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A service selection model for digital music service platforms using a hybrid MCDM approach

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ABSTRACT

Digital music services have provided more and more digital contents and service styles. The number of people paying to download music is on the rise. Digital music files, mainly in MP3 format, have become widespread on the internet. Downloading digital products for free may harm creators and music publishers, because it is very easy to obtain free-music through peer-to-peer sharing technologies over the internet. At the same time, portable entertainment devices and mobile phones are now able to carry music files, enabling people to access music much more easily. On the other hand, with the coming of the 5G in the telecom infrastructure, the rise in downloading music using mobile devices becomes possible. People can access online-music platform services through cable/ADSL with their digital devices (e.g., Personal computer, Notebook and Smart phone) or through the telecom services accompanying their mobile devices. Therefore, a critical issue for record publishers, or digital music service providers, is how to provide services to create value and fulfill customer needs. By determining customer music service needs and intentions, this study identifies the selection criteria necessary for customers to evaluate and select digital music service platforms. A novel MCDM (Multiple Criteria Decision Making) technique is developed that integrates the Decision making Trial and Evaluation Laboratory (DEMATEL), Principal Component Analysis (PCA), Analytical Network Procedure (ANP), and VlseKriterijumska Optimizacija I Kompromisno Resenje (VIKOR). This technique ranks and improves the digital music service platforms to obtain the best win-win service selection. This paper will propose the key driving aspects of the digital music service platforms and rank them by using the model proposed. The conclusions are composed of suggestions for service providers to improve their existing functions and plan further utilities for the digital music service platforms.

1. Introduction

The traditional music storage style of the phonograph disk has been changed by digital storage, due to the new e-era digital technology and the micro-miniaturizing of music storage and playing devices. Consequently, the dissemination of music does not rely on the phonograph any longer. Instead, people can download music from websites or listen to music online. It has also become more and more common for people to carry music with them. Because of the commonness of music websites and the diversification of the service model, users can obtain music services, such as You Tube from websites. As a result, the sales of CD's are declining, while the dissemination of music through websites has become mainstream. Websites for the new e-era digital music services and sales has also been emerging. Consequently, the sales from downloading music have been steadily increasing over the past decade. The internet is now the main platform for digital music. People use their computers to connect to the internet to search, download, listen to and disseminate music. They can also store the music files they download onto their PCs. Following the commonness and powerful functions of portable devices, the evolution of transmission technology and the high penetration rate of the mobile phone in the worldwide market, the mobile phone, except for internet downloading, is expected, to be the next target market in the emergence of a new generation of digital music service platforms. This trend has led communication hardware and software companies to make cross-industry alliances. Music publishers are cooperating

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with other industries and attempting to integrate the mobile phone telecom vendors and mobile phone, or portable music player, manufacturers. They all try to fulfill consumer demands/needs of enjoying music, without the limitations of time and place, and attract consumers to pay for the service by providing a more diversified new e-era of digital music content and services. From the consumers' point of view, the convenience of use and economic efficiency are the most important factors that influence their purchasing decisions. No matter whether they are downloading music from the internet or portable devices, it requires access to the music on the digital music websites. Consumers seem to prefer a better service quality, particularly when the price and other cost factors remain the same.

There have been numerous studies that have evaluated service quality [1–3]. Due to the commonness of the internet nowadays, e-commerce and online shopping has become an emerging field of customer service [4]. Consumer's buying procedures (e.g., ordering) are much different from real purchasing behavior. There have been numerous studies on the evaluation and influence of service quality in the e-commerce market. As a result, some fine-tuned evaluation criteria were proposed. The five primary aspects of e-commerce service quality include: (1) obtainment and contents of information; (2) easy or suitable use; (3) privacy protection and security; (4) user friendly interface; and (5) reliability [5]. These five aspects were developed as a method for evaluating and improving the service quality of e-commerce to obtain the best service selection.

How do music publishers and website service providers achieve the balance between the benefit and the expansion of this new digital music service model and then create value-added to consumers through the platform service? This study will attempt to answer this question by comparing the values of the portable music services that the digital music websites have already provided. To better understand the different preferences of various users, their customer satisfaction level with a portable music service will be discussed. Crucial distinct thoughts between the two genders are also analyzed to suggest the function combination of the digital music platform services. Through the discoveries and analyses to the customers' demands/needs and intentions of the music services, this research introduces several selection criteria for customers to evaluate, improve, and select the best digital music service. Accordingly, a novel MCDM technique is used to solve these problems. In short, this technique involves several steps as following. First, the structure of the NRM (Network Relation Map), among several aspects, is constructed and analyzed by the DEMATEL (Decision making Trial and Evaluation Laboratory) technique. Second, to categorize the criteria by their properties, a PCA (Principal Component Analysis) is conducted. Additionally, the ANP (Analytical Network Process) is used to determine the relative weightings among those criteria, according to the NRM. Finally, the VIKOR (VlseKriterijumska Optimizacija I Kompromisno Resenje in Serbian, which means Multi-criteria Optimization and Compromise Solution) method is applied to rank the sampled digital music platform services to obtain the best service selection.

An empirical study for digital music service platforms in Taiwan is illustrated to demonstrate the proposed methods. The results show that paid digital music service platforms are better than P2P digital music-sharing platforms. However, the later ones are better than the former ones in certain aspect such as pricing and promotion. This is because the operation style of the P2P digital music-sharing platform can reduce license fees and operation costs, leading it being usually more attractive to both students and youngsters who have lower requests in system stability and security. The results also illustrate that customers do not satisfy the current service quality of system stability and the security of the P2P digital music-sharing platform. Hence, the operators of this platform would have more room to improve to satisfy user demands/needs in the future. All these results will assist the digital music service providers in terms of content to create a better service model of a new business opportunity on the mobile digital music market.

The remainder of this paper is organized as follows. In Section 2, the customers' needs on the aspects of the digital music service platform are reviewed and discussed. In Section 3, a best service selection model for the digital music service platform is built. In Section 4, a novel MCDM technique is used to solve the selection problem (i.e., user preferences) and performance for the digital music service platforms are discussed; an empirical study is then demonstrated for the novel MCDM model. Finally, in Section 5, the conclusions and remarks are presented.

2. Evaluation attributes of a digital music platform service

Some studies deem that the value of a mobile service is to provide a seamless service of "anywhere, anytime," which can connect to the best service provider in terms of quality and price, and let the consumer not feel the existence of the internet service provider. In other words, users will evaluate and select the mobile service provider, instead of the mobile network operators [6]. But, from the evolution of the industry value chain, the mobile network operators are taking the place of the mobile service providers, because they control the network, platform service construction and the core competence of customer relationship management [6]. The TAM (Technology adoption model, TAM) technique has been applied widely in this study regarding how people become familiar with the new technology. TAM explains how people accept and use the new e-era technology from technology evolution's viewpoint. It discovered that the outside variables, such as system design, were related to users' understanding of usefulness and ease of use [7]. However, some scholars claimed that the TAM could not explain the phenomenon of the M-Internet, in that the user who used the technology also consumed the services. They concluded that people should analyze this from the consumers' point of view, instead of the technologies'. Thus, they proposed a value-based adoption model (VAM). Consumer decision-making behavior has been widely discussed in the economic and marketing fields. It has indicated that consumers tended to obtain most of the rewards from the money paying for something. The value of products or services are generated from the process of consuming and the feeling of purchasing [7]. This study analyzes the service functions and customers' needs based on literature review and users interviews. And then this study determines the value-created mechanism of digital music service platform including five aspects: Music search & recommendation (SR), Platform design & maintenance (PM), Platform functionality of the website (PF), Pricing & promotion (PP), and Platform image & customer relations (IR) as show in Table 1.

2.1. Music search & recommendation (SR)

How can we consider the dimensions/aspects of a music search and the recommendations for consumers' making-decisions? The recommendation provides a personal support function to lower the difficulty of making a purchasing decision; therefore, the recommendation function is more and more important. The recommendation mechanism can effectively help consumers to screen alternatives and increase their satisfaction levels. The decision making process of online shopping will affect the complexity of shopping behavior. Therefore, if there is some recommendation information, it will help the consumer to make decisions by accepting the recommendation [8]. The most popular supporting search functions of online music stores are ranking, album category, and the introduction of the album or singer, and real time recommen-