

# Outside the mobile communications of the SIM card: SWP, USB and new physical developments. A multilayer survey chasing state-of-the-art and new opportunities. \*

Pedro Hernández Pena  
phernape7@uoc.edu †

## Abstract

The SIM card has become, thanks to its embedding in Mobile Handsets of GSM and other systems, the permanent companion of the subscriber and the more spread Smart Card of the world. The opportunities that arise because its close relationship with the user will be unleashed when actual freedom of communication is given to this device. In this proposal a work on a study of the present Research, Development and Innovation state of the question is presented. This study would mean a gathering of the records related with the topic, as journal papers, patents registration and market information, and a analysis of this data as to find new innovation opportunities and a comprehensive state-of-the-art survey.

## 1 Introduction

Technological transfer and the ways that research becomes innovative products and services is a hot issue at present. In the proposed work the idea is to study the relationships that arise in a determined area of knowledge and try to figure out which will be the next steps in the development of such area and find out new opportunities and niches to exploit the technology in the Innovation field.

The present model of technological development states a three layer situation where the Research is the base where all the further knowledge stands. Development is the actual process to take this knowledge in a practical field and make direct applications of it as to solve some problem. Finally, Innovation, herein the scope of this work, is the way that the developments are applied as to produce brand new

products and services that fulfil the expectations, or create new, of the market and thus, become economic value.

What is proposed in this work is to analyse a focused area of technology, Security Identity Module (SIM) cards communications thorough the handset with the environment, and get all the information at the Research, Development and Innovative layers as to analyse it from different points of view.

This approach will be further discussed in the section 5.

The main topic of study are the communications of the SIM cards with devices and entities that rely in the external environment of the handset, either using the convenient Input/Output usual C5 contact or any other advance that may be used. The SIM card was

\*Master Thesis Research Proposal for *MSc. in Knowledge and Information Society*, by Universitat Oberta de Catalunya.

†Physics degree by Universitat de Barcelona and Telecommunications Project Manager at Giesecke & Devrient.  
pedro.hernandez@gi-de.com

conceived as a slave security token where the information of the subscriber could be stored for its use by the mobile handset. Anyhow, it was developed afterwards as a key device inside the network. As a user interface, with the Toolkit applications that may be accessed from the Mobile handset menu, and as a Network system that helps in the management of the network and also on its monitoring.

In the present days big developments are done in order to provide the SIM card with more connectivity with the outside world than just the Toolkit interaction with the user and the network. Recent developments on Near Field Communications (NFC) and on the Universal Serial Bus (USB) interface have increased the actual possibilities for the SIM card to interact with its environment. Furthermore, some tries have also been held as to set the possibility for the SIM card to implement any of the 802.1x protocols for wireless communications and Global Positioning Systems (GPS) reception for the management of a precise position by the SIM.

## 2 Bibliographic Revision

Significant prior academic research has not been found at present, but a study of similar works in the same area of knowledge as well as with the same methodology in other areas will be held as to check the state-of-the-art of the question.

## 3 Objective

As has been already introduced, the main objective of the work is to put light on the topic of study as to identify the key and hot points on it, find trends of evolution and early opportunities to cover.

Another objective to be covered is the establishment of a framework of research of the

question as to give opportunity to deeper analysis for the future.

## 4 Structure

The structure of the Master Thesis work will be, in general terms, the following.

1. Introduction
2. Related literature and theoretical focus
3. Data Sources
4. Method
5. Research Results
6. Conclusion
7. References

The *Introduction* will consist in a brief explanation of which is the main objective of the work, the motivation, to whom it is addressed, which will be the method and a review of the structure and major findings. Additionally it will include a brief technological introduction to the topic of study. In the *Related literature and theoretical focus* section a review of similar works in the same area and also with the same methodology in near fields will be done, as to establish a framework for the work. In the *Data sources* section a study, analysis and justification of the several sources for extracting the data will be done. A discussion on the methodology and research approach used will be held in the *Method* section. In the *Research Results* a raw exposition of the results of the study will be presented that finally in the *Conclusion* will be summarised. The work will end with a list of *References* with all the bibliography used.

## 5 Research Approach or Methodology

The approach to the topic will be mainly analytical. From the prior research and other

sources, a list of document records will be extracted. This records will either belong to one of the three layers: Research, as scientific papers published in the literature, Development, as patents registrations in the corresponding databases, and finally Innovation as press notes, catalogues and any market news or any market information that may be done public.

This data will be analysed in several dimensions. From the quantitative point of view a study of the type of documents and the different uses that they have. From the qualitative point of view, a descriptive analysis and a mining for the key and hot issues on the topic. Finally a

relational analysis on the relationships between the different records as to establish a map of knowledge of the topic.

## 6 Hypothesis

The main hypothesis to be tested is that there are trends of evolution that may be made explicit from a deep study of the several layers of knowledge of a topic. Additionally, that there are relationships between the several works, at different layers, that may be made explicit and give a comprehension of the state of the question.