A New Idea for Enterprise Resource Management

Filippo La Noce[1], Maria Ilaria Lunesu[2] and Filippo Eros Pani[2]
[1]*Mashfrog, via G. Peroni 400/402, Rome, Italy*
[2]*Department of Electrical and Electronic Engineering, University of Cagliari, Piazza D'armi, Cagliari, Italy*

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Abstract: Nowadays the mobile market, thanks to latest generation smartphones, is still spreading: this is mainly due to increasingly powerful computing tools (microprocessors quad core) and to the used operating systems; Android stands among those with the greatest growth. The fields with a strong growth are those linked to mobile advertising, mobile infotainment and B2C mobile services, within which our proposal takes place. The starting idea of this paper is to show the abilities of the implementation of an integrated platform able to support an organization on its authorization, communication and sharing processes, accessible from mobile devices such as smartphones and tablets belonging to employees or customers of an enterprise.

1 INTRODUCTION

The mobile market linked to the development of support application services is in a continuous and relentless growth; the most expanding sectors are those related/linked to mobile advertising, mobile infotainment and B2C mobile services, where our proposal is placed.

An IDC study (Konary et al., 2016) forecasts an enterprise mobile applications market in a continuous and strong growth: from $ 2.6 billion in 2014 to over 5 billion in 2019.

The study conducted by Mobile Enterprise Observatory splits mobile market into three main areas:

1. Mobile Devices, namely the hardware components (Smartphone, Tablet, Notebook), cover the 67% of the global market;

2. Mobile Biz-Apps, which represent 25% of the global market, and include development, purchase of solutions, and App integration with Information Systems;

3. Enterprise Application Store (EAS), that is the management platform of a whole enterprise mobile ecosystem covers the remaining 8% of the market.

The so-called "mobile Biz-Apps" are increasingly widespread in Italian organizations; the survey conducted by Mobile Enterprise Observatory reveals that 51% of CIO (Chief Information Officer) has already introduced them, it can assist to a sharp increase compared to 35% in 2013, and only 9% of samples isn't interested in using them, whereas 40% of them plans to introduce them in the next future.

The Observatory categorised Mobile Biz-Apps into three macro-categories:

- the "Operative" that are the most used starting from those of Sales Force Automation, already introduced from 37% of CIO, compared to the 41% that will introduce them in the next future;

- the "Office Practice Automation", developed "ad hoc" in order to support organizational and administrative processes with specific features (fill-out of expenses form, permission request, and so on), have already been introduced in 22% of considered organisations (even if only 10% use them intensively), but at least the 46% of CIO is evaluating them for a next future use;

- the "Personal Productivity", developed in order to visualise some information on the enterprise intranet or as a support for elementary individual productivity features (Word processing, spreadsheets), was already introduced from 25% of the Organisations and a further 45% will implement them in the future; they are the less used (8%), waiting that users fully understand its potential.

The aim of this study is to put down the basis for implementing an authorisation, communication and sharing system, accessible from mobile devices of enterprise employees.

Our proposal pays a specific attention to the management of data security too; within Mobile Enterprise this management has a high priority at

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vertices and all business levels.

The second section of this paper recalls some aspects about the state of the art concerning Mobile Device Management (MDM) and Mobile Security Gateway (MSG) areas.

In the third section, we present the aim of this work that is the integrated platform accessible from mobile devices.

The fourth section is dedicated to the proposed approach. The fifth section shows the relevance of the proposed idea and the last section presents the conclusions and reasoning about the future evolution of the proposed project.

2 STATE OF THE ART

The proposal places itself in the MDM (Mobile Device Management) and MSG (Mobile Security Gateway) areas.

The market has still not many competitors that propose valid and complete products; the few participating enterprises have saw the MDM/MSG area as an extension or a diversification of a specific market already consolidated and successful (related to mobile application development, or generic monitoring platforms); for them the MDM/MSG wasn't the enterprise core business, achieving, in this way, a fragmented overview comparing to other services or proposed solutions, often developed in a custom way by System Integrators (O'shaughnessy et al., 2007) (Blinn et al., 2016).

This approach characterised the market from 2001 to 2008. From 2009, with the spread of mobile operating systems such as Android and iOS (Apple), the MDM/MSG market has been completely improved; thanks to an open approach, today it is possible to create MDM/MSG for all purposes and complete platforms, obtained as an outcome of a sharable architectural structure; and is no coincidence that the MDM/MSG area became a point of interest for a huge number of European and American startups that identify, as the keystone of its business, the Device Management platforms development and its services (Owen, 2011).

An important growth of market related to Mobile Device Management services is expected; this is due in particular to:

- the positive trend on ICT mobile area (in 2016 the overtaking occurred, more internet accesses from mobile devices rather than from PC);
- the forecast of a constant growth of mobile devices sales as discussed in the Gartner study (Gartner, 2016);
- the explosion of mobile applications spread, considered essential for business development.

3 THE PROPOSED PLATFORM

The main goal of the proposed work, is to build an integrated platform, able to support the authorization, communication and sharing processes accessible from employees or customers through mobile devices such as smartphones and tablets.

To be able to realise the above mentioned aim, the proposed product will support the management and creation of logic groups in which employees/customers can be inserted and for whose must be guaranteed the mutual interaction and the interaction with the active processes within the company database that establish the "core business" of the company itself. They are suitable for an extension on mobile communication systems according to a "document based" approach; following are some examples of these instantiated processes.

The starting idea may be applied to various areas/sectors:

- tourism: remote access to information related to travel suggestions or guides about places to visit; (Expedia offers already similar services, TripAdvisor too) proposition of an estimate of travel suggestions/proposals; launch of communication channels "for further information" about places to visit; remote management of flights or hotels bookings; payment management through mobile devices; "dynamic" management of support requests during travels;
- smart grid for an efficient electrical energy management: dynamic display on mobile devices of its own home energy consumptions; management of dynamic information related to more affordable provider depending on energy use time slots; management of energy supply contract via mobile device; payment management from mobile device; EDISONPOWER and ENEL already do this in the energy context, PostePay and PayPal in the payment management context:
- agro-industry: display of the agricultural products' offers on mobile device; management of orders and products payments; management of time needed to delivery products (delivery date and time);
- biomedicine: display of biomedical products' offers on the mobile device; sharing of biology and natural science principles that are at the basis of biomedical treatments; creation and management of communication channels among patients and doctors that use biomedical principles.

Among the above mentioned examples those in which a cooperation among people is requested seem to be more suitable for a remote use: the authorization processes in which a physical availability of people involved are usually more recurring and they can cause a meaningful process slowdown, even if it concern a simple consultation process or for the purchase a good or a service.

In addition to the authorisation process, the procedures that take interesting/important advantages from additional channels for delivery or sharing changes on documents and/or information are those related to documents that include sensitive data;

The extension of processes typical for the enterprise that use the proposed platform focuses on the possibility to use the authorisation/enacting remote capabilities via mobile platforms, requires that security standards, similar to those offered when requests are made through platforms connected to Internet, must be guaranteed: according to this we will use the most modern information technological safe transfer with the use of cryptography to record the information on mobile devices.

Moreover, the platform promises to create user groups logically established (i.e. all of users involved in a process of a consultation or discussion among experts) and the availability of specific communication tools able to offer a more direct and instant interaction with group members.

Simultaneously to these communication services, a storage area, if needed with an optional cryptographic protection, might be shared with the users. The purpose of this storage area is to record the contents related to the mentioned communication services and also files belonging to mobile devices that the owner would like to protect.

A further feature is represented by displaying the georeferenced data of the enterprise in a personal map that helps users taking aware decisions.

4 THE PROPOSED APPROACH

The strong mobile B2C services market dynamics, is reflected by the competitive scenario also in its evolution and therefore under an accurate study for project purposes.

A deep study of services offered by competitors and a deep analysis of the market based on specific criteria such as advertising, collaboration, communication, accessibility and productivity will be conducted. In particular, we aim to identify the matrix that show relations among already existent services and the actors that use them. At the same time will be verified and evaluated on various levels (infrastructure, costs, flexibility, scalability, accessibility and security, and so on), the customary technologies mainly effective for responding to the Mobile Security Gateway and Mobile Device Management typical needs. We will start from the declared services specifications to get to define a comparison table according to what will be calibrate the next phases for new primary platform requirements (Liyanage et al., 2015).

Particular attention will be paid to the middleware side in order to manage the communication aspects and the integration issues, and back-end side for defining the components configuration.

Moreover will be made a deep analysis on basic and application issues in order to ensure the system needs from a technological perspective related to collaboration among applications and collaboration among applications and data.

The infrastructure that will be studied will have to be able to manage the flow of data and information coming from the interaction between mobile devices and applications management system using an architecture that promote a clear separation among data related to the user process and those belonging to the owner of mobile device.

In particular, the software component integration will need the development of specific “blocks” that will include important aspects such as modularity, interoperability and flexibility through the use of open standards. The study will interest systems that may connect the authorisation levels not only with the application but also with the single service and eventually to the logical group; in other words the mutual interactions among users and the interaction with some process installed on the Enterprise Resource Planning (ERP) system, must be guaranteed. In the context of applications, we will take into account the complexity issues that rise in case of interaction among several people that work on the same process through personal mobile devices.

In order to support software development, a specific methodology will be defined: on one hand an implemented and innovative Agile/Scrum approach as a software development support, useful even in a distributed and collaborative environment, will be studied; on the other hand an Agile/Scrum integrating even the management of enterprise processes will be developed (Schwaber, 1997) (Schwaber & Beedle, 2002).

Scrum is a management framework iterative and incremental for an “agile” development: the product is organized into multiple tasks developed in iterations and the outcomes are refined step by step;

with the aim to reduce the complexity, a Scrum team works in single iterations (Sprints) of at most 2-4 weeks (Diebold et al., 2015).

It is better to start with the main features, which will be further developed or rejected according to the customer feedbacks received in each sprint (Kniberg, 2015). On the contrary to the typical management of the project, the customer does not have to wait the end of the project to see the results but he is involved in each development phase. In a system where the aim look for an extension of mobile communication systems according to a "document based" approach and to simplify and speed up the enterprise processes that require a direct involvement of several professional roles, even geographically distributed, it makes sense the use of a framework that:

- promotes, in the spirit of achieving a common aim, the communication and coordination among IT section, other departments, the involved employees and where possible, external consultants;
- highlights the visibility of intermediate products; the customer will see the outcomes as he might personally check them and give useful feedback; all the more people feel involved and participating in a project all the more easily then will accept new solutions;
- ensures the quality and allows the cost saving.

In particular, in an Agile environment, all main business areas are structured in a value stream and a sequence of deployment, according to the number of Scrum teams assembled in a logical order.

Instead of designing everything, from the design to the architectures, it can be built one feature at time and can be build in a rising manner architectures and interface by integrating the additional features according to a modular approach and by allowing frequent and continuous change of features even along the way.

The requirements of the system to be implemented will be discussed together with the customer. For each Sprint, it is needed to plan the requirements to be implemented that in order to give value to the customer. During the Sprint Planning meetings it will be specified what, when and how development will be executed.

In each iteration, the team develops a prototype (Minimum Viable Product MVP) that will be improved in next sprints.

In this way, it might be possible to have loops of rapid and iterative change with frequent elementary features (deployments) that will be integrated in next iterations by promoting an increment of the whole system flexibility.

Another important aspect of our proposal is related to the acquisition of the know-how about users-system interactions by supporting the development of innovative and efficient user interfaces of the system to be implemented according to an User-Centered Design approach.

The design of a good interface implicates the use of a rigorous methodology that has as a cornerstone the involvement of the system's final user. It will be also evaluated the user interfaces accessibility, in order to ease the use even to users with disabilities.

5 RELEVANCE AND INNOVATIVE POTENTIALITY OF THE PROPOSAL

The more promising sectors for the use of the proposed platform are therefore:

- mobile business, oriented to internal effectiveness of enterprises or organisations;
- facility management, oriented to services distributed from enterprises operating on agricultural, medical and energy sectors.

These sectors need new and cheap tools characterized from a low life cycle for:

- taking advantage from devices potentiality, that become outright essential work tools;
- optimising the efficiency and productivity of collaborators and customers, that might improve their own performances, even in downtime (waits, unexpected events);
- improving the process of sharing data and information that have to be ubiquitous, that is available on more devices at the same time and accessible everywhere even on mobility;
- improving the usability of service used from workers on their own daily activities;
- incrementing the real and detected security level related to all situations.

If the first potential system customers will be private enterprises allowing to optimise their own organization processes, but it is easy to make an hypothesis about technological transfer of results also in other sectors at well, first of all that of "central and local public administration"; even in the public sector exists the need for the optimisation of employees that spend much time out of the office or that need to authorization in order to make specific operations; i.e. the law enforcements spend much time abroad, the operators involved on the transportation inspections, or traffic wardens that are in charge for the supervision of park within a specific area: for them

the possibility to use smartphones to remoting accessing to the informative systems of their own office would represent a very important advantage in terms of time saving (and for efficiency), error decrease (effectiveness) and interaction convenience, that would bring, satisfaction and increase of the productivity of both employee and the whole organisation system.

Another interesting situation is related to sales world (Sales and Distribution and CRM): the aim is to give to professionals or managers a fast and safe access to sales details (contact, activities, offers, orders, analysis, objects) directly from mobile devices.

6 CONCLUSIONS

The purpose of this work was to put down the basis for implementing an authorization, communication and sharing system, accessible from mobile to enterprise employees.

Our proposal pays particular attention to the management of data security too; within Mobile Enterprise this management has a high priority at vertices and at all business levels.

By now Android equipes the majority of smartphones altough even the numbers of iOS are important: for this reason, mobiles components expected from the design might be used on the mobile devices equipped with iOS or Android.

The development of platforms equipped with Android and iOS represents a certain revenue and the technological growth more convincing in the next 10 years.

Some of the key benefits offered to Enterprise who choose to implement the platform are:

- increment of the sales force efficiency through the remote use of sales software;
- increment of the productivity, leaving time for face-to face sale activities;
- increment of the profitability through a better management of sales and related forecasts;
- ability to speed up the decision process through a real-time collaboration and with direct data access.
- increase of sales orders dimension and customer satisfaction, identifying up-selling and cross-selling opportunities;
- ability to the enterprise information with the customer data through mobile devices in order to facilitate and improve the communications;
- enhancement of abroad sales through the ability to create cost evaluations and apply real time discounts.

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