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# GTTA 2: AN EXTENSION OF THE GENERAL THEORY OF TECHNOLOGY ADOPTION (GTTA)

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*“... more studies of TAM per se will die out, unless someone can find a new addition to TAM and the paradigm shifts” Alan Dennis*

## ABSTRACT

The value perspective to technology adoption has many advantages. They include identifying user benefits beyond perceived usefulness and perceived enjoyment and user costs beyond effort expectancy (inverse of ease of use). However, although traditionally benefits and sacrifices (costs) are considered to be the two dimensions of value, we suggest that a third dimension of user needs is missing in these conceptualizations. The value perception of users depends not only on the benefits provided versus costs incurred but also on the needs profile of the users. This tripartite conceptual of value is useful in providing deeper insights into technology adoption.

## Keywords

General Theory of Technology Adoption

## INTRODUCTION

Kakar and Kakar (2017) proposed a new approach to technology adoption. They suggested that that the behavioral intention (BI) to purchase, choose or use a new technology is determined by the perceived value of the technology to the user. This conceptualization helps extend technology adoption from the Behavioral Intention (BI) of users to use the system to consumer choice of technology and purchase intention. Further, the value perspective in their proposed theory of GTTA (General Theory of Technology Adoption) helps identify additional constructs such as user benefits beyond perceived usefulness and perceived enjoyment and user costs beyond effort expectancy (inverse of ease of use) used in the Technology Acceptance Model (TAM)– see Table 1.

TAM	GTTA
<b>BENEFITS</b>	
Perceived Usefulness (PU)	Utilitarian Benefits (UB)
Perceived Enjoyment (PE)	Hedonic Benefits IHB)
-	Social Benefits (SB)
<b>COSTS</b>	
Ease of Use (PEOU)	Effort Expectancy (EE)
-	Financial Costs (FC)
-	Switching Costs (SC)
-	Opportunity Costs (OC)

**Table 1. Comparison of TAM with GTTA (Kakar and Kakar, 2017)**

However, one important dimensions of user value has been overlooked. The value perception of users depends not only on the benefits provided versus costs incurred but also on the varying needs profile of the users. We explore

this third dimension of value in this study and suggest why including it in GTTA will provide a more complete perspective to technology adoption.

## THEORY DEVELOPMENT

Kakar and Kakar (2017) in their GTTA used the aforementioned two dimensional conceptualization of value (costs and benefits) to arrive at 2 propositions leading to one theoretical statement.

Proposition 1: The BI to purchase, choose or use a technology will be positively influenced by the perceived utilitarian, hedonic and social benefits provided by the technology to the user

Proposition 2: The BI to purchase, choose or use the technology will be negatively influenced by the financial costs, effort expectancy and opportunity costs and positively influenced by switching costs

Theoretical Statement 1: “The behavioral intention (BI) to purchase, choose or use a new technology is determined by the perceived value of the technology to the user”

In this study we suggest that the value perception of users depends not only on the benefits and sacrifices (costs) but also on the needs profile of the users. This tripartite conceptual of value as comprising three dimensions will be useful in providing deeper insights into technology adoption. Users have basic psychological needs that motivate them to use particular products and product features that fulfill those needs and also drive them to willingly incur certain costs. Thus depending on the user needs profile, the value provided by the software product will be perceived uniquely by individual users. However, although users’ value perception was suggested by (Woodruff, 1997, p. 140) as “what they want and believe they get from buying and using a seller’s product.” (Woodruff, 1997, p. 140), the role of basic psychological needs on the user preferences for HB, UB and SB provided by the software product has not been explored in information systems literature.

There is a stream of research on fundamental human needs starting with McDougall (1908), Freud (1920), Murray (1938), Maslow (1954), Baumeister and Leary, (1995) and Reis, Sheldon, Gable, Roscoe and Ryan (2000). In a more recent development, Sheldon, Elliot, Kim and Kasser (2001) examined 10 different feelings, each of which has been proposed as a need by prominent psychological theories. The identified set of 10 basic human needs (autonomy, competence, relatedness, physical thriving, security, self-esteem, self-actualization, pleasure-stimulation, money-luxury, and popularity-influence), are in line with other theories within the literature stream. Of these 10 needs, the needs for self-esteem, relatedness, autonomy and competence were found to be most salient followed by pleasure-stimulation, physical thriving, self-actualization, security, popularity influence and money-luxury (Sheldon, Elliot, Kim and Kasser, 2001).

However, there are individual differences in psychological needs (Deci and Ryan, 2000). For example, the individual need for competence and relatedness may vary. Studies by Richer, Blanchard, and Vallerand (2000) and Richer and Vallerand (2000) have found that individuals high in need of competence are low in need of relatedness. Further, individuals with a higher need for competence may have a higher need for autonomy than individuals with higher need for relatedness. Thus each user has her own unique needs profile.

There is empirical evidence of users’ varying needs profile or “innate propensities” (Ryan and Deci, 2000) as well as their impact on user preferences and use behavior. Service value research has shown that women have stronger hedonic shopping motivations and emphasize hedonic value more than men (Arnold and Reynolds, 2003). Research on technology acceptance also suggests Perceived Enjoyment impacts males and females differently (Gefen and Straub, 1997; Venkatesh, Morris, and Ackerman, 2000; Wu and Lu, 2013). Further, in the early stages of using a new technology, such as new software features, younger men tend to exhibit a greater tendency to seek novelty and

innovativeness (e.g., Chau and Hui, 1998). Thus the relative importance of HB (psychological need for pleasure-stimulation) to users will vary with age and gender. In the theory development section we suggest how each of the 10 psychological needs of users will influence user preference for UB HB and SB.

We suggest that the three values, UB, HB and SB, align well with the ten users' fundamental psychological needs. The needs for self-esteem, relatedness and popularity-influence can be fulfilled by the SB provided by the software product. By expressing their personal values through the use experience (e.g. Chandon et al., 2000), users of software products can establish social standing and relationships (e.g. Belk, 1988; Solomon, 1983) and as a way to engage in social activities with family and friends (e.g. Arnold and Reynolds 2003). SB will therefore have a higher impact on users with high need for self-esteem, relatedness and popularity-influence than with users with low need of self-esteem, relatedness and popularity-influence.

The needs for competence, security and money-luxury can be fulfilled by the UB provided by the software. Competence is related to accomplishing complex and difficult tasks and projects. This can be achieved through UB of the software product. Additionally, UB provides a means for extrinsic benefits such as job promotion, career progression, monetary gains and security. The need for autonomy, self-actualization and pleasure-stimulation can be provided by HB of the product. While UB is associated with work performance and thereby competence, HB is associated with pleasurable experiences.

The need for pleasure can be fulfilled through fun and enjoyment derived from the use of the system and the need for stimulation from its novelty and aesthetics. The need for autonomy is fulfilled by HB of the product through non-directed action such as play or experience of fun and pleasure as contrasted with controlled activities such as accomplishing work through the use of software (UB). While work is accomplished through control and extrinsic motivation, activities that are interesting and spontaneously enjoyable are performed autonomously as an end in itself and not to accomplish some extrinsic goal. Therefore users high in need of autonomy will prefer HB. Further, "self-actualization means experiencing fully, vividly, selflessly, with full concentration and total absorption." (Maslow, 1965; Burlson, 2005). Such users are also more likely to seek HB from the products they use as the feeling of absorption and flow in self-actualization are derived through HB provided by the software product.

Thus the basic human needs will selectively moderate the impact of UB, HB and SB on user outcomes (see Table 2 for a summary) leading us to the following propositions:

User Needs	User Perceived Value
Autonomy	Hedonic
Competence	Utilitarian
Relatedness	Social
Security	Utilitarian
Self-Esteem	Social
Self-Actualization	Hedonic
Pleasure Stimulation	Hedonic
Money-Luxury	Utilitarian
Popularity Influence	Social

**Table 2. User Needs-Value mapping for interaction effect on UL**

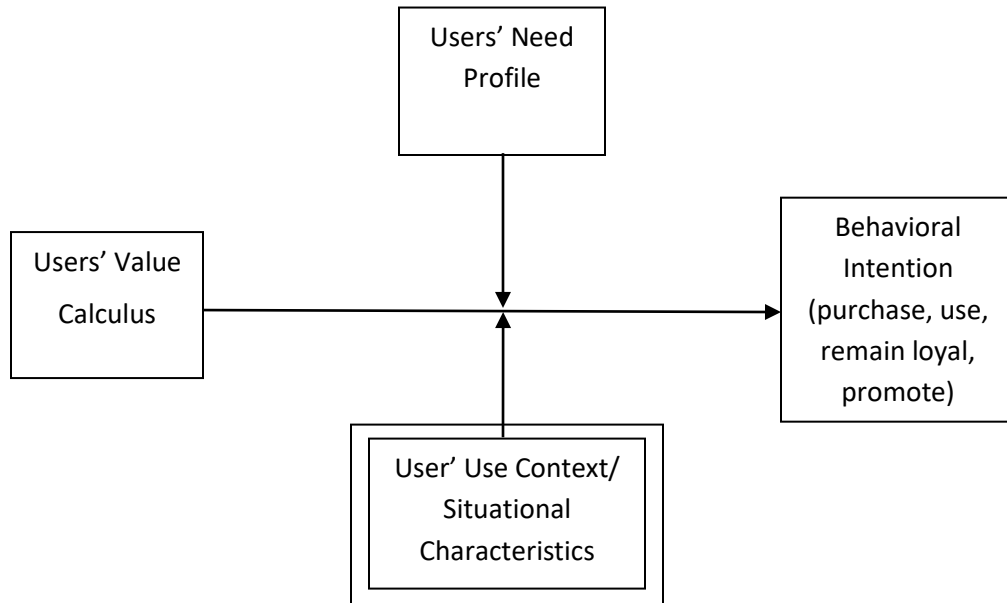
Proposition 3: Users' need for competence, security and money-luxury will moderate the impact of UB on users' value perception such that the impact of UB will be higher at higher level of these needs and lower at lower level

Proposition 4: Users’ need for autonomy, pleasure stimulation and self-actualization will moderate the impact of HB on users’ value perception such that the impact of HB will be higher at higher level of these needs and lower at lower level

Proposition 5: Users’ need for self-esteem, relatedness and popularity-influence will moderate the impact of SB on users’ value perception such that the impact of SB will be higher at higher level of these needs and lower at lower level

Basef on the above propositions we modify the theoretical statement 1 of GTTA based on their 2 propositions (Kakar and Kakar, 2017) to arrive at theoretical statement 2 (see Figure 1):

**Theoretical Statement 2:** The behavioral intention (BI) to purchase, choose or use a new technology is determined by the perceived value of the technology to the user. The user value calculus includes the three dimensions of value – benefits, costs (sacrifices) and user needs. While benefits will impact BI of users postively, the users’ needs profile will moderate the impact of benefits on BI selectively. Costs in general will impact BI negatively except for switching costs which will impact BI positively



**Figure 1. GTTA 2- Extension of General Theory of Technology Adoption**

As per plan, in the third and final stage, we will upgrade the GTTA 2 to GTTA 3 by applying Levitt’s (1980) total product concept to include the moderating influence of system use context on the impact of user perceived value on BI (see Figure 1).

**CONTRIBUTION**

The value perspective aligns the goals of the user with those of technology poroviders and the organizations that deploy them. The value based theory of the firm (Slater, 1997) suggests that the purpose of any organization is to provide value to its customers and users through its products and service and from the user value perspective the goals of the customers or users is to seek maximum value in the products and services they choose to adopt. In this study we propose and develop a three dimensional conceptualization of value – user benefits, costs and needs. This

approach is novel as it has neither been investigated in IS, HCI or consumer behavior literatures and is a unique contribution of the study.

The user needs perspective adopted in this study implies that depending on their needs profile users may give different priorities and weights to the various benefits (UB, HB, SB) in their value calculus. This insights provides a way for technology providers such as software development organization to positioning their products appropriately depending on the needs profile of the users it is targeting. Further, depending on the targetted users, the features of products can be designed/ upgraded appropriately for maximum impact on their BI. For the organizations that deploy these technologies it can provide deeper insights into why some users willingly accept a particular technology while others do not. Further, by bringing the user needs perspective to technology adoption this study helped confirm the validity of including SB in the user value calculus by Kakar and Kakar (2017). Self-esteem, relatedness and popularity-influence are three of the ten fundamental human needs that can be addressed by SB provided by a technology and which cannot be addressed by UB and HB.

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