The Influence of Self and Group-Enhancing Innovations on User Self-Construal: An Experimental Study

Hesham Fazel, André Laplume, Etayankara Muralidharan

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Hesham Fazel [1], ***André Laplume*** [2], ***Etayankara Muralidharan*** [3]

ABSTRACT

This research paper introduces the concepts of self-enhancing and group-enhancing innovations and explains how they may affect user self-construal differently. It is argued that self-enhancing innovations decrease the interdependent self-construal of the user, whereas, group-enhancing innovations decrease the independent self-construal of the user. Pre-test was conducted to identify of the concepts of self-enhancing and group-enhancing innovations. Then a pilot test using a randomized pre-test/post-test design was conducted to pretest the study research design. Employing a sample of consumers in a randomized pre-test/post-test design, the study presents results supporting the hypothesized effect of self-enhancing innovation, and provides partial support for the hypothesized effects of group-enhancing innovation. We discuss the implications of this research for the nexus of business and society as manifested by the interaction of technology and culture.

Keywords: Technology, Innovation, Self-Construal, Experimental Design.

INTRODUCTION

An accelerated pace of technological innovation brings with it the potential for rapid cultural change. Although the diffusion of innovations has been widely studied for some time (Rogers, 1983; Kedia and Bhagat, 1988), few studies have directly examined the effects of different types of innovations on the self-construals of users. This may reflect a widespread belief that innovations do not substantially alter a user self-construal. Possibly, these effects are viewed as externalities outside of anyone's responsibility or control. Nonetheless, understanding and being able to better predict the effects of innovations on user self-construals is useful as a way to avoid product's being rejected in the market on the basis of negative cultural influence.

In order to test whether different types of innovations can affect self-construal differently, it is important to delineate between types of innovations. For instance, there is a wide literature on technological innovation that differentiates between competence-enhancing/ destroying, disruptive and sustaining, radical and incremental innovations (Tushman and Anderson, 1986; Henderson and Clark, 1990; Christensen and Bower, 1996). Dichotomizing technological innovations may also be useful for understanding the effects of technologies on user self-construal, after all, we should not expect all innovations to have the same effects. After reviewing the literature, we settled on two primary types of innovations. Self-enhancing innovations are those we

[1] Assistant Professor of Marketing, Business Department, King Khalid University.
hfazel@kku.edu.sa
[2] Assistant Professor of Management, School of Business and Economics, Michigan Technological University, USA.
aolaplum@mtu.edu
[3] Assistant Professor of Management, School of Business, Grant MacEwan University, Canada.
muralidharane@macewan.ca
Received on 9/6/2013 and Accepted for Publication on 24/10/2013.

expect to have diminutive effects on the interdependent self-construal of the user; whereas group-enhancing innovations are expected to reduce the independent self-construal of the user (Markus and Kitayama, 1991).

The study develops and validates the dichotomy of self-enhancing and group-enhancing innovations. After achieving a reasonable level of inter-rater reliability, we conducted experiments using a sample of potential users. The study results offer empirical support for the hypothesis that self-enhancing innovations may reduce interdependent self-construal, and partial support for the hypothesis that group-enhancing innovations reduce independent self-construal.

The study contributes to the literature on innovations by demonstrating how innovations can alter user self-construal. As such, the study succeeds in (1) establishing a basis for the validity of self-enhancing and group-enhancing innovations; and (2) showing how these two types of innovations alter user self-construals. More broadly, we delve into micro-processes that may accumulate to affect cultural change at a macro-level. Extant research has noted that adopters may modify technological innovations by altering them or by suggesting paths for their evolution to producers (Orlikowski, 2010; Pinch and Bijker, 1989). Less attention has been devoted, however, to the effect of technology adoption on cultural values. For instance, examining product adoption in different nations, de Mooij and Hofstede (2002) concluded that technologies do not change cultural values. Possibly, values are institutionalized and therefore slow to change. Or perhaps, unless a firm is challenged by a powerful and legitimate stakeholder group that is negatively affected by its products, it is unlikely to see the issue as salient (Mitchell *et al.*, 1997). Alternatively, in the pursuit of competitive advantage, firms may be more significantly rewarded by speed to market, rather than by reflecting on the less-predictable issue of cultural change. This is despite evidence that technological innovations can create direct conflicts with culture (e.g., genetic modification, birth control, fertility, worker surveillance, violent video games, and anonymous online transactions). Complex technologies also have the tendency to exceed users' cognitive limitations leading to inevitable accidents (Alvesson, 2012; Perrow, 2011). Further, cultural lag theories suggest that technology evolves faster than cultures can adapt to it, creating periods of misalignment between new technology use and the creation of guidelines for that use (Alvesson, 2012; Carlsen *et al.*, 2010; Ogburn, 1966). Should organizations and their leaders pay attention to the effects of technological innovations and act to regulate those that negatively affect their adopters? Such an approach may be worthwhile when technological innovations involve qualitative breaks from past thought and past ways of living (Appadurai, 2011; Jones, 2010; Robinson and Smith-Lovin, 1992).

This paper proceeds as follows. First, we introduce self-construal as our main dependent variable of interest and introduce the concepts of self-enhancing and group-enhancing innovations. Next, we explain our method and present and interpret our study results. Finally, we discuss the implications of our study for theory regarding innovation management as well as the practice of new product development, and then conclude.

THEORETICAL BACKGROUND

The Importance of Self-Construal

According to Singelis (1994), self-construal refers to different ways of defining one's identity. Emphasizing unique traits and separateness from others is characteristic for the independent self. By contrast, the interdependent self tends to define itself through connections to others. The psychologies of Easterners

and Westerners have been explained in terms of the divergence between the collectivistic and interdependent orientation of the former and the individualistic and independent tendency of the latter (Heine, 2001). The growing body of cross-cultural research on worldviews and self-construal has shed light on cultural differences in behaviors, perceptions, and experiences between and within groups. Collectivists are "interdependent within their in-groups (family, tribe, nation, etc.), give priority to the goals of their in-groups, shape their behaviors primarily on the basis of in-group norms, and behave in a communal way." (p. 909). However, individualists are "independent", give priority to their personal goals. In this section, we briefly discuss collectivism and individualism dimensions to give a baseline for developing the relationship between technological innovation and self-construal within a culture that is individualist dominant or collectivist dominant.

Individualism and collectivism are complex constructs and have both been defined in many ways. Individualism is associated with independence, autonomy, self-reliance, uniqueness, achievement orientation, and competition (Bellah *et al.*, 1985; Markus and Kitayama, 1991; Kim, 1994; Oyserman *et al*., 2002; Sims, 2009). Individualists are described as having control over and taking responsibility for their actions. By contrast, collectivists have a deep sense of duty toward ingroup members, a desire for social harmony, and feel a need to conform to group norms. In this view, behavior and attitudes of collectivists are often determined by norms or demands of the in-group such as extended family or other close-knit communities.

"In collectivist cultures people share and show harmony within in-groups, but the total society may be characterized by much disharmony and non-sharing, because so many interpersonal relationships are individual out-group relationships" (Triandis *et al.*, 1988: 326). Individuals in these latter relationships may show little concern for harm that their actions may bring to out-group members (Priem and Shaffer, 2001). Members of collectivist nations may see in-group members as an extended family rather than the entire society; hence inconsiderate behavior toward out-group members of the society could become the norm. However, individualistic cultural traditions emphasize individual rights and standards that should apply to all. For instance, U.S. law prohibits the violation of citizen's rights to life, liberty and happiness (Hosmer, 1994; Healy, 2007). According to these principles members of individualistic societies are expected to be more alert to their actions that may unknowingly harm others. In other words, individualistic societies may make choices reflecting less self-interest than members of collectivist societies (Priem and Shaffer, 2001).

Self-construal has been established as an individual level construct measuring individualism and collectivism. Since most studies require fine-grained measures of respondent values, cultural group level measures have come to be replaced with individual level variables. Thus, when we discuss cultural differences we invoke the psychological concept of self-construal. Self-construal can be considered to be a group of thoughts, feelings or actions concerning the self in relation to others and the self as distinct from others; how individuals classify or perceive themselves according to the constituted cultural values they follow (Markus and Kitayama, 1991; MacDonald *et al*., 2012). Two types of self-construal have been identified to understand and measure the differences between cultures: the independent self and interdependent self, corresponding to individualism and collectivism respectively (Singelis, 1994). The independent self-construal constructs a clear boundary that separates the self from others, giving higher priority to personal goals than to group goals. The

interdependent self-construal defines the self in terms of relationships with others, giving higher priority to group goals than to personal goals.

Self-Enhancing and Group-Enhancing Innovations

Culture affects the adoption of innovations, for instance, individuals that emphasize an interdependent self-construal are more likely to prefer products and services that guarantee safety rather than achievement or enhancement (Hamilton and Biehal, 2005). Conversely, when individuals experience an independent self-construal, they are more likely to prefer products and services that guarantee personal enhancement rather than safety (Hamilton and Biehal, 2005). Thus, when an interdependent self-construal is primed, the individual feels the need to fulfill their duties, their focus is to minimize problems rather than maximize gains, and hence they become more cautious and conservative. By contrast, when an independent self-construal is primed, individuals tend to focus more on potential gains rather than possible losses or problems; they become less cautious and are more prepared to choose risky options.

On the other hand, technological innovations may alter cultural values through the micro-processes of self-construal. Technology expands in a particular cultural context as a result of changing needs and constraints. The transmission of innovations to other cultures subtly changes them. While and after a new technology is invented, fermented, and diffused, it requires an adjustment on the part of the culture, which must absorb it into its base (Ogburn, 1966). Triandis (1995) highlighted four attributes: definition of self, personal versus communal goals, importance of attitudes and norms as determinants of social behavior, and emphasis on transactional exchange versus relationships, as factors in individual versus collective behavior.

Adopting innovations may also alter user self-construal and may do so in two specific ways: self-enhancing and group-enhancing innovation. Self-enhancing innovations reduce the need for socializing. People become shyer over time as they spend more hours attached into their devices, which drives them to gradually become less able to communicate with the strangers they meet (Takao, 2009). Self-enhancing innovations allow individuals to complete activities that previously could not be done without socialization with others, for instance, through companionship, service relationships, and any other type of contact.

Group-enhancing innovation facilitates social connections and work as mechanisms to increase social relationships. Group-enhancing innovations such as social networks allow people to create, develop, and strengthen social ties. These services may help users to build valuable networks through which to share information and resources. In addition, software for mobile phones has been designed to help people network through location-centered interactions, which also increase social connectedness and help people build unique relationships. In the following section, we hypothesize how self-enhancing and group-enhancing innovations may also user self-construal differently.

HYPOTHESES DEVELOPMENT

Self-Enhancing Innovation and Interdependent Self-Construal

Self-enhancing innovations promote individuality, for instance, any device that individualizes a previously collective activity would qualify, even household washing machines. The group norms, values, rules, and other formal and informal structuring institutions that had coalesced and developed around the previously collective activity, are left behind when a self-enhancing innovation is adopted. The institutions that had formed around the previous technologies disappear long with them. The social psychology of a cultural group can be

altered by the introduction of self-enhancing innovations that empower individuals over their collectives.

By eliminating the need for gathering and communicating, self-enhancing innovations reduce group salience; reduce expressions of group identities and interests (Turner, 1982; Tajfel and Turner, 1986). As the social groups that had formed around the technologies being replaced by the new self-enhancing innovation are abandoned, the adopter becomes increasingly isolated. However, the time and space that had been devoted to the old activity are freed up, and can be used differently. Satisfying the need for distinction and uniqueness over the need for conformity, self-enhancing innovations tear adopters out of their previous social relations and destroy the old identities that had been formed there. The independence gained from the cultural loss heightens the independent self-construal and relegates the interdependent self-construal to the background. Individuals who value interdependence and conformity may become more independent and less interdependence as a result of adopting self-enhancing innovations. More formally, we suggest that:

Hypothesis 1: A self-enhancing innovation decreases interdependent self-construal.

Group-Enhancing Innovation and Independent Self-Construal

Group-enhancing innovations allow collectives to flourish. They take an activity that was previously restricted to individuals and make it into a group activity. They also transform solitary hobbies and chores into collective activities. As a result, they become occasions for the development of group norms, mores, folkways, values, rules, and other formal and the informal structuring of new institutions. For instance, social bookmarking websites have created strong identities among their adopters. As Batteau (2010) put it: "The reconnectivity of the information age is found in the emergence of online or 'virtual' communities" (p. 115). Group-enhancing innovations create occasions for co-creation and a dialectic tension between conflict and cohesion (Pentland *et al*., 2012). Cohesion reflects a group's harmony in beliefs and values, and the intensity of normative pressure to conform. In short, group-enhancing innovations promote cohesion.

Although, collectivism may be routed in the socialization processes of different cultural groups, it may also be enhanced by group-enhancing innovations. By socializing previously individual activities, an institutional fabric is created by the adopting group. This process of institutionalization replaces adopter's previously individual routines. The adopter becomes increasingly part of the culture that forms around the innovation until it cannot distinguish itself from it. This immersion increases the perception of interdependence for the adopter, making the identity group more salient than personal identities. Individuals who value independence and distinctiveness may care more about the collective as a result of adopting group-enhancing innovations. More formally, we expect that:

Hypothesis 2: Group-enhancing innovations decrease independent self-construal.

METHODOLOGY

In the article, we examine the impact of the use of innovations on self-construal. We first conducted a pre-test using several close-ended questions in order to classify several innovations into the self-enhancing versus group-enhancing categories. A pilot test was conducted in order to determine the feasibility of the study design and to give a preliminary test of our proposed hypotheses. Finally, based on the pilot test, we conducted our main study in order to examine the impact of innovations on independent/interdependent self-construal.

Pre-Test

Identifying and Classifying Innovations

To establish content legitimacy for this study, we started with the identification of the concepts of self-enhancing and group-enhancing innovations. The development of a representative set of self-enhancing and group-enhancing innovations is important because the concepts are new to the literature. We needed to ensure that the innovation items are clearly defined, and that the process for claiming technology innovation items as self-enhancing or group-enhancing items is appropriate and objective. This study was conducted in three stages in order to develop an ultimate set of technology innovation items that can be applied in the subsequent studies.

In the first stage a set of approximately 450 innovations representing 240 companies was created based on reviews of new consumer technology products. We identified the sample from new product reviews published online using Google search engine and deploying a set of key words "consumer innovation" published between year 2001 and 2011. We focus our attention on the first 500 search results. The product reviews appeared in online magazine such as Popular Mechanics, The Mac Observer, Gizmodo, PC World, Laptop Magazine, PC Pro, Business Insider, TechCrunch, PC Advisor, CNET, Digital Trends, Wired, CNBC, Engadget, TIME, PC Mag, TechRepublic, Wallstreet Journal, Bloomberg, Fortune, Geek.com, and DailyFinance. The innovations include computers, computer applications and software, internet services, social media, games, and cell phones.

In stage two, given the importance of accurately coding how each single item is viewed and perceived, we invited four coders (including the authors) to categorize each of the 450 items as either self-enhancing or group-enhancing based on the definitions provided in this paper. Table (1) shows the number of technology innovation items, the number of quotes that were analyzed (i.e., product reviews), the coding agreement between the coders on both group-enhancing and self-enhancing innovation, the overall agreement, and lastly the number of group-enhancing and self-enhancing innovations where the coders agreed.

Table 1. Innovation inter-rater agreement.

Technology innovation	Number of innovation items	Number of quotes	Coding agreement between 2 coders	Overall agreement	Number of agreed items
Self-enhancing innovation	450	793	66%	67%	163
Group-enhancing innovation			69%		53

One issue the coding system must address is how to deal with disagreement among coders. Since we are in the stage of identifying and categorizing technology innovation items only, one option that is useful at this particular stage is to remove all disputed items coded from the coding scheme and then re-coding non-disputed items by additional coders. This process improved the coding scheme and narrowed down technology innovation items list to a reasonable and representative one that can be used for further investigations.

In stage three, a coder who was blind to the conditions and predictions of the research was recruited. The coder was instructed to identify and categorize all the technology innovation items that were agreed by previous coders into two categories "group-enhancing innovation item" or "self-enhancing innovation item". The coder was asked to categorize the items according to its use and possible effect. For instance technology innovation items that cause people to socialize less can be coded as "self-enhancing" and technological innovations items that allow socialization to flourish by taking an activity that was previously restricted to individuals and turning it into a group activity can be coded as "group-enhancing". Table (2) shows technology innovation items final categorization.

Table 2. Innovation item categorization.

Group-enhancing innovations	***Self-enhancing innovations***
FaceTime	Earbuds
Skype	USB Mouse
Facebook	Memory Stick
Buzz	Pac Man
Foursquare	Floppy Disk Drive
Hotmail	eReader
iPhone 4	Calculator
TwitterPeek	Mobile Network

PILOT STUDY

The main objective of the pilot study is to pretest the study research design. A randomized pre-test and post-test design that contains two groups and two levels in each group is a common design approach. It is a useful way of ensuring that an experiment has a strong level of internal validity because the pretest ensures that the groups are equivalent. The principle behind this design is relatively simple, and involves randomly assigning subjects between two groups, a test group and a control (Nimon *et al*., 2011). Both groups are pre-tested, and both are post-tested, the ultimate difference being that one group was administered the treatment. This test allows a number of distinct analyses, giving researchers the tools to filter out experimental noise and confounding variables. The researchers can compare the scores in the two-pretest groups, to ensure that the randomization process was effective (Nimon *et al*., 2011). The pilot test also aims to give a preliminary test of the research hypotheses. This step should help us to better develop and modify the research hypotheses in order to provide conclusive findings.

Again, the study utilizes a randomized pre-test/post-test design with pretest (baseline) and posttest (follow-up) stages (see Figure 1). It controls the assignment of participants to experimental (treatment) and control groups through the use of a table of random numbers. This procedure guarantees that all participants have the same chance of being in the experimental or control group. Because of strict random assignment of participants, it is assumed that the two groups are equivalent on all important dimensions and that there are no systematic differences between them (Judd *et al*., 2001).

The innovation effects take place between the pretest (baseline) and the posttest (follow-up) stages. A paired difference test is a type of location test that is used when comparing two sets of measurements in order to assess whether their population means differ. The test uses additional information about the sample that is not present in an ordinary unpaired testing situation, either to increase the statistical power, or to reduce the effects of confounders (Montgomery and Montgomery, 1984).

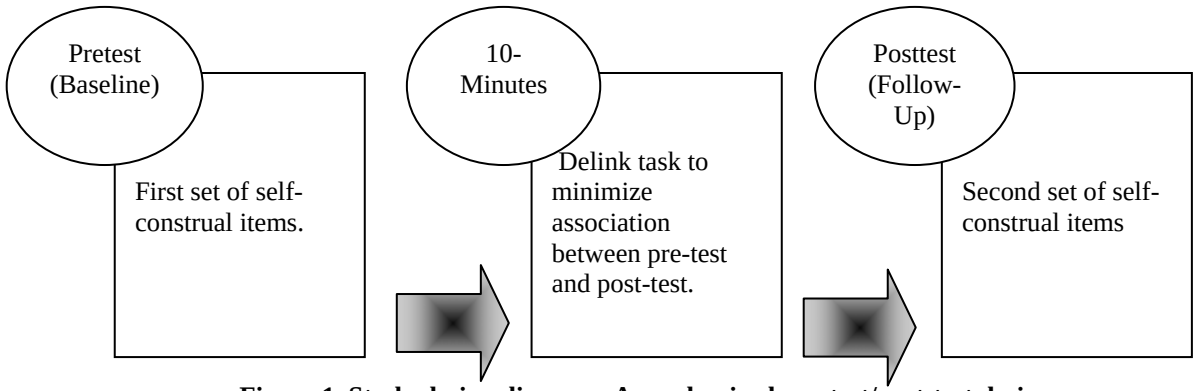

Figure 1. Study design diagram: A randomized pre-test/post-test design.

Singelis's (1994) self-construal scale (SCS) was used to measure independence and interdependence. SCS was designed to measure self-construal as two distinct dimensions (interdependence and independence) and consists of twenty-four items. Matsumoto *et al*., (1998) developed an individualism-collectivism measure that could be used with different social groups and that assessed both values and behaviors. The authors examined the existing literature on individualism-collectivism and selected items from measures that incorporated information about interpersonal interactions and described values related to relationships. A total of 25 items were therefore identified after the authors eliminated items that could not be relevant to all relationship groups. Rhee *et al.*, (1996) also examined the influence of reference groups, in this case kin, non-kin, and general others, on the structure of individualism and collectivism. Participants were from Korea and the United States, including European Americans and Asian Americans. Four different individualism/collectivism measures were used and the items for each measure were divided into kin, non-kin, and 'general' others subscales. It can therefore be observed that development of self-construal scale is subject to the objectives of the research. We adopted a similar rationale and approach to previous studies and split the twelve items in each construct of independence and interdependence into two indices, pre-interdependent and post-interdependent; pre-independent and post-independent. Each index consists of 6 items. We split the original items for each construct into two indices for the following reasons. First, to decrease possible priming of self-independence, which may endorse individualist values more strongly than collectivist ones, and minimize interdependence priming, which may endorse collectivist values more strongly than individualistic ones. In other words, using only 6 items for pre-score to measure the level of self-construal can help weaken possible accessibility to self-activation of independence or interdependence self-construal. Second, in many cases, carryover effects may occur. This leads to the possibility of the participants being able to identify the independent variable and the hypotheses being tested. In other words, participants might recognize the reason or the purpose of the study if they faced the same set of questionnaire items, which might drive them to deliberately answer questions in a different manner (Judd *et al.*, 2001). Therefore, splitting the items should disassociate the two indices and drive participants to answer each set of questions independently.

Procedure

We randomly assigned 56 participants to either self-enhancing innovations or group-enhancing innovations. For the self-enhancing innovations there were 15 participants for pre-interdependent and post-interdependent conditions and 14 participants in the control condition. A control group is a group separated

from the rest of the experiment where the independent variable being tested cannot influence the results. This isolates the independent variable's effects on the experiment and can help rule out alternate explanations of the experimental results and show that the experiment is functioning as planned and outside influences are accounted for (Bailey, 2008).

For the group-enhancing innovations there were 15 participants in the pre-independent and the post-independent conditions and 12 participants in the control condition. In the first step, participants started by answering the first pre-set of 6 items to measure the level of self-construal independent/interdependent. They were then directed to conduct a filler task where they played the five differences game. The purpose of this filler was to prevent the previous questions from having an impact on the later questions and also to distract participants from identifying the main purpose of the study (Sengupta and Zhou, 2007). Following the five differences game, participants were shown several technology innovation items (from Table 2) and were asked to classify them as either self-enhancing or group-enhancing innovations based on the definitions provided. Following this manipulation participants were asked to hypothetically demonstrate how such technology might be used. Finally, they were given the second post-set of self-construal items that measured the level of their independence/interdependence. At the end of the study, they were asked about some demographic information and thanked for their participation in the study.

Results

Paired t-tests were conducted to assess whether there was statistically significant differences between the participants' pre-score level means and post-score level means on self-construal. Each participant was required to report his/her score level of independence/ interdependence before and after selecting the innovation type.

To compare individuals in the first group condition, participants were confronted with self-enhancing innovations items and asked to report their interdependent self-construal pre-interdependent and post-interdependent level. The paired-samples t-test indicated that scores were significantly higher for the pre-interdependent score ($M = 5.06$, $SD = .67$) than for the post-interdependent score ($M = 3.98$, $SD = .99$), $t(12) = 5.04$, $p < .001$ (2-tailed). This indicates support for Hypothesis 1. Participants in control conditions were shown the self-enhancing innovation item and asked to report their independent self-construal pre-interdependent and post-interdependent scores. The paired-samples t-test showed no significant differences between pre-interdependent score ($M = 4.76.$, $SD =. 71$) and post-interdependent score ($M = 4.14$, $SD = .94$), $t(7) = 1.74$, $p =. 131$ (2-tailed) for the control group.

In order to compare individuals in the second group condition, participants were shown group-enhancing innovation items and asked to report their pre-independent and post-independent scores. The paired-samples t-test indicated that scores were not significantly higher for the pre-independent ($M = 4.81$, $SD = .69$) than for the post-independent ($M = 5.07$, $SD = 1.11$), $t(10) = -1.15$, $p < .275$ (2-tailed). The result did not support hypothesis 2. Here again, participants in control condition were shown group-enhancing innovation items and asked to report their pre-independent and post- independent scores. The paired-samples t-test also showed no significant differences between pre-independent scores ($M = 5$, $SD = 1.10$) and the post-independent score ($M = 4.61$, $SD = .52$), $t(9) = 1.10$, $p =. 299$ (2-tailed).

Discussion Pilot Study

The results from the pilot test study provided preliminary empirical evidence for the relationship between innovations and the changes in self-construal

levels. The findings give a preliminary support for the first hypothesis. The level of self-construal for participants who reported interdependent self-construal changed when they were confronted with self-enhancing innovations. This change did not happen for those who were confronted with group-enhancing innovations.

Results from our pilot study therefore showed that the randomization process was efficient and the experimented groups showed a significant difference than the control groups. We therefore conclude that the differences in the results among the experimented groups are due to the manipulation process of exposure to the innovations.

MAIN STUDY

The main objective of this study is to adequately test our hypotheses. Once again, Hypothesis 1 states that self-enhancing innovations decrease interdependent self-construal. Hypothesis 2 states that group-enhancing innovations decrease independent self-construal. A paired t-test is used to test these hypotheses by comparing the means of the before and after-treatments on the same participants.

Method

We followed the same design as in the pilot study. Common measures of self-construal by Singelis's (1994) were used in this study since the Self-Construal Scale (SCS) is the only known scale that measures independent and interdependent self-construal. Here again, we split the original constructs into 4 indices where each index contains 6 items.

Procedure

Using the same procedure as in the pilot study, forty-five (45) participants were randomly assigned to either the self-enhancing or group-enhancing innovation experimental conditions. We also followed the manipulation used in the pilot study (please refer the pilot study). At the end, participants were asked for demographic information and thanked for their participation in the study.

Results

Paired t-tests were conducted to assess whether there was a statistically significant difference between the participants' pre-score level means and post-score level means for self-construal. To compare individuals who reported their interdependent self-construal pre-score and post-score levels when confronted with the self-enhancing innovation item, the paired-samples t-test indicated that scores were significantly higher for the interdependence pre-score (M = 5.08., SD = .1.08) than for the interdependence post-score (M = 4.26, SD = .86), t (23) =6.80 , $p < .001$, 2-tailed); thereby supporting Hypothesis 1, which predicted that self-enhancing innovations would reduce the interdependent self-construal of users.

To compare individuals who reported their independence self-construal pre-score and pot-score level when confronted with the group-enhancing innovation item, the paired-samples t-test indicated that scores were not significantly different from the independence pre-score (M = 4.69, SD = .1.14) than for the independence post-score (M = 4.96 SD = .91), t (20) = -1.43, $p < .167$ (2-tailed); thereby not supporting Hypothesis 2.

Supplementary Analysis

After running an exploratory factor analysis (EFA) we retained only the items that were loading highly in the constructs. Items loading lower than 0.70 were dropped from the pre and post item lists as follows. While no items were dropped from the self-enhancing condition the following items were dropped from the group-enhancing condition. Item 1 "I'd rather say 'no' directly than risk being misunderstood"; item 3, "Having a lively imagination is important to me"; item 4 "I am comfortable with being singled out for praise or reward"; and item 5 "I act the same way at home that I do at

school" from the pre-independent list of items were dropped from the pre-self-enhancing condition. Similarly for the post-independent list of items, item 2, "I feel comfortable using someone's first name soon after I meet them, even when they are much older than I am"; item 4, "I enjoy being unique and different from others in many respects"; item 5, "My personal identity independent of others is very important to me"; and item 6 "I value being in good health above everything" were dropped from the list of items.

Similar results for the self-enhancing condition were found, where paired-samples t-test indicated that scores were significantly higher for the interdependence pre-score (M = 5.08., SD = 1.08) than for the interdependence post-score (M = 4.56, SD = .96), t (23) = 4.81 , p < .001, 2-tailed) , thereby supporting Hypothesis 1. To compare individuals who reported their independence self-construal pre-score and post-score level when confronted with the group enhancing condition with the revised list of items, the paired-samples t-test indicated that scores were significantly different from the independence pre-score (M = 5.03, SD = .1.27) to the independence post-score (M = 4.40 SD = .1.51), t (20) = -2.00, p = .05 (2-tailed); thereby Hypothesis 2 was supported by this supplementary analysis.

Discussion Main Study

For some time, researchers have advanced conceptual arguments about how strong group cultures impact creativity, innovation, and adaptability (e.g., Goncalo and Staw, 2006). Using diverse innovation items we found support for the hypothesis that innovations also impact how we interpret ourselves with regards to our cultures. The study results suggest that self-construals are marked by technological innovation.

The results from main study provided empirical evidence for the relationship between innovations and changes in user self-construal levels. The findings give significant support for our first hypothesis; participants reported weaker interdependent self-construals after exposure to self-enhancing innovations. The main results show no significant change in the second condition. However, the results of the supplementary analysis, where we used only items that loaded well in the factor analysis, suggest that post-independent scores were lower than pre-independent scores for the effects of group-enhancing innovations on independent self-construal.

DISCUSSION AND CONCLUSION

We examined the rarely studied question of how technology affects adopter cultural values. All cultures are inherently liable to change even as they resist change. Culture may take a long time to change, moving without notice or focus. However, the wide adoption of self-enhancing and group-enhancing innovations may cause cultural change within relatively short periods of time. The rapid successive diffusion of technological innovations may move a culture from new heights of collectivism to new heights of individualism and back again within a twenty-first century decade or possibly in less time in the future.

Implications for Managers

One of the most important tasks of leaders and managers is to organize work in a manner that produces an optimal or satisfying outcome for the organization. Stakeholder theory research has suggested that stakeholders are more likely to act as a collective if they have mobilized in the past, communicate effectively, and enjoy a common identity (Rowley and Moldoveanu, 2003). Our study suggests that the selection among competing technological innovations to be used in an organization may affect the degree of identification a stakeholder will have with the firm. In particular, we bring attention to the role of self-enhancing and group-enhancing technologies. Adoption of technological innovation should fall in line with organizational goals.

Leaders and managers who are conscious of the centering and de-centering roles provided by different technological innovations may be more mindful when choosing whether their organizations should adopt them.

Implications for International Management

As firms expand internationally, merge with foreign firms, and form cross-cultural strategic alliances, doing business increasingly requires interaction with people and organizations nurtured in different cultural environments. This entails understanding the dynamics that explain the conflicts and commonalities among people from different cultures (Elsayed-Ekhouly and Buda, 1996). Participation of various employees from different cultures in a multinational enterprise's global initiatives may also require detailed understanding of self-construal (Cross *et al.*, 2011). Researchers have examined the constraints that organizations face when they transfer technology across national borders and these cultural constraints have been explained in terms of Hofstede's (1980) dimensions of culture (Bhagat *et al.*, 2002; Kedia and Bhagat, 1988), but we have yet to systematically research the nexus between technological innovation and cultural change. Technological innovations may protect cultural identities in some contexts and threaten them in others. In many parts of the world, people think of technology as an evil production of man because they can see the negative impact that technology has on their lives (Sclove, 1995). Business operating in countries with large differences in individual-collective orientations should look into the role of regional cultural traditions and unique aspects of social life. Regional cultures may undermine conditions conducive to knowledge creation, inventiveness, information dissemination and knowledge use, and hence constrain firms' innovative capacities and their ability of implement new technology. Further, research should discover how the enablers and constraints on firms' innovative capacities stem from the same local cultures in which they are embedded.

Cultural Values and Technological Dimensions

Technological innovations develop to alleviate the tedium of our daily activities, often causing us to focus on the short-term at the expense of the long-term, which is more difficult to predict (Ehrlich, 2000). Thus, sometimes technologies lead to cultural changes that may become maladaptive in the long run. Thus, there is a need to examine how technologies impact our daily lives and changes how we conceive of our cultural values and norms. Another possibility for future research involves a formal examination of cultural values (power distance, uncertainty avoidance, masculinity, short-term versus long-term orientation) on the potency of self-enhancing and group-enhancing innovations. Beyond individual and collective cultural effects, future research might examine other dimensions of technological innovation, such as those that increase mobility or reduce the need for vision, olfaction, or cognition. Different dimensions of technological innovation may affect other cultural values. For instance, simplicity is disruptive (Christensen and Bower, 1996). It takes something that was complex and cognitively demanding and makes it possible to use out of the box and by a broader range of customers. For instance, although touch screens are less good for typing, they are easy enough for small children and the elderly who have never used substitute technologies to use it immediately and intuitively. Eliminating the cognitive dimensions of a product means it no longer requires controlled cognitive processing to be used.

Limitations

Our relatively small sample size may be responsible for the partial results attained for Hypothesis 2. Other limitation is that the treatment can become confounded with the pretest (i.e. internal validity), as only one group

receives treatment while both the groups were post-tested. These problems could be addressed by future research by using approaches such as using structural equation modeling for measuring latent constructs and their relationships (Dimitrov and Rumrill, 2003).

Self-enhancing and group-enhancing innovations may alter collective understandings to the extent that self-construals affect the development of rules, norms, procedures, customs and conventions. This all sounds very deterministic. It makes it sounds as if technology controls people and culture (Barley, 1986; Fulk, 1993). We submit that individual adoption of technology cannot change the values at the cultural level; only wide adoption can do that. Changes at the individual level of self-construal alter cultural values without notice because technology helps the adopters to reach and accomplish various and dynamic ends, and they do so in waves. This perspective may go a long way in explaining prior null findings (de Mooij and Hofstede, 2002).

CONCLUSION

The current study developed the concepts of self and group-enhancing innovations and demonstrated their empirical validity. Then, using an experimental design, the paper presents research results indicating that self-enhancing innovations decrease the interdependent self-construals of users, whereas, group-enhancing innovations decrease the independent self-construals of users. It behooves us to better understand these possibilities if we are to avoid the rejection of innovations, especially when launching innovations across cultures.

REFERENCES

Alvesson, M. (2012). ***Understanding organizational culture***. Sage.

Appadurai, A. (2011). Disjuncture and difference in the global cultural economy 1990. ***Cultural Theory: An Anthology***, 282-295.

Bailey, R. A. (2008). Design of comparative experiments (Vol. 25). Cambridge University Press. ISO 690

Barley, S.R. (1986), Technology as an occasion for structuring: Evidence from observation of CT scanners. ***Administrative Science Quarterly***, 31, 78-108.

Batteau, A. (2010), ***Technology and Culture***. Long Grove, Illinois: Waveland Press Inc.

Bellah, R.N., Madsen, R., Sullivan, W.M., Swidler, A., and Tipton, S.M. (1985), ***Habits of the heart: Individualism and commitment in American life***. New York, Harper and Row.

Betz, F. (2011). ***Managing Technological Innovation: Competitive Advantage from Change*** (Third Edition). Wiley, 315-338.

Bhagat, R.S., Kedia, B.L., Harveston, P.D., and Triandis, H.C. (2002), Cultural variations in the cross border transfer of organizational knowledge: An integrative framework. ***Academy of Management Review***, 27(2), 204-221.

Carlsen, H., Dreborg, K. H., Godman, M., Hansson, S. O., Johansson, L., and Wikman-Svahn, P. (2010). Assessing socially disruptive technological change. ***Technology in Society***, 32(3), 209-218.

Christensen, C.M., and Bower, J.L. (1996). Customer power, strategic investment, and the failure of leading firms. ***Strategic Management Journal***, 17(3), 197-218.

Cross, S.E., Hardin, E.E., and Gercek-Swing, E. (2011). The what, how, why, and where of self-construal. ***Personality and Social Psychology Review***, 15(2), 142-179.

De Mooij, M., and Hofstede, G. (2002). Convergence and divergence in consumer behavior: implications for international retailing. ***Journal of Retailing***, 78(1), 61-69.

Dimitrov, D. M., and Rumrill, Jr, P. D. (2003). Pretest-

posttest designs and measurement of change. Work: ***A Journal of Prevention, Assessment and Rehabilitation***, 20(2), 159-165.

Ehrlich, P.R. (2000), ***Human natures: Genes, cultures and the human prospect***. Washington, DC: Island Press/Shearwater Books.

Elsayed-Ekhouly, S.M., and Buda, R. (1996), Organizational conflict: A comparative Analysis of Conflict Styles Across Cultures. *International* ***Journal of Conflict Management***, 7, 71-81.

Fulk, J. (1993), The social construction of communication technology. ***Academy of Management Review***, 36(5), 921-950.

Goncalo, J. A., and Staw, B. M. (2006). Individualism–collectivism and group creativity. ***Organizational Behavior and Human Decision Processes***, 100(1), 96-109.

Hamilton, R.W., and Biehal, G.J. (2005), Achieving your goals or protecting their future? The effects of self view on goals and choices. ***Journal of Consumer Research***, 32(2), 277–283.

Healy, L. M. (2007), Universalism and cultural relativism in social work ethics. ***International Social Work***, 50(1), 11-26.

Heine, S.J. (2001), Self as cultural product: An examination of East Asian and North American selves. ***Journal of Personality***, 69,881-906

Henderson, R.M., and Clark, K. (1990), Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. ***Administrative Science Quarterly***, 35: 9–30.

Hofstede, G. (1980). ***Culture's consequences: International differences in work-related values***. Beverly Hills, CA: Sage.

Hosmer, L.T. (1994), Strategic planning as if ethics mattered. ***Strategic Management Journal***, 15:17-34.

Judd, C. M., Kenny, D. A., and McClelland, G. H. (2001). Estimating and testing mediation and moderation in within-subject designs. ***Psychological methods***, 6(2), 115.

Jones, G. R. (2010). ***Organizational theory, design, and change***. Upper Saddle River, NJ: Prentice Hall.

Kedia, B.L., and Bhagat, R.S. (1988), Cultural constraints on Transfer of Technology Across Nations: Implications for Research in International and Comparative Management. ***Academy of Management Review***, 13(4), 559-571.

Kim, U. (1994), *Individualism and collectivism: Conceptual clarification and elaboration.* In Kim, U., Triandis, H.C., Kagitçibasi, C., Choi, S.C., and Yoon G. (Eds), ***Individualism and collectivism. Theory, method, and applications. Thousand Oaks.*** CA: Sage, 19-40.

MacDonald, J.A., Sandry. J., and Rice, S. (2012). ***Self-Construal Priming Affects Speed of Retrieval*** from Short-Term Memory. PLoS ONE 7(11): e50007. doi:10.1371/journal.pone.0050007

Markus, H.R., and Kitayama, S. (1991), Culture and the self: Implications for cognition, emotion, and motivation. ***Psychological Review***, 98, 224-253.

Matsumoto, D., Takeuchi, S., Andayani, S., Kouznetsova, N., and Krupp, D. (1998). The contribution of individualism-collectivism to cross-national differences in display rules. ***Asian Journal of Social Psychology***, 1, 147–165.

Mitchell, R., Agle, B., and Wood, D. (1997), Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. ***Academy of Management Review***, 22, 853-886.

Montgomery, D. C., and Montgomery, D. C. (1984). ***Design and analysis of experiments*** (Vol. 7). New York: Wiley.

Nimon, K., Zigarmi, D., and Allen, J. (2011), Measures of Program Effectiveness Based on Retrospective Pretest Data: Are All Created Equal? ***American Journal of Evaluation***, 32(1), 8-28.

Ogburn, W.F. (1966), ***Social Change with Respect to Cultural and Original Nature***. New York: Dell Publishing.

Orlikowski, W. J. (2010). The sociomateriality of organisational life: considering technology in management research. ***Cambridge Journal of Economics***, 34(1), 125-141.

Oyserman, D., Coon, H.M., and Kemmelmeier, M. (2002), Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. ***Psychological Bulletin***, 128, 3–72.

Perrow, C. (1986), ***Complex Organizations: A Critical Essay***. New York, NY, McGraw-Hill.

Pentland, B. T., Feldman, M. S., Becker, M. C., and Liu, P. (2012), Dynamics of organizational routines: a generative model. ***Journal of Management Studies***, 49(8), 1484-1508.

Pinch, T.J., and Bijker, W.E. (1984), The social construction of technological artefacts: Or how the sociology of science and the sociology of technology might benefit each other. ***Social Studies of Science***, 14(3), 399-441.

Priem, R., and Shaffer, M. (2001), Resolving moral dilemmas in business: a multicountry study. ***Business and Society***, 40(2), 197-219.

Rhee, E., Uleman, J. S., and Lee, H. K. (1996). Variations in collectivism and individualism by ingroup and culture: Confirmatory factor analyses. ***Journal of Personality and Social Psychology***, 71, 1037-1054.

Robinson, D.T., and Smith-Lovin, L. (1992), Selective interaction as a strategy for identity maintenance: An affect control model. ***Social Psychology Quarterly***, 55, 12-28.

Rogers, E. (1983), ***The Diffusion of Innovations***, (Third Ed.) (First Ed., 1962). New York, Free Press.

Rowley, T.J., and Moldoveanu, M. (2003), When will stakeholder groups act? An interest- and identity-based model of stakeholder group mobilization. ***Academy of Management Journal***, 28(2), 204-219.

Sengupta, J., and Zhou, R. (2007), Understanding impulsive eaters' choice behaviors: The motivational influences of regulatory focus. ***Journal of Marketing Research***, 297-308.

Sclove, R. (1995), ***Democracy and Technology***. New York, Guilford Press.

Sims, R.L. (2009), Collective versus Individualist National Cultures. Comparing Taiwain and U.S. Employee Attitudes toward Unethical Business Practices. ***Business and Society***, 48(1), 39-59.

Singelis, T.M. (1994), The measurement of independent and interdependent self-construals. ***Personality and Social Psychology Bulletin***, 20, 580-591.

Tajfel, H., and Turner, J.C. (1986), The social identity theory of inter-group behavior. In Worchel, S., and Austin, W. (Eds), ***Psychology of Intergroup Relations***. Chicago: Nelson-Hall.

Takao, M. (2009), Addictive Personality and Problematic Mobile Phone Use. ***Cyber Psychology and Behavior***, 12 (5): 501-507.

Triandis, H.C. (1995), ***Individualism and Collectivism. Boulder***. Co: Westview Press.

Triandis, H.C., Bontempo, R., Villareal, M.J., Asai, M., and Lucca, N. (1988), Individualism and collectivism: Cross-cultural perspectives on self-ingroup relationships. ***Journal of Personality and Social Psychology***, 54, 323-338.

Turner, J.C. (1982), Towards a cognitive redefinition of the social group. In Tajfel, H. (Ed), ***Social Identity and Intergroup Relation.*** Cambridge: Cambridge University Press.

Tushman, M.L., and Anderson, P. (1986), Technological discontinuities and organizational environments. ***Administrative Science Quarterly***, 31, 439-465.

التقنيات المبتكرة التي تعزز الثقافة الفردية للمستخدم والتقنيات المبتكرة التي تعزز الثقافة الجماعية للمستخدم وتأثيرها على تفسير الذات

هشام فاضل[1]، اندري لابلوم[2]، اتيانكارا موراليد هاران[3]

ملخص

يقدم الباحثون في هذه الورقة البحثية مفاهيم جديدة ومعاصرة لاستخدامات التقنيات المبتكرة، وقد اقترح الباحثون نوعين من التقنيات المبتكرة وهي تقنيات مبتكرة تعزز الثقافة الفردية للمستخدم، و تقنيات مبتكرة تعزز الثقافة الجمعية للمستخدم. يشرح هذا البحث الكيفية العلمية لتأثير التقنيات المبتكرة على تفسير الذات وترجمتها بشكل فردي أو جمعي. وتقوم فرضيات البحث بشكل أساسي على أن استخدام التقنيات المبتكرة المعززة للثقافة الفردية تقلل من الارتباط بالثقافة الجمعية التي تكون أصيلة في المستخدم، في حين أن استخدام التقنيات المبتكرة المعززة للثقافة الجمعية تزيد من الارتباط بالثقافة الجمعية لدى المستخدم التي تكون الثقافة الفردية أصيلة فيه. وتقوم الدراسة على المنهج الكمي التجريبي في اختبار فرضياتها، حيث قام الباحثون بدراسة أولية لتحديد التقنيات المبتكرة المعززة للثقافة الفردية والجمعية وتعريفهما، ومن ثم توظيف عينة من المستهلكين لمعرفة تحقق فرضيات البحث، وتدعم نتائج الدراسة فرضية تأثير التقنيات المبتكرة المعززة للثقافة الفردية على ثقافة المستخدم الجمعية الأصيلة ، وتقدم دعماً جزئياً عن آثار استخدام التقنيات المبتكرة المعززة للثقافة الجمعية، ويناقش الباحثون أيضا الآثار المترتبة على هذه البحوث وارتباطها الوثيق بقطاع الأعمال والمجتمع.

الكلمات الدالة: تقنية، ابتكار، تفسير الذات، بحث تجريبي.

[1] استاذ مساعد في التسويق، قسم الأعمال، جامعة الملك خالد، السعودية.

[2] استاذ مساعد في الادارة، جامعة ميتشيغان للتكنولوجيا، الولايات المتحدة الامريكية.

[3] استاذ مساعد في الإدارة، جامعة جرانت ماك ايوان، كندا.

تاريخ استلام البحث 2013/6/9، وتاريخ قبوله 2013/10/24.