Special Issue on Ubiquitous Media Systems: Guest Editors' Introduction

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Introduction to the Special Issue

As of 2014, the total number of all types of mobile-connected devices has exceeded the world's population and is forecasted to reach 1.5 devices per human being in 2019 [5]. The pace of the emergence and mainstream adoption of new forms of ubiquitous computing devices such as smartphones, tablets and 'phablets' has not ceased gaining momentum - demarking an evolutionary step in the *ubiquitous computing* trend [13]. The extinction of mobile phones and the proliferation of fluid multi-device platforms such as iOS, Android and Windows 10 have blurred the traditional boundaries between stationary and mobile information systems [4], [18].

This dissolution of the traditional segmentation of computing contexts represents a remarkable shift in the fundamental temporospatial nature of IT artifacts [10], [16]. Indeed, individuals are gradually ceasing to perceive their mobile and non-mobile devices as independent ecosystems, but rather as an evolving collection of interconnected devices that are progressively playing a major role in their daily lives [15], [17]. This significant technological evolution has given birth to a new and complex form of connected IT artifact, Ubiquitous Media Systems (UMS), that encapsulates various functions and provides fluid information access across a variety of channels; allowing users to accomplish a multitude of tasks and interact fluidly in a ubiquitous ecosystem [4].

As information access becomes fully ubiquitous and the utilitarian, as well as hedonic functionalities of those devices increase, the emergence of fluid and evolving techno-ecosystems poses important challenges and opportunities for ecommerce theory and practice. By gradually blurring physical, social and temporal boundaries *ubiquitous media systems* allow to deliver new as well as existing online products and services through a multitude of interconnected channels, but also engender radically novel and unthought-of opportunities for e-commerce [9], [11], [12].

Ubiquitous access to the Internet of things also represents new marketing opportunities for businesses as well as the challenge to deeply understand users' behavior in this fluid digital ecosystem [6]. Apprehending *ubiquitous media systems* user behavior is a difficult challenge as the rules that govern its functioning keep being redefined each time a new form of connected device appears on the market [3], [14].

Unfortunately, the understanding of the specificities that surround *ubiquitous media systems* in the electronic and mobile commerce contexts is also limited in information systems research [7], [8]. There is a general tendency to focus on individual or subsets of devices, functionalities, or sub-phenomena, which leads to a fragmented and distorted understanding of the *ubiquitous media systems* reality [1], [2]. This new, complex, interconnected and amalgamated form of IT artifact requires a more holistic and encompassing research approach that is capable of capturing the specificities and pervasiveness of *ubiquitous media systems.*

The objective of this issue is to start exploring in a more holistic perspective, the challenges and opportunities regarding ubiquitous media systems. The five papers selected for this special issue are original contributions that could be classified in two main groups. While the first three papers discuss design issues in developing digital platforms for delivering ubiquitous services, the remaining two articles analyze and discuss case studies related to digital payments.

Eriksson, Åkesson and Lund present a two-year action research study that focuses on the changes fostered by digitalization in the Swedish newspaper industry. The concept of Ubiquitous Media Environments (UME) is used to represent the vision of future media environments enabling device independent mass-scale distribution of ubiquitous media services in integrated infrastructures. Five applications of ubiquitous media services were developed and evaluated in collaboration with practitioners. The paper describes and discusses how ubiquitous media services can be designed to leverage value for advertisers and readers as well as how newspaper organizations can strategize for this new UME reality.

Carlsson and Walden's contribution is an interesting study that investigates how the use of UMS can address challenges of Europe's aging population. The authors present a set of guidelines for the design, implementation and testing of digital wellness services for the *young elderly* (individuals between the age of 60 and 75). In this research, digital wellness services are proposed as effective interventions to build wellness routines. The key goal

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of such services is to provide a support platform to help keep the young elderly healthy, active and independent. One of the key recommendations is to actively engage elderly people in the development of digital platforms (co-creation process) instead of considering them as mere final customers.

The last paper discussing design issues in the development of digital platforms for delivering ubiquitous services is Nickerson and Mourato-Dussault's study of data storage approaches in ubiquitous environments. The authors provide an overview of mobile app design with a particular focus on the management and storage of data (online, offline, synchronized). Special consideration is given to the component in charge of storing mobile app data. The paper identifies three types of mobile apps and describes the stored data characteristics of each type. It proposes decision factors for selecting a data storage approach for a mobile app and the impact of the factors on the usability of the app. It concludes that the data storage approach selected for a mobile app shall depend on the characteristics of the situation in which the app will be used. The authors emphasize one particular approach (synchronized data storage) by highlighting its overall benefits over the other approaches.

The section in the special issues presenting case studies related to ubiquitous digital payments opens with Kazan, Tan and Lim's framework for examining the competitive principles of mobile payment platforms. The authors postulate that the strategic interplay of platform layers will drive the competitive dynamics of platform-driven ubiquitous systems. The framework is used in a comparative case study between monopolistic and federated mobile payment platforms as a way to illustrate its applicability and yield principles on the nature and impact of competition among platform-driven ubiquitous systems. The findings indicate that monopolistic mobile digital platforms attempt to create unique configurations to obtain monopolistic power by tightly coupling platform layers, which are difficult to replicate. Conversely, federated digital platforms compete by dispersing the service layer to harness the collective resources from individual firms. Furthermore, the interaction and integration among platform layers give rise to commodity and value platform layers that translate into competitive battlegrounds among mobile payment services. This paper could represent, to a certain extent, a concrete step in unraveling the competitive dynamics of platform-driven ubiquitous systems from an architectural viewpoint.

The final paper in this special issue is Staykova and Damsgaard's study on the adoption of mobile payment platforms. In recent years, very few mobile payment solutions have turned out to be successful as the majority of the services that are launched failed to gain a critical mass. The authors investigate successful platform adoption strategies by using the Reach and Range Framework for Multi-Sided Platforms. This approach provides a strategic tool to which mobile payment providers can adhere to in order to tackle some of the main challenges they face throughout the evolution of their platforms. The analysis indicates that successful mobile payment solutions tend to be launched as one-sided platforms and then gradually shift into two-sided. This study points out that the success of mobile payment platforms lies with the ability of the platform to balance the reach (number of participants) and the range (features and functionalities) of the platform.

With this set of papers, the aim of this special issue is to provide an initial forum in which preliminary research results are shared and discussed. This shall encourage scholars to consider the specificities and pervasiveness of *ubiquitous media systems* for the design of new digital platforms or else new ubiquitous services. We hope the content of this special issue will raise the interest of both academics and practitioners, providing an initial foundation to further explore the inner workings and specificities of *ubiquitous media systems.*

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