

## Evaluation of Critical Factors in Development of Mobile Payment Software Using DEMATEL and ANFIS Methods

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### Abstract

Software evaluation is an important task in online banking systems. Developing software with inappropriate design can be costly and have a negative impact on the business process of banks. This study developed a new method to consider 5 main dimensions of Technological, Organizational, Human, Hardware and Software factors as well as 25 criteria for mobile payment software evaluation. The factors are identified by reviewing the software development literature. The method is developed using Adaptive Neuro-Fuzzy Inference System (ANFIS) and DEMATEL techniques. DEMATEL is used to determine the most important factors among the five categories by 40 experts who worked in Parsian Bank in Iran and have significant experience in mobile payment software development. ANFIS is used to find the importance level of each criteria in five categories. The results showed that software provider and technology factors are the most important factors affecting the development of mobile software.

Keywords: Software evaluation, ANFIS, Mobile payment, DEMATEL, Banking Software

### 1. Introduction

Software development is a complex process (Khosravi and Nilashi, 2018; Pandey et al., 2010). Achieving goals in the process of software development require careful planning and implementation (Khosravi and Nilashi, 2018). Maintaining software quality hinders software development because many test cycles are necessary to ensure product quality (Baharom et al., 2013).

Usability is an important element of software quality and affects the level of acceptance of the system (Nielsen, 1994). Usability means the extent to which a product can be used by specified users to achieve specific goals in a particular context with efficiency and satisfaction. The usability is linked to the ability of the system to learn, its efficiency in use, its abilities to prevent and recover from errors and user satisfactions (Nielsen, 1994). A number of studies have revealed in the literature on banking systems and usability that analyse the impact of usability factors on the choice of different banking systems (Gumussoy, 2016; Hertzum and Jacobsen, 2001).

Software evaluation is an important task in online banking systems (Egnatios et al., 2008; Karim et al., 2009; Schrader et al., 1999). Developing software with inappropriate design can be costly and have a negative

impact on the business process of banks (Vijay and Asefa, 2011).

This study developed a new method to consider 5 main dimensions of Technological, Organizational, Human, Hardware and Software factors as well as 25 criteria for mobile payment software evaluation. The factors are identified by reviewing the software development literature. The method is developed using Adaptive Neuro-Fuzzy Inference System (ANFIS) (Jang, 1993; Mohandes et al., 2011; Yun et al., 2008) and Decision Making Trial and Evaluation Laboratory (DEMATEL) (Nilashi et al., 2019b; Samad et al., 2019; Shieh et al., 2010; Yadegaridehkordi et al., 2020) techniques. DEMATEL is used to determine the most important factors among the five categories by 40 experts who worked in Parsian Bank in Iran and have significant experience in mobile payment software development. ANFIS is used to find the importance level of each criteria in five categories.

The remainder of this study is organized as follows. In Section 2, we present the related work. In Section 3, the research methodology is presented. In Section 4, the data collection and analysis is presented. Finally, this study is concluded in Section 5.