

# Diffusion of innovations and compatibility essay sample

[Technology](#), [Innovation](#)



“ Theoretical and empirical research in technology acceptance, while acknowledging the importance of individual beliefs about the compatibility of a technology, has produced equivocal results” (Karahanna et al, 2006, p. 781). This study denotes the importance of integrating the compatibility construct within technology acceptance models as well as its confounding results in doing so. Rogers (1962) was the first one to introduce and define the term compatibility in his Innovation Diffusion Theory. “ Compatibility assesses the extent of congruence between a new technology and various aspects of the individual and the situation in which the technology will be utilized” (Karahanna et al., 2006, p. 782). Diverse studies identified a significant relationship between compatibility and technology acceptance (Agarwal and Prasad, 1997; Karahanna et al, 1999; Taylor and Todd, 1995). A study performed by Tornatzky and Klein (1982) concluded that, from ten innovative aspects, only relative advantage, complexity and compatibility were consistently and significantly related to technology adoption. However, integrating compatibility in models of technology acceptance has had limited success thus far. A frequent occurring problem amongst researchers was the inability to discriminate between compatibility and constructs equal to UTAUT’s performance expectancy. According to Karahanna et al. (2006) this was due to the inadequate operationalization of the compatibility construct. Rogers (1983) defined compatibility as the degree to which an innovation is perceived as being consistent with existing values, needs and past experiences of potential adopters.

Studies incorporating compatibility, defined it, like Rogers (1983) as multidimensional, yet operationalized it as a unidimensional construct (e. g. Moore and Benbasat, 1991; Taylor and Todd, 1995). Karahanna et al. (2006) attempt to overcome these methodological shortcomings by defining compatibility as the perceived cognitive distance between an innovation and the organization's habitual method of accomplishing a task. Inherently this means that individuals are not only prejudiced by the forerunner of the new technology but also by prior beliefs and behavior they developed throughout time. Compatibility should assess the equivalence between a new technology and different aspects of individuals and situations in which it will be employed. Karahanna et al. (2006) brought forward four dimensions reflecting this definition; compatibility with existing work practices, compatibility with preferred work style, compatibility with prior experience, and compatibility with existing values. Karahanna et al. took the three dimensions from Rogers' (1983) definition of compatibility (values experience and needs) as a starting point.

However, the ' needs' dimension was dropped from the start due to a tautological relationship with perceived usefulness. Moore and Benbasat (1991) discovered ambiguous relationships between their operationalization of compatibility and relative advantage. " The inclusion of ' needs' is considered to be a source of confounding with relative advantage, as there can be no advantage to an innovation that does not reflect an adopter's needs" (Moore and Benbasat, 1991, p. 199). Consequently they eliminated all items measuring compatibility with ' needs'. To prevent potential

confounding Karahanna et al. (2006) followed Moore and Benbasat's reasoning and eliminated compatibility beliefs about needs. Tornatzky and Klein (1982) reported two distinct concepts representing compatibility; consistency with the values or norms of potential adopters and congruence with existing practices.

The latter concept, also known as operational compatibility, got segregated by Karahanna et al. (2006). " We believe that a finer-grained elaboration of this specific dimension is necessary. It is possible to further disaggregate operational compatibility into three distinct dimensions: compatibility with prior experience, compatibility with existing work practices, and compatibility with preferred work style" (Karahanna et al., 2006, p. 784). Yet again this was corresponding to the reasoning of Moore and Benbasat (1991) who developed a four item operationalization for perceived compatibility;

1. Using [the innovation] is compatible with all aspects of my work.
2. Using [the innovation] is completely compatible with my current situation.
3. I think that using [the innovation] fits well with the way I like to work.
4. Using [the innovation] fits into my work style.

However, as mentioned above, Moore and Benbasat (1991) were concerned about the parallel between relative advantage and compatibility factors, since they did not emerge as separate factors in their final instrument. " While conceptually different, [compatibility and relative advantage] are being viewed identically by respondents, or that there is a causal relationship between the two" (Moore and Benbasat, 1991, p. 208). In their

following research Moore and Benbasat (1996) confirmed their assumption; they discovered a high correlation between relative advantage and compatibility, which indicated a causal relationship. Preceding research in the field of technology diffusion primarily considered compatibility beliefs as independent antecedents of acceptance. In contrast to these beliefs, Karahanna et al. (2006) hypothesize causal relationships among the compatibility beliefs and between compatibility, usefulness and ease of use. “ When a technology is congruent with the way an individual likes to work, because existing work practices have likely been modified to be consistent with such preferences, it will also be congruent with the existing practice” (Karahanna et al., 2006, p. 790).

However, due to the cross-sectional nature of their study, any statement concerning causality is based on theoretical arguments rather than empirical facts. See figure 2 for the theoretical model proposed by Karahanna et al. (2006). Karahanna et al. (2006) concluded that three of the four compatibility variables (existing practices, experience and values), perceived usefulness, and perceived ease of use together explain as much as one-third of the variance in self-reported usage scope and about 25 percent of the variance in self-reported usage intensity. No significant relationships were discovered between the compatibility beliefs and the usage construct. Furthermore, 43 percent of the variance in perceived usefulness is explained by perceived ease of use and the three afore mentioned compatibility constructs. Finally, compatibility with existing practices and experience

explain 33 percent of the variance in perceived ease of use. Innovation Diffusion Theory (IDT)

Research on the diffusion of innovation has been widely applied in disciplines such as education, sociology, communication, agriculture, marketing, and information technology, etc (Rogers, 1995; Karahanna, et al., 1999; Agarwal, Sambamurthy, & Stair, 2000). An innovation is “ an idea, practice, or object that is perceived as new by an individual or another unit of adoption” (Rogers, 1995, p. 11). Diffusion, on the other hand, is “ the process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 1995, p. 5). Therefore, the IDT theory argues that “ potential users make decisions to adopt or reject an innovation based on beliefs that they form about the innovation” (Agarwal, 2000, p. 90). IDT includes five significant innovation characteristics: relative advantage, compatibility, complexity, and trialability and observability.

Relative advantage is defined as the degree to which an innovation is considered as being better than the idea it replaced. This construct is found to be one of the best predictors of the adoption of an innovation.

Compatibility refers to the degree to which innovation is regarded as being consistent with the potential end-users’ existing values, prior experiences, and needs.

Complexity is the end-users’ perceived level of difficulty in understanding innovations and their ease of use. Trialability refers to the degree to which innovations can be tested on a limited basis. Observability is the degree to which the results of innovations can be visible by other people. These

characteristics are used to explain end-user adoption of innovations and the decision-making process. Theoretically, the diffusion of an innovation perspective does not have any explicit relation with the TAM, but both share some key constructs. It was found that the relative advantage construct in IDT is similar to the notion of the PU in TAM, and the complexity construct in IDT captures the PEU in the technology acceptance model, although the sign is the opposite (Moore & Benbasat, 1991). Additionally, in terms of the complexity construct, TAM and IDT propose that the formation of users' intention is partially determined by how difficult the innovation is to understand or use (Davis, et al., 1989; Rogers, 1995).

In other words, the less complex something is to use, the more likely an individual is to accept it. Compatibility is associated with the fit of a technology with prior experiences, while the ability to try and observe are associated with the availability of opportunities for relevant experiences. These constructs relate to prior technology experience or opportunities for experiencing the technology under consideration. Compatibility, and the ability to try and observe can be treated as external variables, which directly affect the constructs in the technology acceptance model. After the initial adoption, the effects of these three constructs could be diminished with continuous experience and reduced over time (Karahanna et al., 1999). Thus far, numerous studies successfully integrated IDT into TAM to investigate users' technology acceptance behavior (Hardgrave, Davis, & Riemenschneider, 2003; Wu & Wang, 2005; Chang & Tung, 2008). Few have attempted to examine all IDT characteristics with the integration of TAM. In

this research, we improve TAM by combining IDT characteristics, adding compatibility, complexity, relative advantage, and the ability to try and observe as additional research constructs to increase the credibility and effectiveness of the study.