Why do People Choose the Wrong Thing? Examining Users' Technology Evaluation in Different Contexts

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ABSTRACT

Previous research on technology adoption from the information systems (IS) discipline tries mainly to understand why individuals accept and use a certain technology. Meanwhile, relatively little is known as to why individuals choose one technology instead of another when multiple options are available. In this study, we study individuals' choice among technologies by applying the evaluability hypothesis from social psychology research. The hypothesis is proposed and tested in a lab experiment. The implications are discussed from both academic and practical perspectives.

INTRODUCTION

As information technology (IT) advances, organizations increasingly take advantage of various kinds of IT to support their different processes and mechanisms [6]. In some cases, individuals may face many options and have to decide which technology they are going to choose [32]. Whereas technology adoption has received much attention in the IS (Information Systems) discipline [31], there are few studies that examine usage choice when multiple options are available. Because the efficiency and effectiveness of various technologies are different, understanding why people choose one technology instead of another technology can have significant implications for an individual's subsequent task performance [32]. This paper tries to examine technology evaluation in different contexts (one option vs. multiple options) with the "evaluability" hypothesis [15] from the social psychology research literature. We argue that the evaluation mode of individuals when they make choices is different from that when they have only one option. That difference in turn causes different results in user evaluation. This study contributes to the current usage choice literature by examining technology in broader contexts, rather than focusing only on media choice in limited contexts, and this study potentially offers insights to help explain why people may view the same technology differently in different contexts. The paper is structured as follows: the next section offers a review of previous literature on choice. The next section then introduces the evaluability hypothesis from social psychology, which then forms the basis for this study's hypothesis. Then the method is discussed, followed by a discussion of implications and conclusions.

PREVIOUS LITERATURE ON CHOICE

Choice is a popular topic in social psychology and researchers have tried to understand the reasons for poor choices [7] [21] [24] [33]. Several theories have been introduced to explain these results, such as lay theory of rationality [19], medium maximization [17] and the evaluability hypothesis [15]. Among these the evaluability hypothesis seems to offer the most promise for technology choice and is thus discussed below in more detail. Most of the choice research from the IS discipline focuses on ICT, and two widely used types of theories there are media trait theories [2] [5] [22] [29] and social influence theories [3] [9] [20] [28] [29]. While this prior research is helpful, the reasons underlying usage choice are still unclear, particularly

with respect to understanding technology choice in broader contexts with multiple options. This study examines how individuals evaluate technologies under different contexts and with different options. This approach to technology evaluation will be consistent with the "attitude toward tool use" [8] approach as well as the "to assess the worth" approach [27].

EVALUABILITY HYPOTHESIS AND HYPOTHESIS DEVELOPMENT

Before introducing the evaluability hypothesis, it is important to first clarify the concept of evaluation mode. As Hsee and his colleagues [15] [18] discuss, the evaluation mode in which individuals make choices is usually different from that in which experience takes place. Individuals make choices in joint evaluation (JE) mode, in which individuals compare multiple options or scenarios. In contrast, the actual experience typically occurs in separate evaluation (SE) mode, in which individuals face the only option that they choose to experience. Thus, because of the difference between JE and SE modes, the perception toward the same option can be quite different, even if that option per se does not change. Based on that argument, Hsee [15] introduced the evaluability hypothesis and refined it with his colleagues [16]. They argued that "people evaluate options differently and exhibit reversals of preferences for options between JE and SE", and that "it is more difficult to evaluate the desirability of values on some attributes than on others and that, compared with easy-to-evaluate attributes, difficult-to-evaluate attributes have a greater impact in JE than in SE" [16, p.576).

To articulate the theory more clearly, consider the following scenario: There are two dictionaries, which have a trade-off across their two attributes: price and condition. The price of Dictionary A is $200, and its condition is new; The price of Dictionary B is $150, and it is used (with some notes).The price of Dictionary A is higher than that of Dictionary B, while the condition of Dictionary A is better than that of Dictionary B. In this scenario, price is the difficult-to-evaluate attribute, since it is usually hard to say that a price is high or low unless it is compared to another price. In SE mode, because price is difficult to evaluate, individuals probably perceive $200 and $150 more closely. On the other hand, condition is relatively easy to evaluate. Therefore, individuals probably evaluate Dictionary A and B mainly according to the difference between their conditions, and they are likely to evaluate Dictionary A higher than Dictionary B. Alternatively, in JE mode individuals can compare both price and condition step by step. Thus, those two attributes both affect the evaluation of the two dictionaries, and the impact of price (difficult-to-evaluate attribute) will increase in JE mode. In that case, individuals probably evaluate two dictionaries more closely or even evaluate Dictionary B higher than Dictionary A[1]. Another finding from the evaluability hypothesis is that the SE-predicted-experience trend is similar to the SE-real-experience trend [18]. In the previous scenario, individuals probably evaluate Dictionary B higher both before and after they use it, when only one dictionary is available to them.

In the context of technology adoption, following the evaluability hypothesis, the way in which individuals evaluate one technology before they use it is different from the way that that they evaluate two (or more)

[1] According to the evaluability hypothesis, difficult-to-evaluate attributes are usually quantitative attributes because it is difficult to conclude a number is large or small unless it is compared to another; easy-to-evaluate attributes are usually qualitative attributes since it is easy to tell if something is good or bad. However, we do not mean that difficult-to-evaluate attributes are always quantitative attributes and vice versa. According to Hsee et al. [16], whether an attribute is easy or difficult to evaluate depends on the evaluability information the evaluators have about that attribute.

technologies to decide which they are going to use. To better understand how individuals evaluate different technologies, we need to break technologies into different attributes, and Task Technology Fit theory (TTF) is a useful tool for opening the black box of IT choice [1].

TTF theory is introduced by Goodhue [11] and Goodhue and Thompson [14], and its measurements are refined later by Goodhue [12]. The theory states that the characteristics of technology need to fit (match) with those of task, to receive higher user evaluation and enhance individuals' task performance. Ideally, if there is one technology and all of its dimensions (operationalized measurements) of fit are high, that technology is a perfect fit. However, the reality is that we cannot have the cake and eat it, too. Thus, we often are in the dilemma of deciding which technology to choose. This research focuses on two dimensions of fit from TTF developed by Goodhue [12]: Locatability and Flexibility. It seems that these two general attributes of technology, locatability and flexibility, can be applied to a variety of technology contexts[2].

Goodhue [12] defines locatability as "ease of determining what data is available and where" in the context of database. Following his logic, the definition of locatability is extended here to be the ease of determining what features and functions of the technology are available and in what task-solving contexts, and thus it is similar to the concept of ease of use in TAM research [31]. In other words, the technology with high locatability enables individuals to relatively easily and quickly locate its functions and features that they need. Here, locatability is a relatively *quantitative* attribute in that individuals can evaluate it based on the time they spent in the search of these attributes. Meanwhile, flexibility is defined as the "ease of changing the content or format of the data to meet changing business needs" in the context of database [12]. Similarly, the definition of flexibility is extended here to be the ease to change the content or format of the technology to meet various needs, and it is similar to the concept of usefulness in TAM research [31]. Given that the flexibility of one technology depends on its various kinds of functions, it is a relatively *qualitative* attribute: The more *diverse* these functions are, or the more malleable they are, the more flexible the technology is. Obviously, simply increasing the number of functions does not necessarily lead to flexibility. Although both attributes are important, flexibility is likely to be more important than locatability since flexibility offers individuals greater opportunity to complete the task in different ways. In other words, individuals are likely to be concerned as to whether or not a technology is useful enough to help them get the job done. Along these lines, TAM research has well established that ease of use is less important than usefulness [31].

Consider the context in which there are two kinds of technologies. Specially, the locatability of Technology A is relatively high and its flexibility is relatively high; the locatability of Technology B is relatively low and its flexibility is relatively high. The difference in evaluation between them in JE mode is X, and the difference of evaluation between them in SE mode is Y. In the context of usage choice, individuals are under JE mode and actually refer to their JE preferences. They probably evaluate A more highly in JE mode because they can compare A and B together and overpredict the difference of locatability. On the other hand, when only one technology is available, individuals are under SE mode and probably make their decision with their SE preference. They probably evaluate technology more heavily based on flexibility instead of

[2] The underlying assumption of technology adoption is that individuals adopt a certain technology to complete a task [31]. Therefore, individuals are usually interested in the ease of use of the technology and if it enables the user to complete the task at hand (usefulness). However, ease of use and usefulness provide few guidelines for design. Benbasat and Barki [1] suggest that TTF can better inform what makes a technology useful or easy to use. Therefore, we select locatability and flexibility at least as a starting point for this study. As discussed further in this paper these two concepts are very similar to usefulness and ease of use. On the other hand, they provide better guidelines for design.

locatability. Thus, their evaluation of A probably becomes lower since its flexibility is relatively low. In other words, when individuals evaluate A and B separately (in SE mode), the difference in evaluation between A and B becomes either less or even reversed. Therefore, it is hypothesized here that:

H: While participants are likely to evaluate A higher than B in JE mode, the difference is more likely to diminish or even reverse in SE mode.

METHOD

An experimental methodology was used to test the hypothesis. There are two considerations for conducting experiments: 1) the availability of relatively large sample sizes, and in this context, 2) the ability to manipulate different levels of locatablity and flexibility. The participants are from a college-wide, entry-level business class at a large North-West University in the United States. 247 students participated in the study. About 1% of their final credit is providing for participation in experiments such as this.

The purpose of this study is to examine how individuals view technologies in different contexts. Therefore, the selection of technology is vital for the study. For this experiment, MS PowerPoint (PPT) and MS Visio were offered for participants to compare. Both applications have functions to draw diagrams. In PPT, individuals can access all shapes by just clicking "Shapes" button under "Insert" ribbon. Therefore, PPT's locatability is relatively high. However, there are not so many different kinds of shapes available, so PPT's flexibility is relatively low. For Visio, individuals access different shapes by viewing different templates after they start Visio (not all templates are available here, though), or selecting one template from the "Shape" option under the "File" menu. While there are relatively many shapes, individuals can not know exactly what shapes are available from a certain template until they select that template, and they often have to switch between templates to find the shape they want. Thus, Visio's locatability is relatively low. On the hand, the various templates within Visio can meet individuals' various needs of drawing different diagrams. Therefore, its flexibility is relatively high.

The task of the study was therefore to let participants imagine that they would draw a structured diagram for a large company with multiple departments (e.g., marketing, customer service, finance, and HR). The terms "large" and "multiple" are emphasized so that the application with high flexibility is likely better to complete the task. A pre-test with background information collection indicated that most students had not used MS Visio before, and while many students had experience with MS PPT, not many were familiar with its drawing feature. As a result, video tutorials were created so that participants could better evaluate the two applications more rationally. All measurements are from previous researchers: Locatability and flexibility are adapted from Goodhue [12]; user evaluation is consistent with "attitude toward tool use" from Dishaw and Strong [8]. Each item was measured using a 7-point Likert-type scale (1=strongly disagree, 7=strongly agree).

Because video tutorials were to give participants to establish the baseline sense of the two applications, it was quite important to know if participants sensed the two applications appropriately from the tutorials. Therefore, a pilot study was conducted to check the manipulation. To be specific, it was important to know if participants perceived after viewing tutorials that PPT had high locatability and low flexibility and that Visio had low locatability and high flexibility. 31 subjects participated in the pilot study. After they arrived in labs, they watched video tutorials for the two applications. Then they evaluated the technology's locatability and flexibility. The average of each application's locatability and flexibility is calculated and

compared, and results confirm the manipulation. To be specific, PPT's locatabilty (3.13) is significantly higher than that of Visio (2.52; t=2.079, p<0.05); PPT's flexibility (2.91) is significantly lower than that of Visio (3.37; t=-2.139, p<0.05). Therefore, subjects successfully perceived the differences between the two applications.

In the lab experiment, subjects are assigned into one of the three groups randomly, following previous evaluability hypothesis research [15]. After participants arrived at the lab, they were first briefly introduced to the purpose of the study. They then went to a Web site for the study to fill out a short questionnaire which collects their background information. Then, the first group was presented Visio only and evaluated it; the second group was presented PPT only and evaluated it. The third group was presented both Visio and PPT and then evaluated them both. Group 3 is further divided into two parts and the sequence of tutorials is countered. The background information of three groups is shown in Table 1. When only one technology (Visio or PPT) was present, there were no other technologies to compare (or choose) and participants could evaluate their technology only under SE mode. When both technologies were introduced, participants then compared and evaluated them in JE mode. Recall that the hypothesis was that while participants probably evaluate PPT higher than Visio in JE mode, the difference would likely diminish or even reverse in SE mode.

TABLE 1. BACKGROUP INFORMATION FOR THREE GROUPS

	Group 1	Group 2	Group 3
Number	89	79	79
Age	21.60 (18-36)	20.62 (18-33)	19.66 (18-23)
% of Female	47.2%	32.9%	40.5%
PPT Experience[3]	-	78/79	78/79
Visio Experience	11/89	-	11/79

RESULTS

The average of participants' evaluation on two applications was calculated and two *T* tests were conducted to compare the difference of evaluation between PPT and Visio. First, a paired sample *T* test was run for the third group. On average, their evaluation on PPT is 5.91, and their evaluation on Visio is only 4.48. The difference is significant (t = 9.723; p<0.001). Therefore, when both applications were introduced, participants evaluated PPT significantly higher than Visio. Second, an independent sample *T* test was run for the first and second group. On average, the evaluation on Visio is 5.27 from the first group, and the evaluation on PPT is 5.39 from the second group. The mean evaluation of PPT is still higher than that of Visio. However, the difference is no longer significant (t = .876; p=.382). Therefore, when only one

[3] In the first group, when participants were to present with Visio, questions about PPT skill were intentionally not asked to lower the likelihood that participants may recall PPT. The same procedures are followed for the second group, who was asked only about Visio skills.

application is introduced, the evaluation between PPT and Visio is not significantly different. Taking the results of the two *T* tests together, the hypothesis of this study is supported. To be specific, participants showed different patterns of evaluation toward two applications. While participants' evaluated two applications differently when both applications were introduced, that difference disappeared when they evaluated two applications separately.

DISCUSSION

With the advance of IT generally, and the rise in relatively inexpensive "open source" technologies in particular, individuals within organizations are facing more and more technology options [32]. The issue often shifts from whether individuals adopt one technology or not to which technology individuals are going to choose when presented with multiple options. The specific attributes of these different technologies are not the same, and the performance is indeed different when individuals use various technologies [32]. Therefore, it is quite important to understand why individuals choose one technology instead of another and what impact this has on subsequent use.

This study tries to understand why people sometimes choose the wrong technology. Based on the social psychology literature, it was argued that the mode in which individuals make choices is different depending on whether they are confronted with a binary choice to either use or not use one technology, or whether they are confronted with choosing among multiple options. Individuals may overevaluate the quantitative attribute of technology during choice, thus causing them to choose the wrong technology. The study clearly has both theoretical and practical implications.

From the theoretical perspective, when user evaluation (or other similar constructs) is measured, researchers probably want to carefully design the experiment or consider the context in which data will be collected. If researchers are interested in user evaluation toward one technology, they may want to make sure that there are no other available options in the context of the research. From a practical perspective, when multiple technologies are available, practitioners need to be aware that users or choosers may overpredict some quantitative attributes while underpredicting other qualitative attribute. To avoid this kind of evaluation bias, they may want to evaluate them separately and then decide which one they really want.

One of the confounding factors for this study is technology experience: most of the students are relatively familiar with PPT, while few students have used Visio before. Therefore, technology experience with PPT was much higher than that of Visio, which in turn may affect the evaluation of PPT and Visio. Technology Adoption Model (TAM) research has found that experience has an interaction effect with other factors on intention to use [31]. Thus, the evaluation of PPT is likely to be higher than that of Visio, especially when participants are in JE mode. Therefore, it was not expected that participants would evaluate Visio higher than PPT when they are in SE mode, and the hypothesis is still supported even if the difference of evaluation between Visio and PPT becomes insignificant when participants are in SE mode. In fact, Prentice and Miller [25] argued that even small effects can be impressive. In this context, participants are much more familiar with PPT. Thus, even if the difference of evaluation between PPT and Visio become insignificant rather than reversed, the results indeed demonstrate that individuals evaluate the same thing differently when they are in different evaluation modes.

CONCLUSION

Individuals are facing an increasing number of options when they decide which IT to choose. Although technology adoption is well examined in the IS discipline [31], technology choice and evaluation has received relatively little attention. This study attempts to understand usage choice of technologies with the evaluability hypothesis. The results show that individuals indeed perceive the same technology differently in different contexts, which may explain why individuals sometime choose the wrong technology when multiple options are available. It is hoped that this study provides a new approach to study technology adoption in the future.

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