# Development of an Integrated Framework for Successful Adoption and Implementation of Mobile Collaboration Technology in Indonesian Healthcare

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## Abstract

Mobile collaboration healthcare system is one of the most widely accepted choices to support medical routine in healthcare organisations. These organisations are well known as having a high degree of communication, coordination and collaborative works, mobility and data and information access from many devices or tools. Although the benefits associated with mobile collaboration technology have been recognised as offering great potential in the healthcare sector, its successful adoption and implementation rate is low and many hospitals did not achieve intended goals in Indonesia. This study, therefore aims to develop a mobile collaborative healthcare implementation success framework by adapting the DeLone and McLean's IS success model to identify both critical success factors and success measures. In order to meet the study objectives, this study will employs a quantitative approach to identify the influence of various information quality, service quality, system quality and mobile collaborative healthcare implementation-related variables on Indonesian healthcare institutions' performance impacts.

**Keywords**: Integrated framework, Mobile collaboration, Healthcare

## Introduction

The everyday hospital schedule of physicians and nurses involves frequent movement between wards, outpatient clinics, diagnostic and therapeutic departments, conference rooms, and operation rooms. It is tough to meet their diverse information and communication demands at a variety of places and at all hours of the day and night. Costly clinical workstations, which require additional allotment of valuable space, though often used, are not always accessible (Ammenwerth et.al, 1999).

As a result of advancements in mobile technology, businesses can now maintain their collaborative information sharing capabilities across the globe, whether employees are working together or independently. It has led to significant innovations in the healthcare organization, which can improve services to patients (Siau, 2003). Mobile collaboration has progressively become a significant concern in computer supported collaborative work (CSCW). Some researchers have been conducted by (Syafar et al. 2013a, 2015); (Herskovic et al. (2009), Hislop (2008), and Milrad and Spikol (2007) in efforts to recognize the implications of mobile work and mobile collaboration on collaborative applications design. Researches on application areas of mobile collaboration such as healthcare (Tentori and Favela, 2008), (Zeng, 2016) and many more have also been studied. Mobile collaborative healthcare is helping professionals provide patients with a higher standard of care-to move healthcare back into the community, reducing the pressure on hospitals and medical centers while reducing the costs of delivering services.

According to Ammenwerth (2000), mobile work in healthcare can cover several of tasks as follows:
- Routine use, everyday activities for healthcare professionals, for example: obtaining regular updates for patients.

- Mobile communications, the possibility to reach the healthcare worker anytime and anywhere.
- Mobile information access, possibility to healthcare records may be accessed through mobile devices.
- Documentation that can be accessed and updated from anywhere, even on the go through a mobile device, to cut down on the need for duplication.
- Evaluation by registered nurses and family physicians, as well as outpatient care Mobile communication is something that nurses and general practitioners have to employ in order to be able to deliver all necessary patient and medical information while they are on the go.

There is no denying the fact that the responsibilities that mobile healthcare play are of utmost significance. Zeng (2016) implied that an enterprise information system including mobile healthcare is an array of information technologies that will affect data, workflow, and the people in an organization. In order to properly install the systems, a team of professionals from various backgrounds will need to collaborate closely. Jakab (2016) report, eHealth involves a broad group of activities that use electronic means to deliver health-relatedinformation, resources and services: it is the use of information and communication technologies (ICT) for health. The eHealth framework creates a favorable setting for the use of ICT in healthcare. However the literature series remain very limited (Fichers et al., 2003). According to Guerrero et al. (2004) and Sconavvacca et al,. (2006); a review of the literature in relation to mobile work in general has been under-researched, and research in mobile collaborative work in particular has been under-researching (Syafar and Gao, 2013a). Moreover, some research show that nearly 83.33% of companies from Indonesia (Dantes and Hasibaun, 2011), 50% - 75% of US firms (Hawari and Heeks, 2010), approximately 90% China firms failed in ERP Implementations in healthcare. In addition mobile collaboration technologies adoption and use in healthcare sectors have not been popular yet in Indonesia.

Therefore the objectives of the research are:
- Critical success factors (CSFs) for mobile collaboration adoption and implementation in healthcare organizations: a study.
- Determining how mobile collaboration's influence on performance may be measured inside healthcare organizations.
- Researching the effects of critical success factors (CSFs) on mobile collaborative uptake and implementation.
- Creating a unified strategy for healthcare organizations to embrace and use mobile collaborations.
This study aims to contribute into the body of knowledge on mobile collaborative, such as:
- Through research and identification of the CSFs, a holistic picture of the mobile collaborative adoption and implementation process may be provided.
- Sharing expertise with a company that makes collaborative mobile tools. The findings of this study will help manufacturers of mobile collaborative systems better comprehend the market's need for such products.
- Formulating an integrated strategy for effective mobile collaborative adoption will help healthcare stakeholders and other organizations embrace and execute mobile collaborative initiatives.

In developing theoretical and research model, we get inspiration from Delone and Mclean (1992) with their IS success model (six dimensions of IS success, such as System quality, information quality, service quality, use (adoption), user satisfaction (collaborator satisfaction, net benefit (performance impacts). We provide a theoretical model that gives a unified overview of the literature on mobile collaborative healthcare by modifying Delone and Mclean's (1992) model for IS factors.

Here's how the rest of the paper is put together: First, literature review, followed by proposed framework and research methodology, and the last section outlines a conclusion.

## Literature Review

### Mobile Collaboration Technology (MCT)

One definition of a "mobile user" or "mobile worker" is someone who uses a mobile computer device equipped with wireless communication capabilities to do work-related activities at any location and at any time. Typically they require functionalities for data synchronization and on-demand collaboration with other people (Syafar & Gao, 2013b, Messeguer et al., 2008).

This study focuses on physicians and nurses who are required to work inside or outside of hospitals, locally or remotely. Their activities must be completed on-site within a certain deadline, or they must operate in many places with a "portable office" and minimal resources. They often work erratic hours with limited windows of opportunity. They must deal with a significant deal of ambiguity and interference. In addition, it is impossible to guarantee the availability of communication channels should they decide to interact.

### Mobile healthcare: adoption and implementation problems

The proliferation of mobile devices has the potential to revolutionize the way healthcare professionals and patients talk to one another. Standing & Standing (2008) state the following issues with the widespread use of mobile technology in healthcare.

System integration is essential. The healthcare industry's IT infrastructure is too complicated, big, and poorly integrated to provide adequate treatment. As a result, the system's central applications are not seamlessly connected, making it difficult to take use of mobile for data access and integration.

The use of centralized control. Centralized models of healthcare administration and management have evolved as bigger facilities have been built to maximize economies of scale. Networks of centralized computers and servers have been supporting these structures. However, the scattered character of labor and the demands of patients are not reflected in this design.

Concerns about personal data security. Healthcare professionals worry about patient privacy and security when they use mobile technologies. As mobile healthcare professionals often store confidential patient data the loss of such a device or unauthorised access to it can be highly problematic (Fitch and Adams, 2006).

## Factors Influencing MCT in Healthcare Adoption and Implementation

### Information Quality

The quality of information related to successful healthcare management, according to Lehmann et al., (2008) more relevant to the dimensions of accuracy, output timeliness, consistent, complete and relevant information and selected mobile devices. Information quality refers to the quality of outputs the information system produces (DeLone and McLean, 1992), which can be in the form of reports or online screens.

### System Quality

There are specific aspects of mobile collaboration systems that contribute to their widespread acceptance and implementation in healthcare organizations, and these aspects are discussed below.

- *Portability.* Physical features that make mobile devices easier to operate. Such features also allow users to collaborate with others anytime and anywhere (Syafar & Gao, 2013b, Syafar et al., 2014a, Syafar et al., 2015; Sarker et al., 2010).
- *Reachability.* With such technology, a person can be in touch and reached by other people at any time (Syafar & Gao, 2013b, Syafar et al., 2014b, Syafar et al., 2015; Sarker et al., 2003; Junglas, 2003).

- *Localization.* The ability of MCT to track the geographical position of a mobile user (Sarker et al., 2003; Junglas, 2003).
- *Identification.* The ability of a device to confirm a user's identity (Syafar & Gao, 2013b, Syafar et al., 2014a, Syafar et al., 2015; Sarker et al., 2003; Junglas, 2003).
- *Accessibility.* The extent to which an individual is able to get access to a mobile network at a given time and geographical location (Syafar & Gao, 2013b, Syafar et al., 2014a, Syafar et al., 2015; Sarker et al., 2003; Junglas, 2003).

System quality is a measure of the technical soundness of an information system and indicates the quality of the information system's processing, which includes both software and data components.

## Service Quality

According to Chatterjee et al. (2009), in the healthcare industry system reliability and system support use will positively affect within the healthcare context. *System reliability*: Whether or whether a job can be expected to be completed without interruptions from the system. Measure of the availability of third-party apps and components for a mobile device's operating system and key applications. Quality is a product which is achieved through services to attain customer satisfaction and managerially it can be defined as an excellence achieved in providing a service (Besterfield, 2006). The significance of service quality has grown due to the fact that it is a means of differentiating one service from another and a means by which one may get an edge over the competition. To what extent customers' normative expectations for service differ from their views of service performance is how much of a gap there is between service quality and the concept service quality.

## Performance Impact

The cumulative effects of an organization's operations and actions on its performance. The extent to which there is a reduction in the delay of healthcare service provided to patients, increase in the accuracy and efficiency of healthcare service, reduction in errors in medical records, improved security of medical records, increase in the ability to continuously monitor critical patients, etc (Chatterjee et al., 2009).

Campbel, Sarker and Valacich (2006) assume that the above capabilities of MCTs are very much required by high expertise mobile workers (e.q. in healthcare organisations). In line with the systems quality regarding MCTs, Kent (2016) and Syafar et al., (2014b) claims that with MCTs' capabilities make it possible for mobile tools to be employed by mobile workersEmployees are encouraged to work together and respond quickly to consumer needs, both of which have a favorable effect on the company's bottom line.

**Proposed Framework**

In order to develop the mobile collaboration healthcare framework, we adapt the D&M IS success Model as presented in Figure 1. The research questions must be resolved before the framework can be created. To what extent may mobile collaboration technologies aid healthcare organizations in successfully adopting and using them?
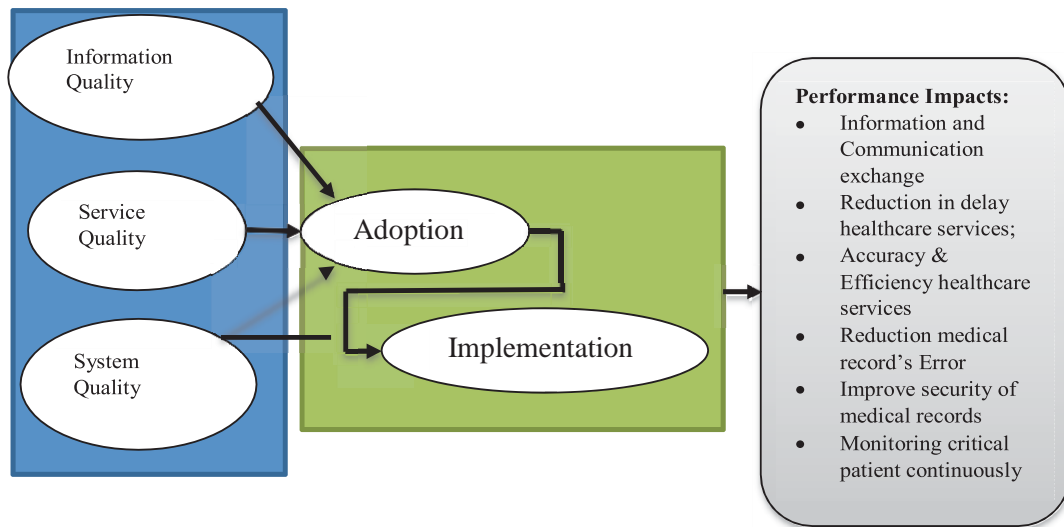
Fig 1. Proposed Research Model (adapted from DeLone and McLean IS success model (1992)

## Research Methodology

The research will use a quantitative method to determine how information quality, service quality, system quality, and the deployment of mobile collaborative healthcare affect performance outcomes.

The link between many latent and observable variables will be tested using the Structural Equation Model (SEM) software.

Questionnaires will be used to obtain the information needed. Respondents will be healthcare providers in Indonesia that have used mobile collaborative systems effectively.
Audiences will be selected specifically to:
Healthcare professionals and senior information systems managers (involved in the adoption process) (physicians, nurses)

The data will be analyzed in two stages: first, the measurement model's accuracy will be evaluated, and then the structural model's accuracy will be evaluated. The validity and reliability of the measuring model will be examined. Using a confirmatory factor analysis, we will look at convergent and discriminant validity to determine construct validity (CFA).

We will use the theoretical foundation of this study to examine the assumptions that underpin the research model shown in Figure 1. Every correlation between variables will have a set of hypotheses provided for it. Theories will be buried in a sea of synthesis from relevant sources that will wash them away.

## Conclusion

It is anticipated that the findings of the study will construct an integrated framework that satisfies all of the prerequisites for effective adoption and implementation. In addition to this, it can improve healthcare planning and implementation, as well as continually improve, and automatically adapt to the newest and most advanced mobile technology. Mobile information and communication systems will have the potential to increase the quality of patient care in the long run if mobile collaborative healthcare practices are implemented. This could include, but is not limited to, the following benefits: a significant improvement in communication; facilitated access to information; a reduction in the delay of healthcare service provided to patients; an increase in the accuracy and efficiency of healthcare service; a reduction in errors in medical records; improved security of medical records; and an increase in the ability of patients to participate in their own care.

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