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# TECHNOLOGY USE AS CONSUMPTION: A LONGITUDINAL STUDY OF SMART PHONES

*Research-in-Progress*

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## **Abstract**

*This paper investigates technology adoption and continued use as consumption behavior instead of through the traditional innovation/diffusion/acceptance frameworks. Building on consumer research we introduce the Theory of Consumption Values (TCV) to IS research in order to understand the underlying values and motives of technology usage. Data was collected through interviews, focus groups, and surveys from smart phone users during a six month period. We have adopted a narrative approach to analyze our empirical data and present the data as a dialogue between two smart phones. The story presented in the dialogue shows how different consumption values, including functional, epistemic, emotional, social, and conditional values, drive technology use and how they evolve over time. In the beginning, epistemic, emotional, social values drove the use. Later, functional value became the key driver.*

**Keywords:** Technology adoption, technology use, smart phones, consumption values,

## Introduction

When new technologies are developed and put on the market, some are adopted by a large group of users and have a profound impact on our daily life. At the present time, the mobile industry offers the promise of a technological revolution. The increased use of smart phone technology, which originally made gains in the business community, has recently exploded within the consumer market, driven primarily by the iPhone and the subsequent new offerings by major mobile phone manufacturers. Now millions of users have a single device with the potential to integrate many of the functions that previously required multiple technology artifacts.

Given the technological evolution and the increasing rate adoption of smart phones in the world, it become necessary to ask how and why do people use smart phone technologies for their everyday life and how does their usage change over time. Is it a question of fit among the best technologies for a certain task? Or is it a choice of the most convenient and available technology? To answer these questions we need in-depth insight into how people use technology and the underlying motives for using technologies over time.

The adoption and diffusion literature has identified a number of factors associated with adoption and diffusion of technologies including spreadsheets (Mathieson 1991), mobile phones (Kwon and Chidambaram 2000), and broadband internet (Hsieh et al. 2008) among others. Focus is given to understanding of the adoption or use at a specific point in time, yet technologies such as the smart phones challenge the understanding of adoption and diffusion as a discrete decision that takes place once (Sheth et al. 1991a, 1991b; Kleine III, 1992). Benbasat and Barki (2007) call for researchers to pay closer attention to IT artifact design and evaluation by end users, which reinforces Karahanna et al.'s (1999) and Holbrook's (2006) calls for researchers to explore the factors differentiating the drivers of initial adoption from those influencing continued use over time. This gap is further emphasized by Blechar et al. (2006), who stress the need to seek the underlying motives or values that drives users to adopt, use and consume technology in general and mobile phones in particular.

This study seeks to fill these gaps in adoption literature by exploring technology use from a consumption perspective through the introduction of the Theory of Consumption Values (TCV) (Sheth et al. 1991a, 1991b) to information systems research. We apply an Actor-network approach (Latour 1996) to include the artifact in the exploration of real-life scenarios that include multiple, readily-available technologies to choose among in a longitudinal field study, where 16 people have been given a smart phone free of charge.

The primary contribution to this paper is to introduce a different way to view technology acceptance and use: technology use as consumption decisions driven by underlying consumption values: functional, social, emotional, epistemic, and conditional.

The remainder of the paper is structured as follows: the first section introduces TCV. The following section details the research methodology used to collect, present, and analyze the data. The subsequent section presents the empirical findings through an illustrative dialogue between two smart phones. The dialogue is then analyzed through the theoretical lenses of TCV. Finally, we discuss results and present concluding remarks and avenues for further research.

## Theory of Consumption Values

In this paper we view the use of technology as a consumption decision based on underlying motives (consumption values) that may change and evolve over time. Consumption values are fundamental to consumer research. They address the implicit and explicit reasons and motives during decision-making. Academic consumer research began in the mid sixties (Holbrook 2006), since when many models, frameworks, and theories have emerged that explain, predict, and describe consumer choices. Examples include the TCV (Sheth et al. 1991a, 1991b), experiential value (Mathwick et al. 2001), and Holbrook value typology (Holbrook, 2006). In the early days the consumer was viewed as a rational economic decision maker who processes information in order to maximize value (Sheth 1979). Consumer value was primarily conceptualized as a tradeoff between price and quality. In the early 1980s, however, researchers began to question the logic of the economic rational man and the assumption that consumers resemble a calculator (Holbrook 2006). To address this gap in understanding, Holbrook and Hirschman (1982) proposed what is known as the experiential approach. They introduced concepts such as fantasies, feelings, and fun (Holbrook 2006). Since then consumer research has evolved from a simplistic view of the consumer decision process to embrace many more reasons and motives including both intrinsic and extrinsic values (Holbrook 2006).

The TCV (Sheth et al. 1991a, 1991b), which was applied to technology by Alpert's (1994) marketing study of the decline in functional, epistemic, emotional, and social value of technology over time, outlines five different values that underlie consumer choice. The framework thereby provides an encompassing understanding of the consumer experience. A particular choice may be determined by one value or influenced by several values. The five values are described below:

- Functional value follows the logic of the rational economic man and assumes economic utility theory. Use and purchase decisions are based on characteristics or attributes of the consumable item. For example, the purchase or use of a mobile phone might be based on functionality, quality or price.
- Social value is important in consumer decisions which involve highly visible products or services to be shared with others (such as gifts). Social value embraces the idea that some products or services possess symbolic importance in excess of their functional worth.
- Emotional value is the third type of value influencing consumer choice. The thrill, joy, or excitement of a product is the emotional value. Aesthetic considerations, such as beauty, can add emotional value to a product.
- Epistemic value applies when one is bored with a current product, curious about something, or just wants to learn something new. It derives its value from the curiosity to learn or explore something new or different.
- Conditional value applies to products or services that only have a value dependent the context (time or place). For example, an umbrella only has value when it rains.

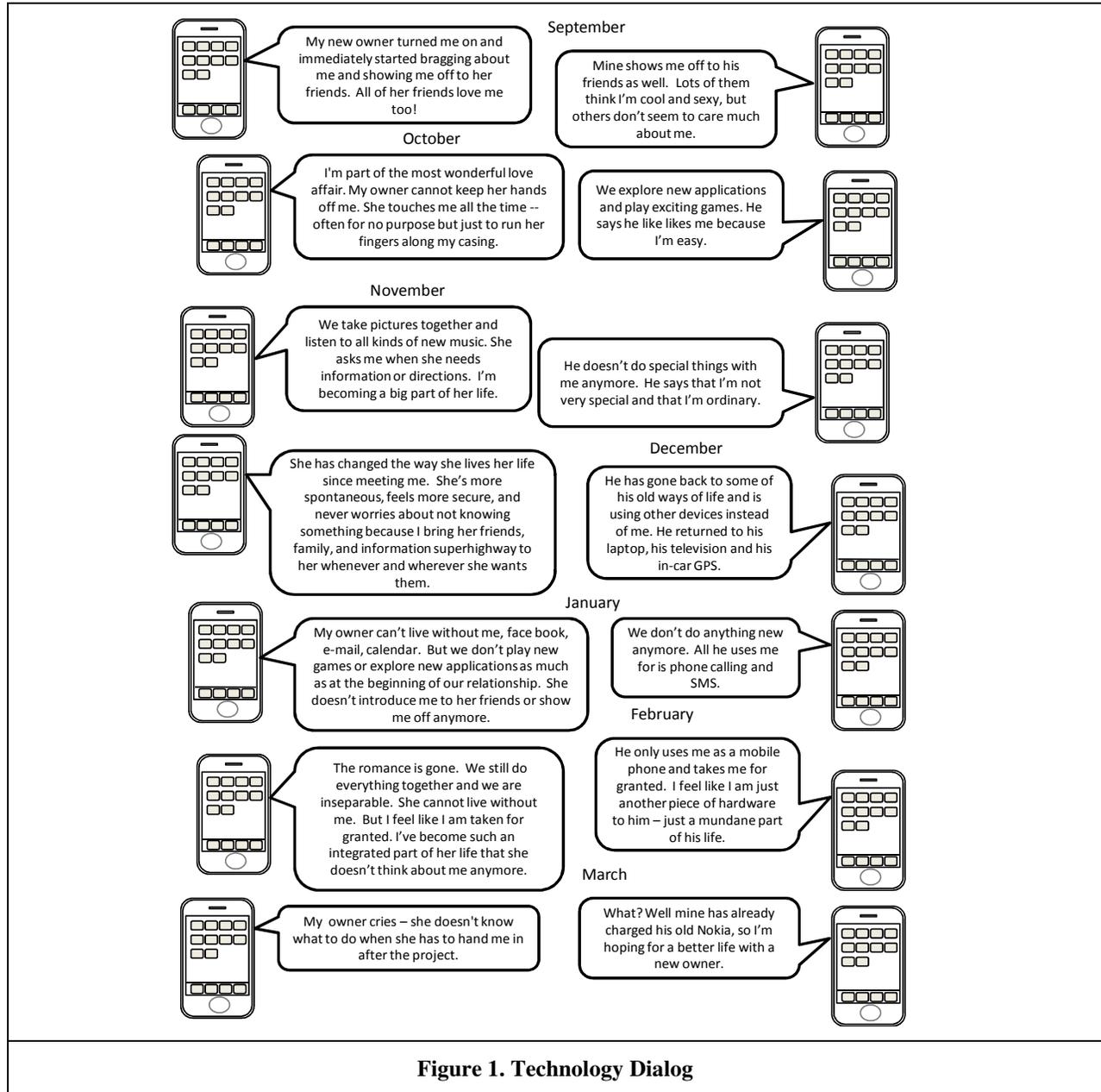
## Methodology

This study is part of a larger research project on future mobile services. The aim of this study is to increase the understanding of how and why people use technology over time. We followed 16 iPhone users who were given iPhones and operator subscriptions to use at their discretion for a 6-month period that commenced shortly after the European product launch. The participants were enrolled in a master program in e-Business. The mixed gender group ranged in age from 22 to 51 and all were working full- or part-time. We sought a balance of commonality and diversity by choosing participants who would interact on a regular basis and disseminate knowledge, yet be diverse enough in job, personal life situation, and age to offer different attitudes and habits. During the project period, 60 one-on-one interviews, three focus groups as well as three surveys were administered in order to collect data.

For the analysis of our empirical data we have adopted a narrative approach. Taking our cue from the sociological critique of the correspondence theory of truth that assumes that textual representations have validity as representations of the world (Czarniawska 2004), we have analyzed the qualitative data from the interviews, focus groups, and surveys as "stories" that, in order to be analyzed and understood, require some form of "emplotment". According to Laure-Ryan (1993), this implies identifying central characters, attributing functions to events, and finding an interpretative scheme. This allows us not only to understand the chronology of events or actions because emplotment states the causality of events and actions in social science research. Thus, it refrains from the descriptive mode of reporting from empirical encounters to better give account of overall thematic, experiential, and causal relations between events in social data.

We have chosen the dialogue form to figuratively give the reader an impression of the material that we have collected. The dialogue is based on participant comments, re-contextualized in a dialogical form to emphasize how the iPhone is also a central protagonist in the story. Rather than just letting "the facts speak for themselves" we have chosen the narrative as a presentational strategy (Czarniawska 2004) that allows the reader to better understand the motivation, the experience, and the value-based opinions expressed by the participants in the study. In the story the iPhone will be the protagonist, the central character around which activities and experiences revolve. It might be somewhat peculiar to cast a piece of technology as the leading character in our narrative. However, understanding the relationship between humans and technologies as (at least analytically) symmetrical, the technology takes on the role of an actor and conveys a certain agency vis-à-vis the human actor (Latour 1996). This allows us to sidestep the strong humanist tradition of casting the human as the prime mover in technological relationships. In our story, intentionality also subsists in the technology itself. The strength of this approach is that we are allowed to see how technology is "dialogical" in the way in which it actively allows, disallows, motivates, and extends capacity for action in the human user, and how the user in turn attributes emotions and values to the technology. Thus, following Latour, our approach to analysis and interpretation provides an opportunity to open the "black box" of technology that would otherwise function as an invisible tool or provide an invisible, un-reflected delegation (Latour 1996).

Thus, the delegation of agency to the artifact that we methodologically employ gives a more nuanced picture of the role that artifacts play beyond mere “usage” (Orlikowski 2001). The interpretative scheme for the data thus rests on the assumption that the technology in question entails the ability to change and “script” certain kinds of behavior and experiences in the user; and that behavior develops in an ongoing co-evolution between the artifact, the human, and the network. This behavior might be preferred but also, as we shall see, might have unanticipated consequences.



## Analysis

The framework for this paper hinges on the TCV. We see the narrative strategy combined with the symmetrical approach to human/machine agency that theoretically underlies our method as a way to become more attentive to the role of the artifact in this kind of research.

**Functional value:** The smart phone offers functional value to users. It provides constant access to email and the WWW. Additionally, it enables telephone conversation and SMS, two features that have become part of everyday communication. Offering so many useful tools in one artifact, accessible as needed, makes the smart phone functional and distinct from other ICT devices. The functional value offered by the phone changes (increases, matures, declines). Functional value was not a defining driver of early use, but becomes extremely important for continued use. Some began using features such as the Facebook app and the search capabilities more extensively over time. In some cases the constant connectivity to Facebook made them addicted to the phone. The seamless integration with iTunes and App Store was found very easy to use. Others stopped using advanced features, returning to other devices for non-phone specific tasks. However, the perceived functional value varied between the users depending on personal preferences and technological maturity.

**Social value:** The iPhone itself creates social value. It can be a conversation piece about which many people ask questions. It can serve as an icebreaker for iPhone users to begin talking to other users, thereby facilitating social interaction and establishing new relationships. The reaction from others – and hence the social value – differs based on different social settings and groups. In some settings the iPhone may garner admiration for its owner; however, it can also be deemed unfashionable or inappropriate in certain settings. Social value decreases over time, which can result from intrinsic reasons or from social responses.

**Emotional value:** The emotional need for belonging is fundamental to many of the participants, and it is filled by the ability to be constantly connected. For example, the ability to access social networks (Facebook) and various twitter sites enables people to maintain their social relationships in a way that other types of communication do not offer. The technology integrated within the smart phone provides tools for altering one's emotional state. Emotional value changes over time. Some people remain excited about having their phones. Others compare their emotional relationship with the iPhone to a love affair, which is fun and exciting in the beginning, "but then it's just part of your everyday life."

**Epistemic value:** In this study, epistemic value experiences the steepest decline over time. As indicated by the literature, curiosity and novelty are key drivers of epistemic value. As familiarity with a device grows, the epistemic value declines. In the beginning, participants explored the iPhone features and downloaded applications simply to explore and experiment with something new. As the study progressed, the amount of tinkering declined substantially. This could be explained through the initial exploration where the phones embedded limitations are discovered (e.g. tilting the keyboard and recording video, which is impossible if the phone is not 'jailbroken').

**Conditional value:** The conditional value for the iPhone was based on convenience-related measures. Much of the conditional value hinged on whether a laptop with an internet connection was available. In general, if a nearby computer were connected to the internet, participants would choose the computer. If time were limited, the long-boot up time of a computer added conditional value to the iPhone, which was ready for use. When a Wi-Fi or land line internet connection was unavailable, the conditional value of the smart phone rose dramatically because it was the only alternative. No participant placed much value on using the iPhone to type email unless a computer was unavailable, the message needed to be sent immediately, and the message could be conveyed in a few short words. At the same time, some preferred reading email on their iPhone, even when the computer was ready-at-hand. Such preference was often described as a habit, rather than a conscious choice.

Summing up the analysis, we find it significant that the use of the smart phone changed dramatically over time. Indeed the artifact changed from a coveted, exotic artifact to become an integral part of everyday life. This process entailed a parallel change in the values assigned to the product. Such change underlines the challenge to information systems research to understand the dynamic nature of the artifact and the human-technological relations that artifacts and contexts make possible. Clearly there are important lessons to be learned for practitioners and researchers alike in understanding how technologies change and how users' validation of artifacts is not a pre-hoc process, but an ongoing, dynamic process that hinges on a variety of factors in the technology itself.

To a large degree, the dialogue that gradually emerged from the research centered on the transformation of both the users and the technology over time. It is not a great surprise that even new, fancy technologies gradually become mundane and "taken for granted" in the lives of the users. The story also stresses the point that the same technology may be used very differently depending on the users' likes and preferences.

When discussing the findings, it is necessary to consider that the choice of the iPhone as the research artifact may lead to some limitations. The extremely high level of hype surrounding the product introduction is different from

most technology launches. Additionally, the selection of the iPhone rather than a basket of assorted smart phones may result in findings that have a device-specific bias.

Given the limitations, it still seems obvious that technology must constantly re-contextualize itself in order to be used. Love at first sight (emotional value) most aptly describes the initial situation for most of our participants in the study. For our iPhone protagonists, they too loved their users and rewarded them with a lot of attention, convincing them to change the way they performed daily activities such checking Facebook, reading e-mail and writing SMS. The waning love from their human users was a result of becoming mundane – becoming an integrated part of daily practice, a piece of hardware rather than something extraordinary that demanded attention or interest. Curiosity and exploration (epistemic value) shared the path of emotional value, but declined even more rapidly. Devices that evoke the desire for learning and exploration are likely to be used, so artifacts that can stay novel can continue to be the object of attention. The social value also declined over time; but it is much more dependent on those interacting with the owner. In some setting the artifact signals newness, richness, coolness; but in others it was seen as following the crowd.

In cases such as this one in which social, emotional and epistemic values decline, the functional and/or conditional value must rise or usage will drop. The path of functional and conditional value varies depending upon on users' personal preferences. It may drop for some, whereas other users may attach an increased functional value over time with expanded use of the device. The conditional value may also compensate for a decrease in other values. Debating a Trivial Pursuit question late in the evening is an example of conditional value that encourages continued use. The story told is one that emphasizes the ongoing emotional and value-based commitment (or lack of commitment) that makes a multifunctional technology such as the iPhone work. It also demonstrates how functional and conditional value may compensate for decline in the other three values.

In previous studies, such as information adoption research based on Innovation and Diffusion Theory or Technology Acceptance Models and in consumer research, focus is given to understanding of up-front acquisition decisions (Holbrook 2006), yet technologies such as the iPhone challenge the understanding of consumption as a discrete decision that takes place once (Sheth et al. 1991a; 1991b; Kleine III, 1992). The story that we saw in our empirical data related consumption as a continuous process through which becoming mundane or transparent of technology was one of the outcomes. Use is both a discrete event and a process. The data from this longitudinal study indicate that three of the five consumption values that lead to initial adoption decline rapidly over time, affecting the way people use the smart phone and affecting the perceived desirability of the device compared to other offerings in the market.

## **Conclusion**

This paper employs a longitudinal study to examine the adoption and continued use of technology in general (smart phones in particular) through the framework of consumption values. The Theory of Consumption Values, borrowed from consumer research, explains initial adoption and continued use as a decision based on underlying motives. The 5 values (function, social, emotional, epistemic, and conditional) explain how use changes over time. In this data set, for example, the values that act as primary drivers for adoption are not the values that drive the decision to continue use of the technology. Accordingly, initial adoption is determined by social, emotional, and epistemic (curiosity) values. These values, however, rapidly decline after initial use. For continued use, functional value becomes the primary determinant of use. As such, those participants who found great utility used their smart phone in increasing ways. Conversely, those who found declining utility used their device more selectively as the study progressed.

This study investigated technology use as consumption in a voluntary, consumer situation. While TCV provides a suitable framework for such research, further research is required to determine the explanatory power of TCV in mandatory technology use settings, such as organizational and group environments.

More broadly, this paper highlights the need for IS researchers to consider the interplay among users, artifacts, and value. It also emphasizes the need for researchers to study how value changes over time and to break away from investigating single, discrete points in time. With the introduction of TCV to IS literature, a door has been opened to include consumption values as part of technology decision modeling and theory building.

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