A SELECT STUDY OF USE DIFFUSION FOR SHORT MESSAGE SERVICE

By

ASHISH KUMAR

Department Of Management Studies

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CERTIFICATE

This is to certify that the thesis entitled **"A Select Study of the Use-Diffusion of Short Message Service"** being submitted by **Ashish Kumar** to the Indian Insitute of Technology Delhi for the award of the degree of Doctor of Philosophy is a bonafide record of original research work carried out by him. He has worked under our guidance and supervision and has fulfilled the requirements for the submission of the thesis, which has reached the requisite standard.

The results contained in this thesis have not been submitted, in part or full, to any other University or Institute for the award of any degree or diploma.

(Dr. Ravi Shankar)
Professor
Department of Management Studies
Indian Institute of Technology Delhi
New Delhi 110016, India

(Dr. Kirankumar Momaya)
Professor
S. J. Mehta School of Management
Indian Institute of Technology Bombay
Mumbai 400076, India

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(Ashish Kumar)

ABSTRACT

In spite of being one of the most successful telecommunication services, Short Message Service (SMS) has not been widely studied. A review of the literature showed that use-diffusion (UD) (as opposed to adoption-diffusion) as a paradigm, and SMS as the object of diffusion, are both under-researched. Further, there do not appear to be any published empirical diffusion studies of the Singapore market. Hence, it was felt that a study of the use-diffusion of SMS in Singapore would contribute to the existing research on multiple fronts.

The overall objective of this research is to develop and test a model for the use-diffusion of SMS. This entails modification of the established Use-Diffusion (UD) model for home computer use, for SMS UD, including identification of variables impacting SMS UD, assessment of the relationships between SMS US variables, selection or development of item scales for the measurement of these variables and establishing the *determinants*, *patterns* and *outcomes* of SMS UD.

A survey of the latest published annual reports of 32 Asia-Pacific mobile operators provides insights on non-voice services in general, and SMS and MMS in particular. Then, the Bass Diffusion Model (BDM) is applied to SMS and MMS diffusion data in China, India and Philippines. Operators experience large differences in the contribution of non-voice services to their revenues, and in the usage levels of SMS and voice calls. Education, power distance, collectivism and gender egalitarianism have significant relationships with the percentage of non-voice revenue. The BDM shows good explanatory power.

A hypothesized model for SMS UD was developed based on the literature. Variables were operationalized, scales were selected and one scale (for "Interest in Future Mobile Services") was developed. A survey was administered in three stages and 383 complete responses were retained for analysis.

After reliability testing, exploratory factor analysis revealed that the loading of all items was not in line with theory. Hence, the mapping of items to factors was revised. Repetition of the reliability tests after revising the item mapping revealed innovativeness to have low reliability, leading to this variable being dropped from further analysis.

After this stage, analysis was carried out in three steps. Firstly, multiple linear regression showed that performance value, emotional value, social value, market mavenship, SMS network size and household size are significant predictors of rate and/ or variety of use. Secondly, cluster analysis and multinomial logistic regression showed that the categorization of limited, specialized, non-specialized and intense UD segments is valid, that it fits the data. Thirdly, MANOVA, ANOVA and discriminant function analysis showed that there are significant differences in the means of outcome variables – satisfaction, perceived impact and interest in future mobile services – per UD segment.

ISM analysis showed that the driving relationships based on the views of the expert panel differed from the SMS UD model in the literature. Especially, satisfaction was found to have a very high driving power instead of being perceived as an outcome. Thus ISM generated alternatives to the hypothesized SMS UD model.

The tested model was then analysed to see if some alternatives would result in an improved model. These alternatives were generated using ISM. Structural Equation Modeling (SEM) was used to test them. SEM showed that in addition to being an outcome of SMS UD, satisfaction also has a feedback effect on the rate of SMS use. In the cases of other alternatives, the model fit indices deteriorated on incorporating the alternatives and hence they were not accepted.

The contributions of the research can be categorized into subject and methodological contributions. In terms of subject, there does not appear to be any study of SMS Use-Diffusion prior to this research. Further, there do not appear to many be survey-based mobile usage oriented primary consumer studies carried out in Singapore prior to this. In terms of methodology, the contributions are that BDM has been applied to mobile messaging, ISM has been applied in marketing research., aspects particular to mobile usage have been incorporated in the research, a scale has been developed for "Interest in Future Mobile Services" and hypotheses related to SMS UD were developed and tested.

Keywords: Diffusion of Innovations, Short Message Service (SMS), Use-Diffusion (UD), Multimedia Messaging Service (MMS), Non-Voice Revenue.

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