Chapter 29
Proposal of a Digital Mobile Platform for the Urban Farming Revolution

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ABSTRACT

Information and communication technologies have contributed decisively to the evolution of the agriculture field, allowing the exchange of information between various platforms, the automation of processes, and the storage and processing of large volumes of data. This study proposes the development of an application for mobile devices that facilitates the process of managing and monitoring the production of an urban farming. The application can also be used by less experienced farmers by providing relevant information on the best products per season according to soil characteristics and climate. The results of the developed application demonstrated the application's potential to increase crops visibility, increase efficiency throughout the value chain, access to real-time business and financial data, turns possible to customize the application according to the users' profile, increase the efficiency of marketing processes, and contribute to reducing transport costs.

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1. INTRODUCTION

Progressive global migration of the rural population to large urban centers has contributed to the emergence of environmental, social and economic problems (Østby, 2016). In fact, cities were not prepared for this population growth. With this migratory flow to large cities, populations seek to improve their quality of life without considering the possible irreversible damage to the environment. Therefore, one of the concerns in the planning and management of cities is to ensure sustainable development. Sachs and Ki-moon (2015) advocate that sustainable development seeks to respond to the ecological limits of the planet, which are not infinite, and it is also necessary to ensure the existence of natural resources for future generations.

The rapid growth of cities has led to the massification and industrialization of production processes. This situation has led to the loss of food quality, which leads people to increasingly value the food from organic and healthy agriculture (Kearney, 2010). As a result of this process, urban agriculture presents progressively as an important alternative for feeding the population that allows ensuring sustainable development in urban space. This practice improves the quality of life of the inhabitants by giving them back agricultural traditions and may occur in a spontaneous or organized manner, in public or private spaces, and individually or collectively (Chumbler et al., 2016). The urban agriculture can be practiced in various spaces, such as urban gardens, gardens, roadside plantations, balcony cultivation, etc. (Vazhacharickal, 2014).

Agriculture has been enhancing the city with its multi-functionalities, which goes beyond food production and benefits other elements of the urban environment, such as services, green areas, buildings, leisure spaces, among others. Several authors have debated the benefits resulting from this activity. Heather (2012) mentions that at the environmental level, urban agriculture promotes the development of green spaces, the recovery of degraded areas and the reduction of pollution. At the economic level, urban gardens contribute to the reduction of probity, because they enable the harvesting of food, of good quality and for personal consumption (Krikser et al., 2019).

Agriculture has gone through several phases of evolution since the introduction of mechanization, genetics and, more recently, information technology. Fourth revolution technologies (i.e., agriculture 4.0) have led to emerging technologies such as sensors, remote connection, statistics, and artificial intelligence being adopted in agriculture to improve product performance and to increase the visibility and efficiency of the entire value chain (Braun et al., 2018; Rose and Chilvers, 2018). Smartphones and tablets promise to revolutionize agriculture due to their wide range of functionalities and features. The adoption of these technologies turns possible to attract ordinary citizens to agricultural activity and there has been a progressive demand for the use of this equipment by new farmers and agricultural technicians through the use of applications that facilitate daily work on their farms. In this sense, this study proposes the development of a digital mobile platform that allows users to organize or reorganize their growing space in urban gardens. The developed application uses exclusively open source software and provides users with advice on products to be produced, when they should be produced, production times and harvesting processes, which are fundamental for users who are not familiar with the production processes in agriculture.

The paper is organized as follows: initially, a contextualization of urban agriculture activity and the role of technologies in this sector are carried out. Next, the methodology defines the research questions and presents the requirements and architecture of the developed application. After that, the results of the