

## Chapter 12

# Step Towards Pervasive Technology Assessment in Intensive Medicine

**Filipe Portela**

*Universidade do Minho, Portugal*

**Manuel Filipe Santos**

*Universidade do Minho, Portugal*

**José Machado**

*Universidade do Minho, Portugal*

**António da Silva Abelha**

*Universidade do Minho, Portugal*

**Fernando Rua**

*Centro Hospitalar do Porto, Portugal*

### ABSTRACT

*This paper presents the evaluation of a Pervasive Intelligent Decision Support System in Intensive Medicine making use of Technology Acceptance Model 3 (TAM3). Two rounds of questionnaires were distributed and compared. The work is based on a discursive evaluation of a method employed to assess a new and innovative technology (INTCare) using the four constructs of TAM3 and statistical metrics. The paper crosses the TAM3 constructs with INTCare features to produce a questionnaire to provide a better comprehension of the users' intentions. The final results are essential to validate the system and understand the user sensitivity. The paper validates a method to access technologies in critical environments and shows an example of how a questionnaire can be developed based on TAM3. It also proves the viability of using this method and advises that two rounds of questionnaires should be performed if we want to have better evidence on user satisfaction.*

DOI: 10.4018/978-1-7998-2451-0.ch012

## INTRODUCTION

The process of implementing Information Systems needs to be carefully designed and well done. The success of implementation depends primarily on the type of the system, the characteristics of the environment, the users and their willingness to change. This process should be properly evaluated before the final implementation as it is fundamental in critical areas as is Intensive Care Units (ICU). ICUs are categorized as hospital units where the patients are in a serious condition which requires continuous treatments. In this type of environments, the arrival of a new technology can be incorrectly interpreted as compromising ICU tasks. In these cases and according to the ICU professionals there is a set of barriers to overcome: as the system cannot fail, it should require a low number of human tasks. Moreover, it cannot interfere with the normal activity of the service, and it should contribute to the patient's best care.

Pervasive Intelligent Decision Support Systems (PIDSS) in ICUs are crucial to support the decision-making process. ICUs are recognized to be critical environments where the patients are in weak conditions, usually with organ dysfunction and in a life-risk situation (Silva, Cortez, Santos, Gomes, & Neves, 2008). The adoption of PIDSS is a valuable asset for the users who want to improve their decisions (Lyerla, LeRouge, Cooke, Turpin, & Wilson, 2010; Varshney, 2009). Nowadays, this type of systems requires an environment change and an information system architecture redesign. After the system deployment, the use of a methodology to understand the usability of the PIDSS (intention and behaviour) by the ICU professionals (users) is fundamental. Evaluating the technology during the test phase becomes essential as this environment is complex. In the literature, there are many methodologies to assess technologies. In this case, the Technology Acceptance Model (TAM) 3 was chosen. TAM3 (Chooprayoon & Fung, 2010) was developed to evaluate the Perceived Ease of USE (PEOU), Perceived Usefulness (PU), Behaviour Intention (BI) and Use Behaviour (UB). This approach was applied to a real system called INTCare which was implemented in the ICU of Centro Hospitalar do Porto (CHP) – Hospital Santo António. To support the evaluation phase, a questionnaire covering all the system features and TAM constructs was introduced. This questionnaire was sent to the INTCare users in two separate phases. The first round was essential to understand the system's viability and user opinions. The second round was performed after resolving the issues reported in the first round. Its main goal was the final evaluation of the system.

This paper presents the study conducted, its conditions and the main result achieved in each round. The results allow understanding the degree of satisfaction denoted by the users and which features need to be improved. Beyond this introductory section, the paper contains seven sections. The second section presents the related concepts. The third section presents the TAM3 constructs, the questionnaire and their relation to system features. Section four presents the modifications done in the system after the first questionnaires. Section five and six present and discuss the attained results. Finally, some final conclusions are made, and the future work is described.

15 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:  
[www.igi-global.com/chapter/step-towards-pervasive-technology-assessment-in-intensive-medicine/246248](http://www.igi-global.com/chapter/step-towards-pervasive-technology-assessment-in-intensive-medicine/246248)

## Related Content

---

### Radio Frequency Identification Technology in an Australian Regional Hospital: An Innovation Translation Experience with ANT

Chandana Unnithanand Arthur Tatnall (2020). *Hospital Management and Emergency Medicine: Breakthroughs in Research and Practice* (pp. 404-428).

[www.irma-international.org/chapter/radio-frequency-identification-technology-in-an-australian-regional-hospital/246258](http://www.irma-international.org/chapter/radio-frequency-identification-technology-in-an-australian-regional-hospital/246258)

### A Soft Computing Approach for Data Routing in Hospital Area Networks (HAN)

Rakheeand M. B. Srinivas (2020). *Hospital Management and Emergency Medicine: Breakthroughs in Research and Practice* (pp. 71-83).

[www.irma-international.org/chapter/a-soft-computing-approach-for-data-routing-in-hospital-area-networks-han/246239](http://www.irma-international.org/chapter/a-soft-computing-approach-for-data-routing-in-hospital-area-networks-han/246239)

### Integrated Hospital Information System Architecture Design in Indonesia

Putu Wuri Handayani, Puspa Indahati Sandhyaduhita, Achmad Nizar Hidayanto, Ave Adriana Pinem, Haya Rizqi Fajrina, Kasiyah M. Junus, Indra Budiand Dumilah Ayuningtyas (2020). *Hospital Management and Emergency Medicine: Breakthroughs in Research and Practice* (pp. 244-273).

[www.irma-international.org/chapter/integrated-hospital-information-system-architecture-design-in-indonesia/246250](http://www.irma-international.org/chapter/integrated-hospital-information-system-architecture-design-in-indonesia/246250)

### A Case Study Perspective for Balanced Perioperative Workflow Achievement through Data-Driven Process Improvement

Jim Ryan, Barbara Doster, Sandra Daillyand Carmen Lewis (2020). *Hospital Management and Emergency Medicine: Breakthroughs in Research and Practice* (pp. 45-70).

[www.irma-international.org/chapter/a-case-study-perspective-for-balanced-perioperative-workflow-achievement-through-data-driven-process-improvement/246238](http://www.irma-international.org/chapter/a-case-study-perspective-for-balanced-perioperative-workflow-achievement-through-data-driven-process-improvement/246238)

### Application of Fuzzy Soft Set in Patients' Prioritization

Samira Abbagholizadeh Rahimi (2020). *Hospital Management and Emergency Medicine: Breakthroughs in Research and Practice* (pp. 367-390).

[www.irma-international.org/chapter/application-of-fuzzy-soft-set-in-patients-prioritization/246256](http://www.irma-international.org/chapter/application-of-fuzzy-soft-set-in-patients-prioritization/246256)