framework for a content universe, (2) a structure of empirical observations, and (3) the rationale for the correspondence between the definitional framework and the structure of empirical observations (Shapira and Zevulun 1979). A complete process of “theory” construction thus starts with the precise articulation of a definitional framework for a universe of observations in the area of study, and ends with the examination of correspondence between the definitional framework and collected empirical data.

[3] Such as the view of Sutton and Staw (1995) who argued that a list of variables, or a construct, alone, is not a theory. A theory needs to explain “why variables or constructs come about or why they are connected” (Sutton and Staw 1995, p. 375).

FT is predominantly concerned with the arbitrariness of definitions, as argued by (Guttman 1971, p. 329) …

> *Definitions are of course arbitrary. […] One can make words mean what one wishes [… hence,] all that is formally required of a definition is that it be clear [so that to] enable reliable use of the concept concerned. A more informal, heuristic, desideratum is that it actually influence[s] theorists and researchers to progress in their work.*

In this sense, the essential strategy in FT is to enumerate a list of related concepts along with the focal concept under study, and to define all concepts under the same heading, or within a *definitional framework* (Guttman 1971). The collection of related concepts is presumed to represent the *content universe* within the domain of investigation. To precisely represent the relationships of related concepts, or in other words, the structure within a content universe, Guttman (Guttman 1954a; 1954b) introduces the concept of *facet* to construct the definitional framework. Such a framework is called the *facet definitional framework*. Under this framework, related concepts are differentiated along some common properties of these concepts within the content universe; those properties are defined as *facets* in FT. Based on Set theory, a facet is defined as a Cartesian set[4], representing a common property of these related concepts (Shye et al. 1994). Hence, like a set, one facet can have multiple elements. Each element is an instantiated property that is owned by one or multiple related concepts. For example, consider a content universe consisting of two related concepts, information quality and system quality, both of which are frequently adopted in the literature to evaluate some information system (DeLone and McLean 1992). While different regarding the object being evaluated, they tend to both capture a certain kind of object-based belief, namely, belief about information and belief about quality respectively (Wixom and Todd 2005). As such, it might be reasonable to define an *evaluative response* facet consisting of only one element, object-based belief.

Related concepts can be differentiated by more than one facet. A collection of these facets makes up a facet definitional framework. When a content universe is defined by a facet definitional framework, each concept in the content universe should correspond to a combination of elements, with each element from a separate facet. In addition, Guttman (1954a; 1954b) suggests this combination of elements can be used to distinctively define that particular concept.

Based on the preceding conception, Guttman (1954a; 1954b) further suggests such a combination of elements can be represented as a single semantic sentence. This sentence is useful to act as a scale to empirically measure the concept. The correspondence between concept and sentence is called *mapping sentence* (Shye et al. 1994). When the whole collection of those scales is sampled in the population, empirical data are expected to exhibit similar structure as the facet definitional framework (Guttman and Greenbaum 1998). The process of analyzing empirical data structure to examine correspondence with a facet definitional framework is called *Facet Analysis* (Shye et al. 1994). The research design entailed, to complete the entire Guttman’s “theory” construction process, is called *Facet Design* (Shye et al. 1994).

Note that the examination of correspondence does not confirm or disconfirm the existence of a certain facet definitional framework. Rather, it only confirms its usefulness (Guttman and Greenbaum 1998). To conduct facet analysis, a set of statistical procedures is recommended, called *Smallest Space Analysis* (SSA) (Guttman 1968). For example, if elements in one facet *A* are ordered, it is hypothesized that the empirical data measured by the sentences mapped with elements in facet *A*, should be ordered accordingly. If such correspondence were statistically strong (tested with SSA procedures), we would have more confidence that the hypothetical structure, where the elements are ordered as such in facet *A* is useful.

[4] For a Cartesian set, elements of a set are ordered based on an axis.

Interestingly, although Guttman illustrated his notion of theory, his use of the term "*Facet Theory*" per se does not seem to align with his own notion; namely, *Facet Theory* is not a theory either by the definition of Guttman or by other definitions such as Sutton and Staw (1995). Guttman's original articulation of FT is represented as a "theory construction" methodology; however, given its different conception of "theory", it would be more appropriate in today's language (that is, a theory must include constructs and relationships among the constructs rather than only the constructs), to characterize FT as a methodology for construct definition, operationalization and validation. Hence, to avoid confusion, we adopt the term *Facet Theory Methodology* (FTM) to replace the use of *Facet Theory*, specifically referring to Guttman's "theory construction" methodology as introduced above. In the subsequent discussion, we will consistently use the term FTM as such.

3.2. Impact of FTM

Guttman's creative work on *Facet Theory* (FT) has been influential across various disciplines and subject matter. One contribution of FT is to the development of measurement theory in Psychometrics, or the methodology of measurement (Guttman 1971). Although developed a half century ago, FT techniques are yet being used, either jointly as a complete process, for example, in umbrella construct studies on work commitment (Carmeli et al. 2007; Morrow 1983), work values (Elizur 1984), and interpersonal trust (Paul and McDaniel 2004); or partially integrated with other methods, such as for measurement scale development (Chin et al. 2008), and/or in the data analysis process (Loehlin 1998).

It is also perceived that FTM is an implicit theoretical basis for statistical data analysis techniques, such as *Multidimensional Scaling* (MDS) (Borg and Groenen 2005). More specifically, it is argued that FTM offers a theoretically meaningful interpretation for some statistical procedures (Borg and Groenen 2005). For example, in MDS, FTM can explain the treatment of data with a regional hypothesis, which states that, "the MDS space can be partitioned such that each region represents a different facet element" (Borg and Groenen 2005, p. 89). In this manner, the logic of FT brings meaning to those statistical procedures, for the purpose of improving their empirical usefulness (Borg and Groenen 2005). FTM is also considered by some as the early foundations of factor analysis (Lange 2008; McGrath 1984; Loehlin 1998).

In addition, the logic of FTM is useful for the development of typologies in behavioral and social sciences (Lange 2008; Shapira and Zevulun 1979). In typologies, types are often conceived as implicitly classified by some underlying dimensions (Doty and Glick 1994). From this point of view, many researchers were implicitly employing logic akin to FTM to distill facets for some domain of interest, and, subsequently, to develop a typology based on those facets (McGrath 1968; 1984). As such, it is the particular contribution of FTM that defines these analytic components used for typology development and gives this process a theoretical basis (McGrath 1968). More specifically, the explicit articulation and elaboration in FTM has been a useful incentive for researchers to more systematically consider important similarities and differences within the same domain of interest (McGrath 1968). Thus, theorists have appropriated FTM for exploring the conceptual domain and representing typologies based on the conceptual domain (McGrath 1984), rather than merely using FTM as an empirical analysis tool (Lange 2008).

Though useful, FTM as a methodology has been rarely employed comprehensively, and less so more recently. One reason might be the overlap between FTM and other data analysis techniques such as factor analysis (Shapira and Zevulun 1979). 'Comprehensiveness' as a methodology is a quality often advocated of FTM, to differentiate it from other techniques that focus more narrowly on data analysis (e.g. Guttman and Greenbaum 1998; Shapira and Zevulun 1979; Shye et al. 1994). However, it is unclear how this distinction is useful, as researchers regularly, effectively integrate data analysis techniques, such as factor analysis or multidimensional scaling, with other research processes.

Another potential reason FTM has not seen wider application might be its ambition to span the entire research process; this goal maybe perceived by other researchers as grandiose and infeasible. It is perhaps because of this perception the ideas of FTM have only been gradually assimilated by various streams of research.

Ironically, FTM, though claimed to be comprehensive, has been challenged because of its inattention to the full research process. For example, the selection of related concepts, the selection of facets, and presentation of the facet framework, rely heavily on the researchers' own intuition, observation and understanding of the domain of study (Shapira and Zevulun 1979). As such, FTM is criticized for its lack of systematic procedures and activities for these critical steps, which can, and often do, entail substantial effort and uncertainty (McGrath 1968).

We speculate that FTM has been ostracized for its implied autonomy; its inattention to links with existing knowledge. Scientific knowledge rarely exists in isolation, but needs to be part of the larger scientific enterprise. Even after several decades' of its development, we perceive difficulty positioning FTM relative to other thought and the collection of scientific knowledge. Many concepts and processes in FTM are analogous to processes in other methodologies, and to concepts we are using today such as *construct*, *item*, *measure*, *operationalization*, etc. There has been little effort to explicitly bridge the gap between FTM and contemporary concepts and methodologies. With such a gap, it is difficult for us to either judge the quality of studies using FTM or evaluate the true strength of FTM.

As such, it is one goal of our writing to bridge this gap; particularly, to better understand FTM in terms of existing knowledge, and, thereby, to leverage its utility. In light of its limitations, another goal is to delineate various concepts and processes in FTM, and, to extract the 'spirit of FTM'. We argue the spirit of FTM is useful for clarifying overlapping concepts. With these two purposes in mind, we begin our discussion by exploring what the spirit of FTM is and how we can use it for clarification.

3.3. On the Narrative Use of FTM

Rather than its measurement and empirical analysis aspects, which have received relatively more attention (e.g. McGrath 1968; 1984; Lange 2008), we selectively focus on the theoretical logic of FTM. We believe the theoretical logic of FTM constitutes its central value. Given this focus, we are not concerned with aspects of FTM other than the theoretical logic, such as the suggested "theory construction" process in FTM. We next illustrate what we mean by the theoretical logic of FTM.

A distinction between the "philosophical imagery" of FTM and other parts such as the corresponding techniques or methods described in FTM can be made (Shye et al. 1994). Shye et al. (1994) employs the term, "philosophical imagery", to denote the basic ontological assumptions held in FTM. This imagery *a priori* conceives concepts as related entities, a collection of which constitutes a content universe. A content universe is the domain of interest under investigation. The notion of philosophical imagery and its correspondent content universe, is thus contrasted with the more conventional "mechanical view" originated in natural science, which posits that concepts are discrete entities; and, as such, they can be independently defined and, subsequently be used to investigate causal relationships among them (Shye et al. 1994).

This philosophical imagery is one of the fundamental premises we emphasize. Accepting such imagery, we further accept the imperative to precisely delineate the conceptual overlap among related concepts prior to the investigation of any causal relationships among these concepts and others. To achieve such a goal, FTM embodies logic for exactly specifying the conceptual overlap among related concepts (McGrath 1968). In essence, this logic formally describes the structure and the state of an ideal classification system that ought to clarify related concepts to the extent possible. Herein, we denote such logic as the theoretical logic of FTM.

The theoretical logic can be precisely described as a set of ideal principles adapted from McGrath (1968, p. 192-197) as below[5]. These principles are adapted to be consistent with terminology we employ herein.

P1. Concepts should be classified in terms of all relevant facets.

P2. Each facet should be analyzed into a set of collectively exhaustive elements.

P3. Each facet should be analyzed into a set of mutually exclusive elements.

P4. The logical relationships among elements of a facet should be specified.

P5. The logical relationships among facets should be specified.

P6. The facets, collectively, should be logically exhaustive of the content universe.

P7. The facets and the elements of facets should yield to the principle of concordance.

According to these principles (particularly P1, P2, and P3), related but different concepts within a content universe ought to be analyzed along relevant facets and elements of facets, where each concept can be defined by a combination of elements with each element from a distinctive facet.

For example, consider three concepts related to satisfaction: user satisfaction (Wixom and Todd 2005), user information satisfaction (Ives et al. 1983), and end-user computing satisfaction (Doll and Torkzadeh 1988). Assuming they are the only related concepts under investigation, the content universe related to satisfaction thus consists of these three concepts. User satisfaction refers to “the attitude that a user has toward an information system” (Wixom and Todd 2005, p. 87). User information satisfaction, in contrast, is defined as “the extent to which users believe the information system available to them meets their information requirements” (Ives et al. 1983, p. 785). Lastly, end-user computing satisfaction is defined as “the affective attitude towards a specific computer application by someone who interacts with the application directly” (Doll and Torkzadeh 1988, p. 261).

While these concepts are different on various aspects, they tend to hold one common form, characterized as the evaluative response towards some evaluative target (Melone 1990; Muylle, et al. 2004). Hence, two facets could be defined[6,7] to classify these three concepts: evaluative response facet and evaluative target facet. As user satisfaction and end-user computing satisfaction are defined as attitude whereas user information satisfaction is defined as belief, evaluative response thus can have two elements: attitude and belief[8]. In addition, according to the differences in evaluative target, these three concepts can also be distinguished on the evaluative target of information system, or computer application. Therefore, evaluative target facet could have two elements: information system and computer application[9]. In summary, these three concepts can be analyzed along two facets and two elements in each facet. This example is summarized in Table 1.

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[5] Note that several alternative sets of terminologies exist in the literature. For instance, McGrath (1968) and others, employ “property” and “dimension” as synonymous with “facet”, and refer to concepts as “objects” and elements of facets as “values” and “categories”. To be consistent, we implemented the set of terminologies (e.g. concepts, content universe, facets, and elements) that we found most intuitive.

[6] There might of course be other obvious facets not included in this example.

[7] Though in the preceding sentence we used the facet names in the general definition of IT value, we are not advocating this is *essential*. Unlike the original FT’ proposition by Guttman, we believe the linguistic definition of IT value does not *necessarily* need to reflect the names of facets defined. We have done so here for clarity of illustration.

[8] For the purpose of demonstration, herein, we simply assume the definitions of these concepts have accurately captured their underlying conceptualizations.

[9] We do not here clarify the implied distinction between ‘information system’ and ‘computer application’, but simply assume they are conceptually distinctive types of IT artifact for illustration purposes (see Orlikowski and Iacono (2001) for further discussion on how IT artifacts could be conceptualized differently).

Table 1. An Example of Applying the Theoretical Logic of FTM

Facet	User Satisfaction	User Information Satisfaction	End-User Computing Satisfaction
A: Evaluative Response	$A_{[1]}$: Attitude	$A_{[2]}$: Belief	$A_{[1]}$: Attitude
B: Evaluative Target	$B_{[1]}$: Information System	$B_{[1]}$: Information System	$B_{[2]}$: Computer Application

Based on the defined facets and elements of facets, user satisfaction, therefore, can be uniquely characterized by a combination of elements, denoted as "$A_{[1]}B_{[1]}$". Similarly, user information satisfaction and end-user computing satisfaction can also be uniquely characterized as "$A_{[2]}B_{[1]}$" and "$A_{[1]}B_{[2]}$" respectively.

Ideally, according to P1, P2, P3, and P6, exhaustiveness and mutual exclusivity are required for the theoretical logic of FTM to classify concepts. The exhaustiveness criterion for facets (P6) is met only when, defining an additional facet will not achieve the further distinction of concepts in the content universe; in contrast, the exhaustiveness criterion for elements (P2) is met only when each concept in the content universe can be characterized by at least one element in each facet. For example, assuming we did not define evaluative target facet in the previous example, in that case, user satisfaction and end-user computing satisfaction are characterized as the same by existing facets. Therefore, by defining the additional evaluative target facet, user satisfaction and end-user computing satisfaction can be further distinguished. The set of facets that only contain evaluative response thus is not exhaustive for the content universe consisting of these three concepts (this assumes we have not discerned they are the same concept with different names). In contrast, the set of facets containing both evaluative response and evaluative target, is exhaustive, as all three concepts in this content universe are uniquely characterized.

Elements within a facet too are ideally exhaustive. Consider another variation of the previous example, where evaluative response facet has only the element of attitude. In such a case, the set of elements for evaluative response facet is not exhaustive, as user information satisfaction cannot be characterized by any element in the evaluative response facet.

In addition to exhaustiveness, elements in any facet must be mutually exclusive, according to P3, such that each concept in the content universe can be characterized by only one element of any given facet. For example, all three concepts of user satisfaction, user information satisfaction, and end-user computing satisfaction, can be exclusively characterized by either attitude or belief of evaluative response facet. The elements in evaluative response facet are thus mutually exclusive.

According to P4 and P5, relationships among facets and relationships among elements of a facet must be clearly specified. First, for relationship among elements of a facet, there might exist several possibilities. For instance, a hierarchical order of elements could exist, such as computer application and information system in evaluative target facet, based on level of analysis from lower to higher. Relationship between these two elements could also be specified as inclusive – information system consists of computer application and other parts.

While relationships could also exist among multiple facets, the ideal situation is when facets are logically independent of each other; such a classification of facets being most efficient (McGrath 1968). Independence means the determination of elements in any facet will not affect the determination of elements in another facet. When the independence criterion is not met, there will exist so-called 'null cells' (in a cross-reference of all facets in multidimensional space) that will never be utilized (McGrath 1968). Following the previous example, assume we have defined an additional facet, called theoretical level, characterizing the level of theory to which the generalization of the concept is manifested (Kozlowski and Klein 2000). We further assume this facet has only two elements, individual level and organizational level. As such, this facet is not independent to evaluative response facet, as when attitude is used to characterize concepts, individual level will simultaneously be used. In this example, the combination of attitude and organizational level will never be used to characterize any existing or potential concepts[10]. Their combination will thus result in some null cells. Null cells indicate inefficient[11] use of facets; thus, they are undesired results given the ideal independence criterion for facets.

The last principle (P7) requires facets and elements of a facet, yield to the principle of concordance, or the contiguity principle (McGrath and Altman 1966). This principle evaluates the usefulness of the classification with intended facets and elements of facets, as argued by McGrath (1968, p. 197, emphasis added) that…

> *Regardless of the purpose of the system or the nature of the objects to be classified, though, it seems clear that the major aim of any* ***a priori*** *classification ought to be to order the objects in terms of their logical properties in such a way as to be predictive of their ordering on (meaningful) empirical properties.*

Central to this principle is the idea that concepts that are theoretically classified as alike should also be observed to be empirically alike (McGrath 1968). Again, in the previous example, user satisfaction and end-user computing satisfaction are only different on the evaluative target facet, whereas user information satisfaction and end-user computing satisfaction are different on both evaluative response and evaluative target facets. As such, we might conclude end-user computing satisfaction is more 'like' user satisfaction than user information satisfaction (by pragmatically assuming that every facet has equal importance when evaluating the 'likeness' of concepts). Although this might not be the only way to operationalize likeness, likeness here, if operationalized as such, is thus also hypothesized to be observed from empirical evidence.

The philosophical imagery of FTM and its derivative theoretical logic is the spirit of FTM we emphasize. We next argue such emphasis has implications for conceptualization in general and consequentially for conceptualizing IT value in particular.

4. A Deeper Understanding of Clear Conceptualization

The spirit of FTM is useful for establishing a meta-theoretical view for clarifying overlapping concepts. Specifically, two points can be discerned.

The philosophical imagery provides an alternative methodological view for understanding the relationships among overlapping concepts. A conventional methodological view dominating our discipline is that concepts should be differentiated based on their positions in the nomological network (Cronbach and Meehl 1955). According to Cronbach and Meehl (1955), a nomological network relates theoretical constructs to each other or theoretical constructs to observables; if constructs are operationalized to qualitatively measure different things, they are considered to be in different positions in the nomological network and as such, they are qualitatively different. This dominant ontological view is particularly useful for construct operationalization and measurement, and it also provides a convenient way for researchers to differentiate theoretical constructs through comparing measures.

However, this dominant view is less useful for clarifying constructs at the theoretical level; and as such, it discourages conceptual clarification work. This is because this ontological view essentially supports a dichotomous distinction of theoretical constructs, namely, constructs are either exactly the same or completely different, based on their positions in a nomological network. We speculate this dominant view further encourages laziness with theoretical clarification of similar constructs, as strong believers in this dominant view need only differentiate their constructs from previous work by simply adopting a different set of measures. Our general experience is that many studies, though able to differentiate their

[10] We assume a collective's attitude is no longer an attitude, but another instance of evaluative response.
[11] While we refer to 'efficiency' the main value from seeking such efficiency is parsimony, simplicity, consistency, completeness and veracity; seeking efficiency yields insights that achieve these qualities of the concept universe.

theoretical constructs at the measurement level, are unable to do so adequately at the theoretical or conceptual level. Such concern and craving for clear concepts is expressed and amplified in several recent editorial notes (e.g. Suddaby 2010; Markus and Saunders 2007).

In contrast, the philosophical imagery of FTM advocates an alternative ontological view of theoretical constructs by explicitly acknowledging a continuum of construct relationships from exactly the same to completely different. Such a view affords a basis to meaningfully consider how one theoretical construct is different from (or turns out to be exactly the same as) similar ones. Theoretical clarification of one construct from other similar ones is thus encouraged. Therefore, the philosophical imagery of FTM can complement existing ontological views of theoretical constructs, by facilitating theoretical clarification and, subsequently, continuous improvement of construct clarity.

Additionally, built on the philosophical imagery, the theoretical logic of FTM further offers theoretical guidance on formulating clear conceptualization; specifically, a tangible and achievable roadmap to comparing and contrasting similar, potentially overlapping concepts. Of course not all concepts should be compared and contrasted, and where they are, the criteria used should be clear. Thus, when comparing and contrasting different concepts, we must ask, to what extent should these concepts be compared and contrasted, on what alternative bases, and which such basis should be preferred?

To answer these questions, the theoretical logic sets several ideal goals regarding how similar theoretical constructs ought to be related. The logic provides a tangible means of systematically comparing and contrasting concepts. Although the full set of ideals may never be fully achieved, there is merit in striving to approximate them as far as possible as our understanding evolves – the approximation of truth in any scientific inquiry (Kaplan 1964).

Further, these goals or ideals have been implicitly espoused by others. As noted by MacKenzie et al. (2011), in defining a construct, attributes or characteristics that are common to all exemplars of this construct, as well as attributes or characteristics uniquely possessed by exemplars, should be specified, in order to adequately distinguish them from other similar constructs. Similarly, Nunnally and Bernstein (1994) argued that defining a construct not only requires explication of its conceptual domain but also adequately addressing how this construct is different from other constructs.

In summary, the philosophical imagery of FTM provides a solid meta-theoretical view for exploring construct clarity. The derived theoretical logic of FTM is most useful to define a construct and its relationships (instantiated by defined facets and elements of facets) to other related similar, potentially overlapping constructs, in order to be clear. Following this approach, any construct ought to be defined based on other related constructs.

5. Conclusion

This paper is initially motivated by the central importance of the IT value concept in the IS research and perceived issues with its conceptualization in terms of research comparability and cumulative contribution to knowledge. It first suggests, that construct clarity is essential in judging a good (IT value) conceptualization, and goes on to discuss a meta-theoretical view for conceptualization, instantiating the higher-order criterion of construct clarity. This view offers some tentative ideas regarding what a clearly conceptualized construct ought to be. We believe these are useful considerations that could potentially inform advancement of methodological theories of conceptualization; that is, prescriptive guidelines addressing how to appropriately conceptualize.

6. References

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