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Non-Linear Effects of Information Systems Innovation

Completed Research Paper

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ABSTRACT

This study investigates the impact of innovation on users of an evolving Information Systems (IS) product. Building on two different streams of research, Levitts (1980) Total Product Concept and the Three Factor theory (Kano. 1984) this study identifies three types of innovation: Basic, Expected and Augmented. The impact of introducing these innovations on user satisfaction was found to be dependent on the level of user satisfaction (performance) before the innovations were introduced and the type of innovation. Basic innovations impacted user satisfaction positively when the current level of performance of the IS product was low but not when the current level of performance was high. Expected and Augmented innovations impacted user satisfaction when the current level of performance was high but not when the current level of performance was low. This finding has interesting implications for practice and future research.

Keywords

IS Innovation, Basic Innovation, Expected Innovation, Augmented Innovation

INTRODUCTION

Change has never been so fast or happening on such a scale. The needs and expectations of users are becoming increasingly sophisticated as customers experience new ideas in the world around them every day (Plsek, 1997). An innovative product evolution process therefore requires an understanding and response to the continuously changing user wants and needs. There is a need to study and develop procedures that can help a company or project team gain a profound knowledge of user requirements to develop products with innovative features (Shen, Tan and Xie, 2000a).

Product innovation can lead to significant value creation for both provider and user. Launching innovative offerings can lead to first mover advantages, where the developer reaps outsized benefits due to increasing barriers to entry. The provider is rewarded with increased brand equity for having offered the product feature or benefit before competitors. Later entries are then perceived as "me-too" offerings that are undifferentiated from the first mover.

However, innovation during product evolution can be challenging. During an evolution phase whether a product is able to successfully innovate or not depends on the choices about features made during feature selection. Although the goal is to evolve a successful IS product, yet it is at the feature level that the manager must make decisions. Innovation can be risky. The product evolution should be innovative in the users' frame of mind not the developers'. Innovations that do not resonate with the user create wasted development effort, delay in time-to-market, and increased complexity, maintenance and operational costs of the product.

Integrating concepts from Levitt's (1980) Total Product Concept model and the three factor theory (Kano, Seraku, Takahashi and Tsuji, 1984), this study suggests that there are three basic types of product innovation, basic product innovation, expected product innovations and augmented product innovation. Further it is proposed that each type of innovation fulfills distinct strategic product goal and has a differential impact on user outcomes. The study then empirically validates the differential impacts of each type of innovation and the trade-offs between these the different types of innovations through experiments with actual users of an IS product.

LITERATURE REVIEW

Levitt's (1980) model

Levitt's (1980) total product concept is rated by the marketing guru Kotler (2003) as amongst the top 80 concepts that every manager should know. It has been applied in areas as varied as business strategy (Slater and Olson, 2001) and product branding (Mudambi, 2002). In this study we use it to explain how software products evolve and how the three elements of the product can be utilized to take strategic product innovation decisions through feature selection.

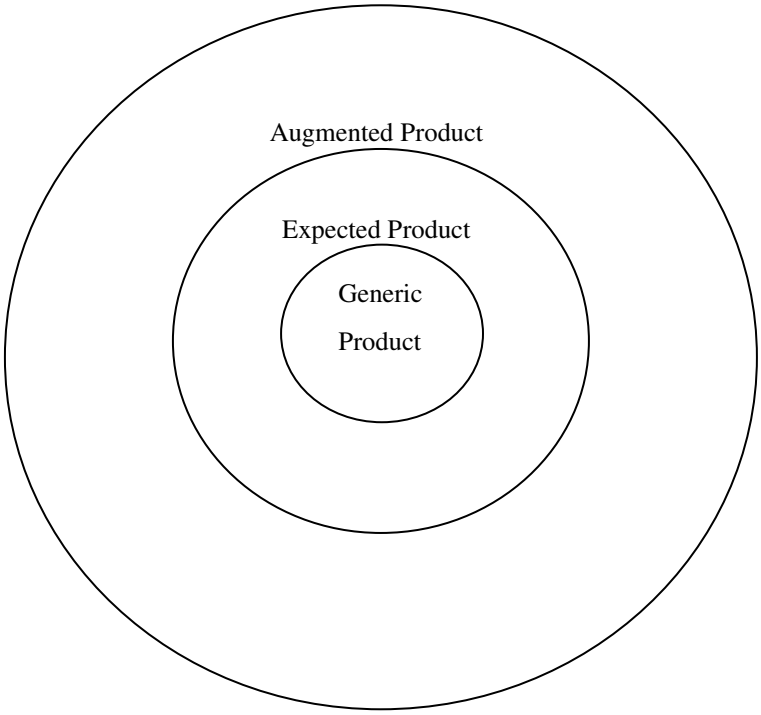

Figure 1. Levitt's (1980) Model

Levitt's (1980) Total Product Concept model suggests that all elements of a product fall into three value categories: generic, expected and augmented. Generic elements are features which every product or service would offer. It is a requirement to enter the market. Expected elements are those features beyond the generic but still expected from a quality provider. It is what the users expect when they use or purchase the service or product. These features make a product competitive in the market Augmented elements are what surprises the consumers and which they did not expect from the product. They differentiate the product from its competition.

The three factor theory

The three factor theory is popular in product quality literature as the "theory of attractive quality" (Kano et al, 1984). In the three factor theory product features are grouped into three categories each with its own characteristics:

Basic factors: They are prerequisites and must be satisfied first, at least at threshold levels, for the product to be accepted. The fulfillment of basic requirements is a necessary but not a sufficient condition for satisfaction. The user takes Basic requirements for granted, and therefore does not explicitly ask for them. Users are Indifferent if these requirements are met as they are entirely expected but experience dissatisfaction if they are not met. The other names used for Basic factors are Minimum Requirements (Brandt, 1988), Must-be requirements (Kano et al, 1993), Implied requirements (ISO/IEC 9126-1, 2001).

Performance factors: These are requirements that the user deliberately seeks to fulfill. They are uppermost in her consciousness. Fulfilling these requirements leads to user satisfaction and not fulfilling those leads to dissatisfaction. The other names for Performance factors are One-dimensional requirements (Kano et al, 1993), Stated requirements (ISO/IEC 9126-1, 2001).

Excitement factors: Excitement requirements are those that the user did not expect. They surprise the consumer by adding unexpected value to the product thereby delighting her. Not fulfilling excitement requirements do not lead to consumer dissatisfaction. The other names for Excitement requirements are Attractive requirements (Kano et al, 1993), Value enhancing requirements (Brandt, 1988).

THE TYPOLOGY OF INNOVATION AND HYOTHESES DEVELOPMENT

Although they have different origins, one in marketing and the other in job satisfaction literature, the concept in Levitt's (1980) model of the Total Product Concept and those elaborated in the three factor theory (Kano et al, 1984) are remarkably similar. While the total product concept talks about 3 layers of product, the generic, expected and the augmented, the three factor theory talks about 3 types of product features Basic, Performance and Excitement. There is a close association between the generic product and basic features. While the generic product represents the core product, the basic features represent the core minimum features. Users do not explicitly specify them as they are prerequisites. Similarly there is a correspondence between the expected product and the performance factors. The user explicitly specifies them and knows when they are made available and when they are not made available. The augmented product consists of excitement features which the users did not expect but is surprised and thrilled to have them in the product.

Based on the concepts from Levitt's (1980) model of Total Product Concept and the three factor theory (Kano et al, 1984) we categorize user feature requests into three types of innovation:

1. Basic Product Innovation

These are product innovations required for Market Entry

2. Expected Product Innovation

These are innovations required to make the product competitive

3. Augmented Product Innovation

These are innovation required to differentiate the product from other products in the same product category

The basic features establish a market entry threshold for the product. Thus they are decisive when the performance with the current version of IS product is typically low. A user would place higher value on the Basic features if in his assessment the product does not meet its core functionality. From another perspective Basic features represent the users' lower level needs. Maslow (1970) suggests that the basic needs must be met before an individual is motivated to pursue higher level needs. If the lower level functional needs are not met the individual remains focused on its fulfillment first before desiring to move up the needs hierarchy.

Hypothesis 2-1: A Basic innovation when introduced into a IS product does not significantly impact user satisfaction when current performance (user satisfaction) of the IS product is high but will increase user satisfaction significantly when the current performance of the IS product is low

User Satisfaction is used as a measure of performance for the evolving IS product performance as it is one of the most prevalent measures of software success and use (Ives, Olson, and Baroudi, 1983; Torkzadeh and Doll, 1991; Delone and Mc Lean, 1992; Seddon, 1997; Zviran and Erlich, 2003). and a measure of value provided by the COTS product (Calisir and Calisir, 2004). Gelderman (1998) found that user satisfaction was significantly related to system performance factors "providing empirical evidence for the popular assumption that user satisfaction is the most appropriate measure for IS success available".

The Expected features represent the expectation set of the user and are hence uppermost in his consciousness. They will thus positively impact user satisfaction if implemented in the product irrespective of whether the current performance is high or low. Conversely they will negatively impact user satisfaction if not implemented into the product irrespective of whether the current performance is high or low.

Hypothesis 2-2: An Expected innovation when introduced in an IS product significantly increases user satisfaction irrespective of the current performance of the IS product

Excitement factors are not expected by the user. Hence they impact the user satisfaction positively by surprising them with features that add value to the product. But providing augmented features will not satisfy the user if the current performance of the product is low, that is if the core or the expected functionality of the product is not met. From another perspective,

Augmented features represent higher level needs of the user in the Maslow's hierarchy of needs Thus fulfilling higher level needs by providing Augmented features alone will not impact user satisfaction. The core and expected functionality of the product have to be satisfied first before augmented features can differentiate the product from competition.

Hypothesis 2-3: An Augmented innovation when introduced in an IS product significantly increases user satisfaction when current performance (satisfaction) of the IS product is high but will not have a significant impact when the current performance of the IS product is low

METHOD

An experimental method was used in this study.

Participants

The participants were young men and women aged between 18-24 year who are users of Gmail.

Experimental Variables

The independent variable was the type of feature innovation. This categorization was done using the Kano (Kano, Seraku, Takahashi and Tsuji, 1984) survey method developed by Dr. Noriaki Kano of Tokyo Riko University. The Kano survey includes two questions for the every product feature: a functional question "How do you feel if this feature is present?" and a dysfunctional question "How do you feel if this feature is NOT present?" The first question reflects the consumer reward for including the feature into the product and the second question reflects his penalty for not including the feature into the product. The user has to choose one of the five possible options for the answers for both the functional and dysfunctional question:

1. I like it this way
2. I expect it this way
3. I am neutral
4. I can live with it this way
5. I dislike it this way

Based on the consumer responses to the questions in both functional and dysfunctional form for each of his requirements, the quickest way to assess the questionnaires is to map each response in Table 1 and determine the category.

		Dysfunctional question				
		Like	Expect	Neutral	Live with	Dislike
Functional question	Like	Q	E	E	E	P
	Expect	R	I	I	I	B
	Neutral	R	I	I	I	B
	Live with	R	I	I	I	B
	Dislike	R	R	R	R	Q

Table 1: Matrix for Assessing Kano categories

B-Must have or Basic requirements

P-Linear or Performance requirements

E-Excitement requirements

R-Reverse, i.e. wrong features, that would make the consumer experience worse

Q-Questionable, i.e. the consumer answers is inconsistent

I-Indifferent, i.e. the consumer does not care about this feature

The dependent variable was user satisfaction with the three scenarios, that is when a Basic, an Expected or an Augmented feature is added to the product. Participants will rate their satisfaction with feature subsets on a 7 point scale which will have terrible at one end of the scale and delighted at the other end of the scale (Andrews and Whithey, 1976):
1 – Terrible
2 – Unhappy
3 – Mostly Dissatisfied
4 – Neither Satisfied nor Dissatisfied
5 – Mostly Satisfied
6 – Pleased
7 – Delighted

Design

A repeated measure design was used in the experiment. Subjects will answer a paper-based survey that uses the Kano method to categorize features. This data from each subject is then analyzed to tailor questions specifically for that subject. The second survey is conducted a week after the first survey and subjects rate their satisfaction with three scenarios of the upgraded version of IS product by adding a Basic feature, a Performance feature and an Augmented feature. Previous research demonstrates that the temporal separation between measures reduces potential effects due to Common Method Variance (Sharma et al., 2009). The use of repeated measure design offers two advantages. Variation in response due to individual variation is mitigated. The design is therefore extremely sensitive to finding statistically significant differences between the four conditions. In addition fewer participants are needed for the experiment.

Control Procedures

A number of control procedures were used to eliminate extraneous variables. The participants were a homogeneous group of 18-24 year olds. The feature requests in the survey instrument were randomly selected from actual pending feature requests of users of Gmail. They were re-worded in a simple and standard style to avoid bias (see Table 3). Shifts in structure, content and format may introduce unwanted sources of variability that may confound participant response. To address the order or sequencing effect a counterbalancing design using Latin squares (see Sheehe and Bross, 1961) was used (see Table 2) to get subject responses for different methods of feature selection. Every fourth subject got the same sequence.

	Adding features to current version of IS product		
Subject 1	Basic	Expected	Augmented
Subject 2	Expected	Augmented	Basic
Subject 3	Augmented	Basic	Expected

Table 2. Sequencing of methods for selection of product features

Test Instrument

The user feature requests taken from the company web site were re-worded in a simple and standard style, a sample set used in the pilot study is shown in Table 3.

No	Feature description
1	Allow sending emails/ replies to emails at a later time or date. Presently if the user has to send an email or a reply to email at a later date she can only save the draft and remember to send it when the date arrives.
2	Allow user to have another view of their inbox below the message they are composing. This will allow users to reference information from one or more emails, if required, while composing
3	Provide preview of media stored on other sites within an incoming Gmail message when the sender includes only a link. Users get tired of clicking on links to get to the videos and photos of friends
4	Allow sub-string, partial word and wildcard search to provide a powerful mechanism for searching relevant emails
5	Threaded conversations should be made optional to users. Presently it is a mandatory feature

Table 3. Sample of Feature Description in the Test Instrument

Sample Size

The sample size for the experiment was determined based on the effect size found during the pilot study. Assuming a power of 0.8 and alpha=0.05 (one tail), we then look up Cohen's power primer (Cohen, 1992) to get the sample size. To account for mortality rate, as a repeated measures design is used in the study, we inflated the figure from Cohen's table by 10 % to get a sample size of 70 subjects.

Method of Analyses

Repeated measure ANOVA was used to test the difference in user satisfaction overall, at high levels of performance (satisfaction), at medium levels of performance and at low levels of performance for all three scenarios, that when a Basic feature is added to a subset, when a Performance feature is added to a subset and when a Augmented feature is added to a subset. The category of feature is the independent variable and user satisfaction is the dependent variable. In this study the measurement of dependent variable user satisfaction was repeated as participants rate their responses on "user satisfaction" for each of the three scenarios. Using a standard ANOVA in this case is not appropriate because it fails to model the correlation between the repeated measures as the data violate the ANOVA assumption of independence. IBM© SPSS© Statistics Version 19 was used to run repeated measures ANOVA. ANOVA is robust against violations of normality but requires that the variances for each set of different scores and their covariances are equal. Violations of this assumption of sphericity can invalidate the analysis. We therefore conduct the Mauchly's (1940) spherecity test to evaluate sphericity.

RESULTS AND ANALYSIS

The descriptive statistics for the user satisfaction for the current version of Gmail software and when 1 Basic, 1 Expected or 1 Augmented feature is added to it is shown in Table 4 below:

Experimental Condition	Mean	Standard. Deviation	N
1 - Current Version	4.54	1.293	122
2 - Adding 1 Basic feature	4.60	1.251	122
3 - Adding 1 Expected feature	4.66	1.383	122
4 - Adding 1 Augmented feature	4.67	1.369	122

Table 4. Descriptive Statistics

However the data violated the assumption of sphericity as the probability of Mauchly's test statistic was less than 0.05 as shown in the Table 5 below:

Mauchly's W	Approx. Chi-Square	df	Sig.
.610	59.261	5	.000

Table 5. Mauchly's Test of Sphericity

Applying the Greenhouse-Geisser correction reveals that the difference in the mean scores of four different scenarios of IS product are statistically significant (p=0.005). Although we have an overall significant difference in means but we do not know where those differences occurred. Therefore we examine the post-hoc test result in the pair-wise comparison Table 6 below for all the 4 experimental conditions to discover which specific means differed. Post hoc tests using the Bonferroni correction from the above table revealed that adding a Basic, Expected or Augmented features significantly increased the satisfaction level of users. We can therefore infer that all the three types of innovation do affect user satisfaction levels. However the satisfaction level increase due to adding an Expected or Augmented features was significantly higher than adding a Basic feature in the IS product. We can therefore infer that all the three types of innovation do affect user satisfaction levels.

Experimental Conditions (I)	(J)	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-.057*	.027	.034	-.110	-.004
	3	-.115*	.031	.000	-.177	-.053
	4	-.131*	.037	.001	-.204	-.058
2	1	.057*	.027	.034	.004	.110
	3	-.057	.037	.127	-.131	.017
	4	-.074	.047	.118	-.166	.019
3	1	.115*	.031	.000	.053	.177
	2	.057	.037	.127	-.017	.131
	4	-.016	.044	.707	-.103	.070
4	1	.131*	.037	.001	.058	.204
	2	.074	.047	.118	-.019	.166
	3	.016	.044	.707	-.070	.103

Table 6. Pair-wise Comparisons for all users

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

We next examined the effect of these features at various performance levels. We therefore used repeated measure ANOVA for users below the threshold level of satisfaction that is below level 4 of the terrible-delighted scale, which implies the user is neither satisfied nor dissatisfied. The descriptive statistics for the various experimental conditions is shown in Table 7 below:

Experimental Conditions	Mean	Standard. Deviation	N
1 - Current Version	2.76	.435	29
2 - Adding 1 Basic feature	2.93	.371	29
3 - Adding 1 Expected feature	2.76	.435	29
4 - Adding 1 Augmented feature	2.86	.441	29

Table 7. Descriptive Statistics for users below threshold level of performance

Mauchly's W	Approx. Chi-Square	df	Sig.
.691	9.884	5	.079

Table 8. Mauchly's Test of Sphericity

The Mauchley's Spherecity test (Table 8) was found to be not significant (P>0.05). Assuming Sphericity we find that the mean scores of the four different scenarios of IS product are statistically significant (p=0.026). To further assess the specific differences we examine the post-hoc test (Table 9) result in the pair-wise comparison table below to discover which specific means differed. The pair-wise comparison tests (Table 9) shows that only Basic feature adds significantly (p<.05) to the satisfaction levels. At below threshold level of performance adding an Expected or Augmented feature did not.

Experimental Conditions		Mean			95% Confidence Interval for Difference[a]	
(I) factor1	(J) factor1	Difference (I-J)	Std. Error	Sig.[a]	Lower Bound	Upper Bound
1	2	-.172*	.071	.023	-.319	-.026
	3	.000	.050	1.000	-.102	.102
	4	-.103	.058	.083	-.221	.014
2	1	.172*	.071	.023	.026	.319
	3	.172*	.071	.023	.026	.319
	4	.069	.085	.424	-.105	.243
3	1	.000	.050	1.000	-.102	.102
	2	-.172*	.071	.023	-.319	-.026
	4	-.103	.058	.083	-.221	.014
4	1	.103	.058	.083	-.014	.221
	2	-.069	.085	.424	-.243	.105
	3	.103	.058	.083	-.014	.221

Table 9. Pair-wise Comparisons for users below threshold level of satisfaction

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

We next examined the effects of feature at the threshold performance level, that is at level 4 on the 7 point terrible-delighted scale which indicates that the user is neither satisfied nor dissatisfied. The Descriptive statistics of the data obtained is shown in the Table 10 below:

Experimental Conditions	Mean	Standard Deviation	N
1- Current Version	4.00	.000	27
2 - Adding 1 Basic feature	4.04	.338	27
3 - Adding 1 Expected feature	4.11	.320	27
4 - Adding 1 Augmented feature	4.00	.392	27

Table 10. Descriptive statistics for users at threshold level of performance

The Mauchley's Spherecity test (table 11) was found to be significant. Applying the Greenhouse-Geisser correction we see from Table 11 below that the mean scores of the four different scenarios of IS product are statistically significant (p=0.038).

Mauchly's W	Approx. Chi-Square	df	Sig.
.553	14.665	5	.012

Table 11. Mauchley's test for users at threshold level of satisfaction

The Mauchley's test for spherecity as can be seen from Table 11 above failed (p<.05) and even after applying the Greenhouse-Geisser correction we find that overall there is no significant change in mean (p=.477) by adding different features to the current version of Gmail. Hence we stop further analysis of the data at threshold level of performance.

Finally, we examined the effect of adding a feature at high level of performance that is performance above level 4 or the threshold level (see Descriptive statistics in Table 11 below).

Experimental Conditions	Mean	Standard Deviation	N
1 - Current Version	5.55	.435	66
2 - Adding 1 Basic feature	5.56	.371	66
3 - Adding 1 Expected feature	5.70	.435	66
4 - Adding 1 Augmented feature	5.73	.441	66

Table 11. Descriptive Statistics at Above Threshold Performance

The Mauchley's test for spherecity as can be seen from Table 13 below failed (p=0.000).

Mauchly's W	Approx. Chi-Square	df	Sig.
.425	54.596	5	.000

Table13. Mauchley's test for users above threshold level of satisfaction

After applying the Greenhouse-Geisser correction we find that overall there is a significant (p=.001) change in mean by adding different features to the current version of Gmail. We therefore examined the post-hoc test result in the pair-wise comparison (Table 14) below to discover which specific means differed. Post hoc tests revealed that adding Expected or Augmented features significantly increased the satisfaction level of users. Adding a Basic feature did not increase the levee of user satisfaction. No difference was found between adding an Expected or Performance feature to the current version of Gmail.

Experimental Conditions (I)	(J)	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-.015	.026	.568	-.068	.038
	3	-.152*	.044	.001	-.240	-.063
	4	-.182*	.052	.001	-.287	-.077
2	1	.015	.026	.568	-.038	.068
	3	-.136*	.052	.011	-.241	-.032
	4	-.167*	.059	.007	-.285	-.048
3	1	.152*	.044	.001	.063	.240
	2	.136*	.052	.011	.032	.241
	4	-.030	.061	.621	-.152	.091
4	1	.182*	.052	.001	.077	.287
	2	.167*	.059	.007	.048	.285
	3	.030	.061	.621	-.091	.152

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 14. Pair-wise Comparisons for users above threshold level of satisfaction

The results of the experiments are summarized in the Table 15 below:

Current Level of User Satisfaction	**Change in User Satisfaction after adding a Basic feature**	**Change in User Satisfaction after adding an Expected feature**	**Change in User Satisfaction after adding an Augmented feature**
Below Threshold	Positive	Not Significant	Not Significant
At Threshold	Indeterminate	Indeterminate	Indeterminate
Above Threshold	Not Significant	Positive	Positive

Table15. Summary of Results of Experiments

DISCUSSION AND INTERPRETATION OF RESULTS

The results of the analysis thus show that Hypothesis 2-1 was supported as adding a Basic feature at low level of performance did add significantly to user satisfaction but not at threshold or high level of performance. Hypothesis 2-2 was partially supported as adding an Expected feature did increase user satisfaction at high level of performance. However, adding an Expected feature did not add to user satisfaction at threshold and low level of performance. Hypothesis 2-3 was also fully supported as adding an Augmented feature did add to user satisfaction at high level of performance but not at low or threshold levels.

Thus the characteristic impacts of the three types of innovations on user satisfaction were not fully supported. While the Basic and Augmented innovations displayed characteristics as hypothesized, the Expected feature did not display the expected behavior at low level of performance. Perhaps at performance below threshold level of satisfaction the user remain focused on the product fulfilling the Basic requirements. Even though Expected innovations are uppermost in his

consciousness it is only after the Basic requirements are fulfilled that the users give credit for the product fulfilling their expectations. This could be a possible reason for the positive impact of Expected innovations only above threshold levels of product performance.

Thus the empirical results of the study show that innovations can be categorized into two buckets instead of three based on their distinctive characteristics - Basic innovation in one bucket and Expected and Augmented Innovations together in the second bucket which we can call Enhancive innovation. These two bucket categories can be explained by viewing the innovations in the second bucket as "motivators" in line with Herzberg's (1966) Motivation-Hygeine theory. These innovations will impact user outcomes only when the "Hygiene" (Basic) requirements (first bucket) of the users are first met. Until the Hygiene requirements are met the users remain firmly at below the threshold level of satisfaction. Only by fulfilling the Hygiene or Basic requirements do the users reach the threshold level of satisfaction for the "Motivators" (expected and augmented innovations) to take effect.

CONTRIBUTION

Innovative products cannot be designed and developed by accident. This study through the use of a new typology of product innovation offers a systematic approach for engendering innovation in evolving IS products. The typological scheme suggested in this study offers interesting insights into the different types of product innovation and empirically validates their distinct impact on product outcomes. The effectiveness of this approach was tested on an actual IS product, Gmail, with actual users of Gmail as subjects.

The study offers managers an approach of making trade-offs between different types of product features. Product features can be selected depending on the stage of evolution of the IS product. Basic innovative features should be chosen when the product is in the generic product stage (performance below threshold level) to secure a firm market entry, expected features and augmented features should be selected to make the product competitive and to differentiate it from other products in the market. Providing Basic innovative features in the product when the performance (user satisfaction) is high (beyond threshold level or generic product stage) does not add significant value to the evolving IS product, from the users' perspective, just as adding expected and augmented innovations do not add significant value to the evolving IS product when the performance is low.

LIMITATIONS AND FUTURE RESEARCH

The participants chosen for the empirical study are youth between 18-24 years of age. The rationale behind this approach is to get as homogenous a group of sample as possible as the objective of the study was to control extraneous variables such as segmental difference in user preferences. However, this study design choice limits the generalizability of the results. Future research may consider testing the results of the study for other user segments and other IS products.

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