

THE CURRENT AWARENESS OF RADIO FREQUENCY IDENTIFICATION TECHNOLOGY

Erik JANÁK¹

Abstract

The article can be divided into two constituent parts. In the first part is introduced the RFID reference model, which categorizes RFID applications into eight groups. In the second part are thereafter presented the results of the survey of the use of information and communication technologies in Slovak enterprises, which was conducted by the Slovak Statistical Office, as well as the results of own questionnaire survey, which was aimed to determine the level of current awareness of RFID use in Slovakia.

Key words

Radio Frequency Identification Technology, Current State, Awareness

Introduction

Radio frequency identification technology (RFID, for short) is without doubt one of the most discussed topics today. However, RFID is in no way a new technology. Whereas in abroad it is possible to encounter with the most sophisticated RFID applications, RFID in Slovakia is, from this point of view, in its infancy. Accordingly, this article which can be divided into two constituent parts, deals with RFID issues, as well as with the current awareness of RFID. Based on this, it will be possible to conclude that the level of awareness of RFID in Slovakia is really low, as well as that we use only a small amount of RFID benefits.

RFID in abroad

The RFID application area is truly vast and very diverse, ranging from various logistics applications through various access cards to the timing of sports events participants. Forasmuch as every application is in a way specific and different from each other not only in standards, objectives as well as expected results, European RFID users and vendors have launched the initiative „Coordinating European efforts for promoting the

¹ Institute of Industrial Engineering, Management and Quality, Faculty of Materials Science and Technology, Slovak University of Technology, Paulínska 16, 917 24 Trnava, Slovak Republic, erik.janak@stuba.sk

European RFID value chain“. The main objective of this initiative was to create a reference model for classification of RFID applications.

In order to create a reference model were collected 493 RFID applications that have already been implemented, respectively, their implementation was scheduled until the end of 2009. As can be seen in the figure 1, the reference model categorizes RFID application in eight areas.

The area „Logistical tracking and tracing“ includes all applications related to the identification, localization and tracking of products, packaging, pallets and containers applied in logistics processes. Benefits of RFID logistics applications can be grouped into two areas. The first is a natural process optimization, which is related to saving labour and time. The second area represents the benefits associated with improved quality of information and transparency of business logistics processes.

The second category of the reference model represents the area „Production, monitoring and maintenance.“ This area encompasses a variety of archival and management systems, automation as well as production of automobiles, aircrafts, food and consumer packaging.

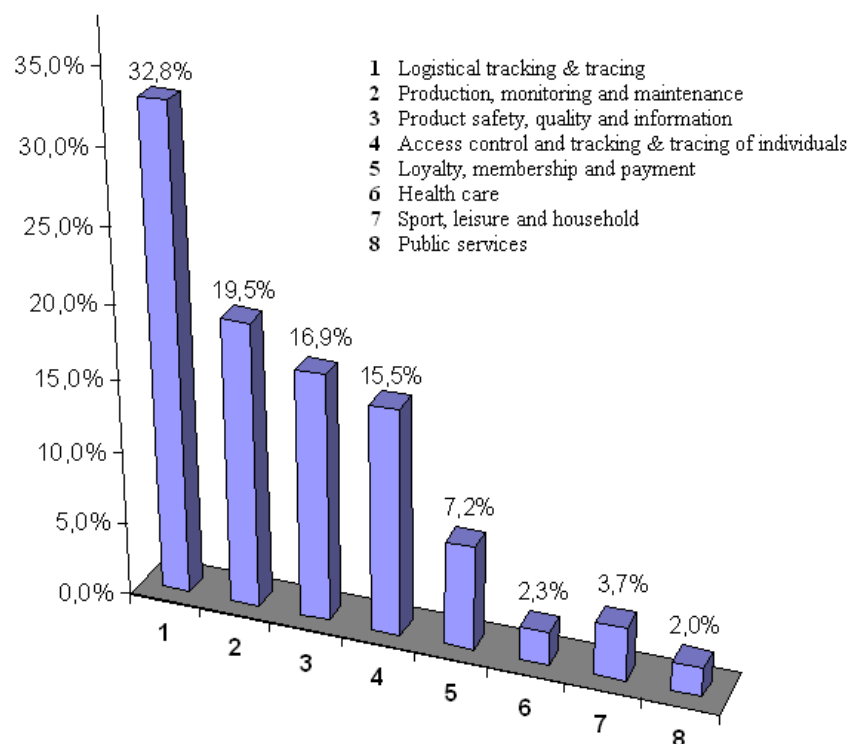


Fig. 1 RFID reference model (Source: own processing by (2))

A third area „Product safety, quality and information“ focuses on RFID applications in the area of consumer packaging, electrical and electronic products, clothing, food or customer information systems.

The fourth area „Access control and tracking and tracing of individuals“ as the first area of the reference model focuses on tracking humans, not objects and describes the possibility of using RFID technology to access control, monitoring and traceability of movements. Perhaps the most important application in this area was the use of RFID transponders in the tickets for the FIFA World Cup, which was in Germany in 2006.

Another category encompasses smart cards (different customer cards, credit cards or membership cards) and RFID-supported payment options that are used in the public transport.

Sixth area "Health care" includes applications designed to help physically disabled persons, and hospital management in the form of RFID implants to monitor health status and physical functions of patients.

In the penultimate category „Sport, leisure and household” are collected RFID applications in the field of leisure and home environment. It can be mentioned the application that allows the timing of sport events participants (e.g. during a marathon), application that supports the arbiter decisions (e.g. whether the ball was behind the goal line), applications used in car rentals and libraries or applications such as smart house or smart fridge.

The last category of the reference model presents RFID applications in the field of services and as the subcategories can be given garbage collection, toll systems, ID cards and passports or electronic health cards.

RFID in Slovakia

In the first part of the analysis of the current awareness of radio frequency identification technology in Slovakia we focused on the survey of the use of information and communication technologies (ICT) that was conducted by the Statistical Office of the Slovak Republic (SOSR, for short).

SOSR conducted the first survey on ICT in 2002, as part of the annual structural survey in enterprises, including the financial sector and a year later the government sector and the health service too. The results of these surveys were presented in their publications on the use of ICT.

A separate survey focused on information and communication technologies with larger number of indicators was performed for the first time in 2004. This survey was divided into three separate parts, specifically the use of ICT in enterprises, the use of ICT in the financial sector and ultimately the use of ICT in households and by individuals.

A similar survey focused on enterprises and the financial sector was conducted by SOSR in 2009 and in this survey was included a module focused on the use of RFID technology, which is shown in the following figure.

According to this survey, less than 5% of businesses with ten or more employees use RFID technology. As can be seen, the vast majority of these companies use the RFID technology to access control or personal identification, almost 17% of enterprises use this technology to label their products to protect against theft and the same percentage of companies to monitor stocks and flows in their supply chains.

7% of enterprises use the RFID technology to control and monitor industrial production, less than 9% of enterprises to manage maintenance services as well as to monitor the assets and finally, less than 3% of companies use the RFID technology to check the payments, either for highway toll collection as well as in public transport.

A similar survey was conducted by SOSR again in 2011, including a module focused on the use of RFID technology, but reduced to only three different areas. According to this survey, less than 9% of businesses with ten or more employees use the RFID technology, thus the number of companies that use the RFID technology nearly doubled in less than two years.

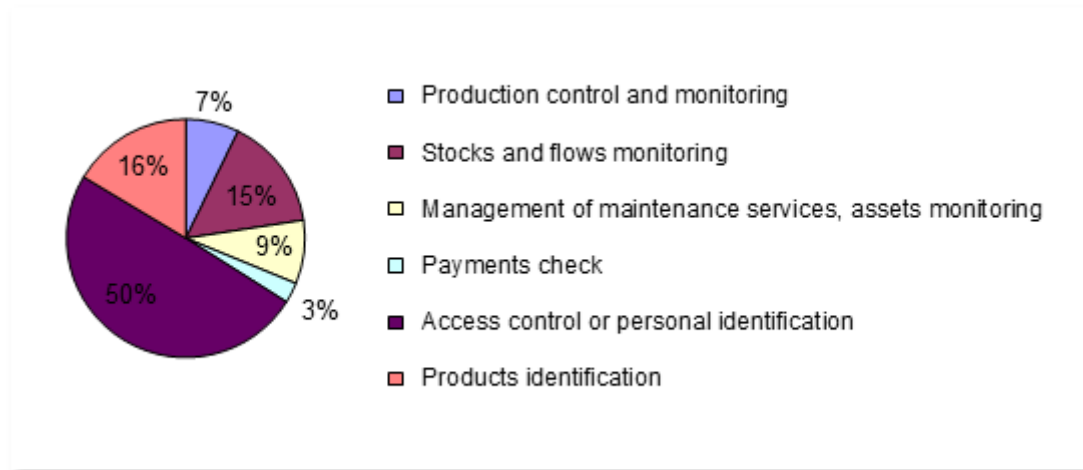


Fig. 2 Results of the survey on ICT in enterprises in 2009 (Source: SOSR)

As can be seen in the following figure, less than 70% of enterprises use the RFID technology to access control or personal identification, 10% of enterprises to identify their products and less than 21% use the RFID technology as a part of the manufacturing process.

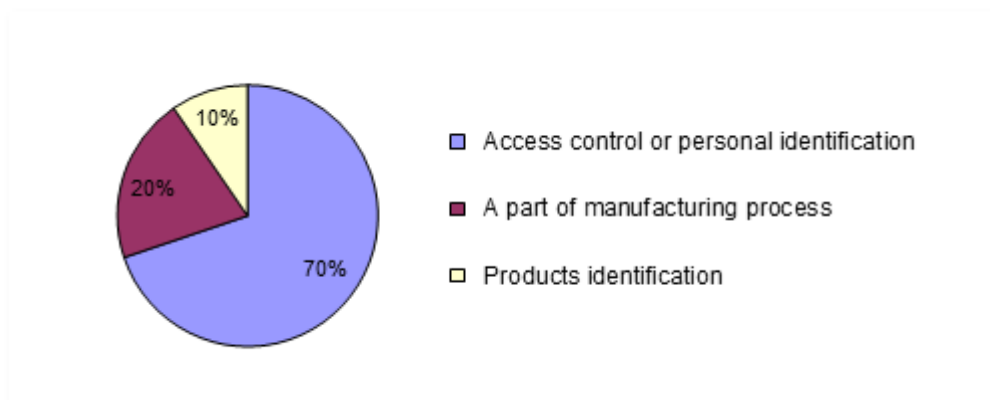


Fig. 3 Results of the survey on ICT in enterprises in 2011 (Source: SOSR)

Based on this survey and study it may finally be concluded, that RFID still did not assert itself in Slovakia. Although the number of companies that use RFID technology has been for nearly two years practically doubled, other areas of RFID use in contrast with logistics are still dominant and so is used only a small amount of benefits that this technology offers.

Following the previous research, we conducted a survey that was only aimed at the usage of radio frequency identification technology. In this context, we only focused at industrial enterprises and their level of awareness about RFID as well as their level of knowledge and experience with this technology.

The target group was comprised of industrial enterprises from Slovakia. For this purpose, we developed a questionnaire, whose content was dynamically changeable and adaptable according to the respondent's previous answers. Through this questionnaire it was able to sort out companies that are familiar with RFID technology, have experience with it and their applications of RFID are related to the logistics. For this purpose we addressed 263 industrial

enterprises across different sectors of economic activity of the total amount of industrial enterprises in Slovakia that was last year 2294 and we achieved the return rate of 20.53%.

As can be seen in the following figure, the vast majority of respondents met with the term „RFID“, but they knew nothing more about this technology. 26% of respondents stated that they do not know the RFID technology nor they did not meet with this term, what was the biggest surprise of this survey.

33% of respondents stated that they know the principle of operation of RFID technology as well as the possibility of its use, and only 4% of respondents stated that they are familiar with virtually all aspects of RFID technology.

Greatest interest in the introduction of radio frequency identification is currently registered in the automotive industry and in the warehouse and production management. Currently, from the trio of Slovak automotive plants that does not use RFID technology in the production or storage is Trnava PSA Peugeot Citroën. Volkswagen uses RFID tags to manage autonomous trucks at various production places and RFID plan to introduce in their near future to control the flow of supplies. Kia already has experience with RFID and uses this technology in body shop almost since the start of production (1).

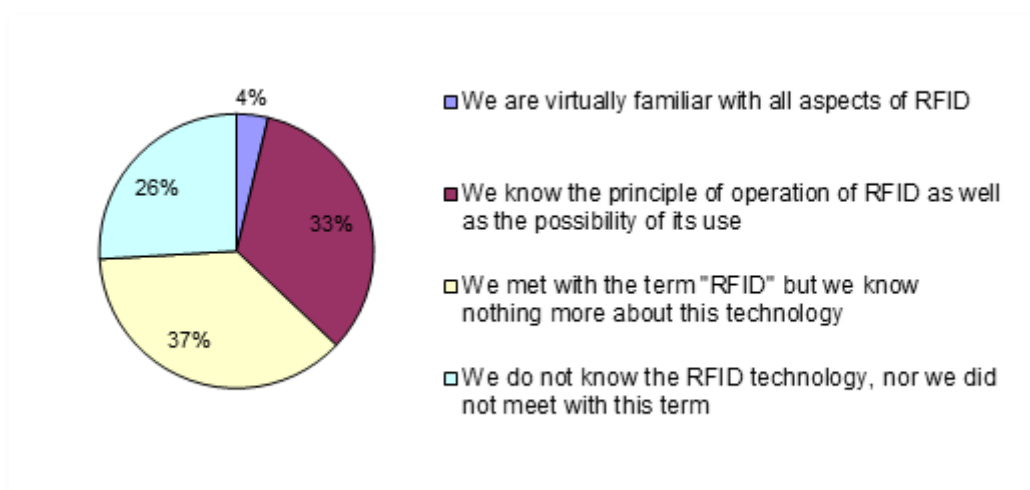


Fig. 4 Results of own survey on RFID use (Source: own processing)

Conclusions

As was mentioned above, the RFID technology is in no way a new technology and without a doubt is one of the most discussed topics today. In the literature, but also in a variety of technical articles it is possible to encounter with various examples of RFID use, as well as with the benefits flowing from its use, so it is really interesting that the vast majority of businesses never met with this term in any of these contexts. Based on these results, it can be concluded that the level of awareness about the radio frequency identification technology in Slovakia is very low as well as that we use only a small amount of RFID benefits. The fact is that many successfully implemented projects in abroad clearly testify in its favour and it is really only a matter of time, when this technology finds its application in Slovak industrial enterprises too.

References

1. Successor to barcodes attracts and discourages (in Slovak) <http://technologie.etrend.sk/it-biznis/nastupca-ciarovych-kodov-laka-aj-odradza-3.html>, last access: 27/08/2012
2. TAMM, G., TRIBOWSKI, CH. RFID (in German). Berlin: Springer, 2010. p. 41 – 44. ISBN 978-3-642-11459-5
3. The results of the survey of the use of information and communications technologies (in Slovak) <http://portal.statistics.sk/showdoc.do?docid=23559>, last access: 27/08/2012

Reviewers:

Renata Stasiak Betlejewska, MSc. PhD.

Joanna Rosak Szyrocka, MSc. Eng.