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Understanding and predicting the motivators of mobile music acceptance – A multi-stage MRA-artificial neural network approach

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ABSTRACT

The adoption level of digital music is still at its formative stage although the adoption renders advantageous to consumers. Therefore, the study develops a model to predict on the motivation leading to consumer's intention to adopt mobile music services by extending Perceived Cost (PC), Perceived Credibility (PCr), Social Influence (SI), and Personal Innovativeness (INNO) with Technology Acceptance Model (TAM). 160 Respondents were tested using a multi-stage Multiple Regression Analysis (MRA) and Artificial Neural Network (ANN) approach. A non-linear non-compensatory Multi Layer Perceptron (MLP) ANN with feed-forward back-propagation algorithm and ten cross-validation neural networks was deployed in order to capture the motivators of mobile music adoption. All predictor variables were found to have relevance to the output neuron based on the non-zero synaptic weights connected to the hidden neurons. The RMSE values indicated that the ANN models were able to predict the motivators with very high accuracy. The ANN models have out-performed the MRA models as they are able to capture the non-linear relationships between the predictor and criterion variables. While the study found that TAM is a significant predictor, the insignificance linear relationships of PCr and INNO requires further investigation. The music industry can use the findings from this study beneficially to the development of mobile music adoption.

1. Introduction

The unleashed of digital music from the physical form has revolutionized the global music industry. The advent of downloadable MP3s and other audio file formats has offered substantial opportunity for the growth of digital music services (Computerweekly.com, 2011). Organizations existing business models have been extended as the result of digital music services and thus they are able to reach out to consumers across the globe (Digital Music Report, 2012). According to Businessweek.com (2006), the download of ringing melody services has been the primary contributor to the growth of digital music industry over the past years. Takeishi and Lee (2005) commented that the services also appeared to be the largest mobile business in Japan and Korea. As mobile devices (m-devices) like smartphones and other portable music devices

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increasingly becoming more sophisticated, more devices are now equipped with, bigger storage options and the capability to digital play back. Therefore, the services for download full-track music are paving their way into the music industry. Hence, this brought significant opportunity to the mobile music industry.

According to Buhse (2002), mobile music (m-music) is a digital form of music that is made available in the commercial market through the distribution of mobile networks. Corresponding to the context of this study, we define m-music as an innovative method of purchasing a downloading digital music using m-devices. The adoption of digital music renders many benefits. One of the benefits is the portability advantage, which allows individuals to engage music while working on their desktops, surfing the internet or while walking on the streets. While it has become an inseparable part of today individuals' lifestyle, it has also revolutionized how organizations should design and delivered their music services. Internet service providers (ISPs) and telecommunication companies are aware that entertainment content can attract and retain customers. Hence, attractive commercial footprints and billing structures are developed in their joint venture collaboration between ISPs and telecommunication companies to engage a wider spectrum of consumers (Digital Music Report, 2012). One example of a 'bundling' partnership is between Cricket, a leading wireless company in US and Android smartphone. Cricket offers not only unlimited national talk time, text and web access but also unlimited songs; ringtones and ringback tones download with a monthly commitment of only $65 (Digital Music Report, 2012). The company has since successfully attracted more than 500,000 customers; with half of them are new subscribers (Digital Music Report, 2012).

The Malaysian population is approximate at 28 million people (Tan et al., 2011); in 2011 the hand phone subscribers reached 36.6 million which the penetration rate accounted for more than 100% (Wong et al., 2012). Despite attaining an overwhelming penetration rate, the m-music adoption rate in the country remained low thus requires further investigation. Similarly, Google faced the same problem at the end of 2011 when they launched their music service 'Google Music'. Three months after launching, Google Music did not live up to expectations although they have massive customer base with over 20 million activated Android phone and tablet uses (news.cnet.com, 2012). Although the survey through Businessweek.com (2006) indicated that consumers have expressed interest in downloading music to their m-devices, the number of sales transactions of songs download via mobile platform did not attain the desired results. Thus, the question remains if it is possible to transform m-music into a profitable business? Motivated by past studies conducted on the influence of m-music resources (Wang and Doong, 2010), this paper intends to investigate the other factors that could provide insights towards the diffusion of m-music services. As the behavior of users is one of the salient factors that affect the development of m-music business, it remains to be seen if there will be a change of consumers' behaviors in their intention to purchase m-music rather than physical digital music service. Surveys so far revealed that Asia Pacific yielded a remarkable demand in ringtone and ringback tones downloading. Businessweek.com (2006) further commented that emerging markets in Asia Pacific is an important m-music revenue driver in the region (Businessweek.com, 2006). As such, industry players must keep an eye on the latest trend of m-music applications that has potential commercial value, especially in emerging markets like Asia. Hence, the purpose of this study is as follows: (i) investigating the factors influencing m-music diffusion, (ii) exploring the relationships among variables of m-music adoption behaviors, (iii) and how these factors affect the growth of m-music industry.

There are significant contributions as discussed in the following sections of this paper. Firstly, by understanding the characteristics and its influential power this could provide important analytical cues for the overall development of the m-music industry. The study will also enable m-music services provider to be more aware of the problem faced by customers. By identifying the critical factors, the information can contribute to the enterprises' knowledge especially when designing their marketing strategies. By employing online games as a killer application, South Korea has successfully increased their broadband adoption rate among consumers (Lee et al., 2003; Ooi et al., 2011). Taking this point into consideration, more local bases research is therefore needed to be carried out in order to find the best and compatible business strategy. The diffusion models offer a unique perspective in understanding new technology adoption. These models have been developed and tested to predict the development of new diffusion process with the intention to provide more useful theoretical and empirical explanations. In this study, technology acceptance model (Davis, 1989) was adopted as the underlying framework as it is a useful research model to explain the internal and external motivation in initiating m-music adoption. This study is organized as follows, where the first section provides an overview of the study. Subsequently, in the second section, we discuss on the theoretical background and hypotheses development. In the third section, we elaborate on the methodology and this is followed by a detail interpretation of our findings. Lastly, we will conclude the study with implications, limitations and suggestions for future research.

2. Literature review and hypothesis development

2.1. Technology acceptance model (TAM)

Many theoretical models rooted from the psychology and sociology literature were proposed to explain the different implementation of new technology innovation (Venkatesh et al., 2003). The technology acceptance model (TAM) and theory of reasoned behavior (TRA) are among the most popular theories discussed by scholars. Drawing upon belief–attitude–behavior models as exemplified by the theory of TRA, TAM attempted to study on computer and IS adoption (Schepers and Wetzels, 2007). The model explained that the concept of actual use is influenced by the person's behavioral intention