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THE IP MULTIMEDIA SUBSYSTEM (IMS) & THE MOBILE INTERNET
Opportunities for the Mobile Operator

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Abstract: The IP Multimedia Subsystem (IMS) is a new mobile communications architecture, which enables many new and innovative services, and can extend the possibilities of mobile Internet application development. These mobile Internet applications and the IMS, considered in terms of the impact that they can have on the critical success factors (CSFs) of mobile operators. The CSFs identified are particular to mobile operators that are competing in a highly saturated (in terms of mobile penetration) marketplace, and that are facing the threat of increasing competition.

1 INTRODUCTION

When most people think of the Internet, they think of desktop PCs. However while that was substantially true five years ago, it is out of date today. By the end of 2003, there were 1.4 billion mobile users, serving about 25% of the world's population (Keshav, 2005). In comparison, there were only 607 million PCs (Keshav, 2005). Therefore, mobile phones, in terms of sheer numbers alone, are the dominant platform for Internet access (Keshav, 2005).

Therefore the aim of this paper is to look at the IP Multimedia System, and the potential it offers for mobile Internet application development. In the Irish marketplace, operators are facing increasing competition in the shape of Mobile Virtual Network Operators (MVNOs). This represents a real economic threat, as the Irish market is already highly saturated in terms of mobile penetration rates, and so increasing their subscriber base is not an option in terms of increasing their revenues.

The goal of this paper is to identify the CSFs of mobile operators in such a marketplace, and assess the impact of IMS and the mobile Internet on the CSFs.

The findings of this paper are based on primary (in conjunction with one of the major Irish mobile operators) and secondary research in the areas of both IMS and the mobile Internet.

This paper is composed as follows: Section 2 describes the IP Multimedia Subsystem and the CSFs of the mobile operator. Section 3 considers the business case for mobile location-based services and presents the role of the Integrated Information Service Provider. Section 4 assesses the impact of IMS and the mobile Internet on the CSFs previously identified.

2 THE IP MULTIMEDIA SUBSYSTEM (IMS)

The IP Multimedia Subsystem (IMS) is a new architecture designed specifically for mobile networks, which allows for the provision of IP telecommunication services – for example, rich multimedia and VoIP (Ericsson AB, 2004a; Tadault *et al.*, 2004). It is a standardised approach, which has been defined by the Third Generation partnership

Project (3GPP) (Ericsson AB, 2004a; Tadault *et al.*, 2004).

According to 3G Americas (2004), IMS was designed to fill the gap between the existing telecommunications technology and Internet technology. 3G Americas (2004) describes it as enabling the convergence of data, speech and mobile network technology over an IP-based infrastructure. IMS is designed in such a way as to enable and enhance real-time, multimedia mobile services such as rich voice services, video telephony, messaging, and conferencing (3G Americas, 2004).

2.1 IMS and the CSFs of Mobile Operators

The IMS architecture presents a number of opportunities to the mobile operator. However before we consider these opportunities it is important to consider the critical success factors (CSFs) for mobile operators which find themselves in a market that has high mobile penetration rates, such as Ireland.

During this study the CSFs for the mobile operators in such a marketplace were found to be:

- Expand Service Offerings and Revenues
- Control of Subscriber and Business Relationships
- Decrease Time-to-Market
- Decrease Costs.

These critical success factors identify the areas in which a mobile operator must be successful in order to succeed, and each CSF has a number of objectives, which must be met in order to be successful in that factor. So the question is, can IMS be an enabler in terms of meeting the objectives associated with each CSF?

IMS provides real competitive advantage to the operator because it allows them to develop new and innovative service offerings in a shorter timeframe then is possible with current technologies (Ericsson AB, 2004a). And it allows operators to do this in an extremely cost-effective manner, because of the re-use of the infrastructure and the common functions and components (3G Americas, 2004; Siemens AG, 2004).

Increased revenues are possible through the integration and interaction of services which is possible (UTMS Forum, 2002), because IMS allows for highly personalised bundles, which in turn gives product differentiation.

Operators can open their networks to third party developers while still maintaining control of their value chain (3G Americas, 2004).

However, the biggest saving from IMS will be when the architecture can be used to handle the operators' voice calls, which is currently infeasible because of quality of service issues (McMahon, 2005). This will ultimately mean that one architecture can be used for both voice and data calls. Therefore the costly circuit-switched core network can be retired and voice handling will be done via an application server (McMahon, 2005).

While these opportunities are obviously extremely important to the operators in a highly saturated marketplace, do they specifically address the CSFs of the mobile operators?

The first CSF is to increase their revenues and subscriber base; however, in such a marketplace increasing your revenues by adding to the subscriber base is not a viable option. Therefore, operators must look at new and innovative services as a way of increasing their subscriber spend, and they must decrease their costs and time-to-market significantly.

The introduction of the IMS architecture can reduce the operators' costs and time-to-market in a number of ways. Increasing the subscriber monthly spend, however, is not something that IMS alone can address. What the IMS can offer in this instance is the ability to offer new and innovative services such as those enabled by the mobile Internet.

3 THE MOBILE INTERNET & IMS

Keshav (2005) claims that the cell-phone has become the dominant platform for the Internet. However he (Keshav, 2005) acknowledges that many cell-phone users do not actually use their phone for Internet access yet.

Low uptake on data services can be attributed to users' expectations that the cell phone would provide us with the 'Internet in our pocket', which, because of the usability limitations, was never a real possibility (Paavilainen, 2002). Therefore, the focus should shift to new services and business concepts (Paavilainen, 2002).

3.1 Mobile Location-based Services and Mobile Operators

Mobile Location-Based Services (LBS) have been heralded as providing the ultimate in convenient, high quality service options (Barnes, 2002; Rao *et al.*, 2003).

There are many different opinions as to the potential and uptake of LBS in Europe, which range from $6 billion (Strategy Analytics in Paavilainen, 2002) to $32 billion (Rao *et al*., 2003) in 2005. However, despite the huge difference in opinion, according to Paavilainen (2002) the business case for mobile LBS is strong, as it offers opportunities to both consumers and suppliers alike (Turban *et al*., 2006).

For consumers, LBS offer the ultimate in convenience, safety, increased productivity, and even cost savings (Paavilainen, 2002; Turban *et al*., 2006). For operators it represents the ability to differentiate themselves in the competitive marketplace. This is of particular interest to operators in a saturated marketplace because in order to maintain and increase revenues, operators must consider new value-added services which increase customer loyalty, and which encourage customer spending.

3.2 Integrated Information Service Provider (iISP)

During the study the role of an Information Service Provider or iISP was presented. This is a term to describe a new role that can be adopted by a mobile operator that chooses to implement the IMS architecture, and which leverages mobile location-based services in order to utilise the revenue opportunities that they present to the operator.

This role is one of a highly flexible information provider, whereby information is pulled by, or pushed out to, the user, and is device independent, and may or may not be location dependent. It is a new concept, which uses the strengths and opportunities that are inherent in the IMS architecture, and combines them with mobile location-based technology as a means of generating revenue through a personalised value-added service.

It was shown that the IMS architecture offers many potential opportunities and benefits to the iISP, such as the use of the URI (Universal Resources Identifier), enhanced presence management capabilities, ability to adapt to changing user information needs, more cost-effective and timely delivery of new services, and finally decreased service deployment time. Figure 1.1 shows the typical structure of the iISP.
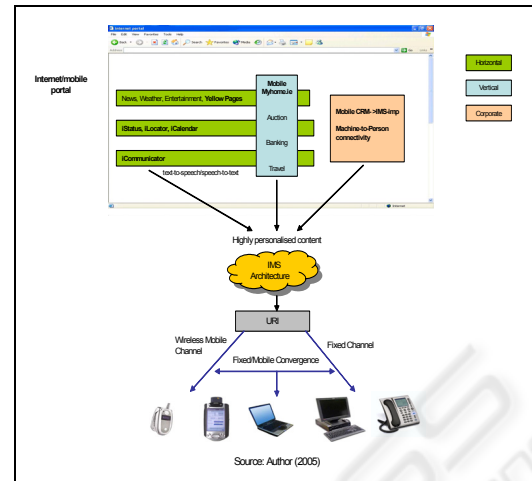

Figure 1: Structure of the iISP.

4 IMS & THE CSFS FOR IRISH OPERATORS

In Section 2.2 the CSFs of mobile operators that compete in highly saturated marketplaces were presented. Having considered the opportunities of the IMS and the mobile Internet applications that it enables, it is now important to consider the impact they can have on the CSFs previously identified.

During the study it was shown that IMS can make a positive contribution to all of the CSFs. In terms of the first CSF, 'Expand Service Offerings and Revenues', IMS is an enabler for the value-added services, and also allows for the creation of better, more personalised, bundles and services.

The second CSF is 'Control of Subscriber and Business Relationships'. IMS again is an enabler for many of the tactics that help to meet the objectives of this CSF, such as product differentiation and richer user experience, and availability management. In terms of expanding the enterprise customer base, IMS was found to address many of the communications needs of enterprises. During the study, a functional description of an enterprise communications tool (IMS-Imp) based on IMS was submitted to a major Irish mobile operator for evaluation. It was found that this tool could have a significant impact on their corporate communications process. In terms of controlling business relationships, the IMS architecture is, most importantly, operator-centric, which means that operators can maintain control of their value chain position.

The third CSF is 'Decreased Time-to-Market.' Using current technologies, the creation and delivery of new services is a long and costly process. However, the horizontal nature of the IMS architecture allows for re-use of common functions and service enablers, thereby reducing the development effort. Its standardised nature also allows for faster integration and deployment.

The fourth and final CSF is 'Decreased Costs', and for the mobile operator the ability of the IMS architecture to cut costs is its biggest benefit. Firstly, it can be used to decrease some of the internal operational costs, by making these processes more efficient. However, the biggest savings from IMS will be in the future, when the architecture can be used to handle voice calls, which means that the operator will be able to retire their costly circuit-switched core network.

5 CONCLUSIONS

Mobile operators are facing increasing competition as more and more competitors enter the market, and as their penetration rates in some countries hit saturation point. Operators in the Irish marketplace are faced with both of these threats, increasing competition in the shape of MVNOs, and a subscriber penetration rate of over 103%. These operators have a number of CSFs that are particular to their competitive market, and identifying them is the first step to addressing them. IMS is a new technology that promises a revolution in terms of our communications capabilities, however it is important to see if IMS could address the CSFs of the operators.

Once the CSFs were identified, they were each considered, to see how IMS could contribute in a positive manner to meeting the objectives of each particular factor. This contribution was based on the strengths and opportunities of the IMS architecture that were identified during the study, and from the feedback received from the major Irish mobile operator, in terms of the possible usage scenarios, i.e. the IMS-Imp and the iISP.

Having considered the strengths and opportunities inherent in the IMS, and types of applications it enables, such as location-based m-commerce, it was concluded that IMS could have an impact on all of the CSFs.

It was also concluded that the CSFs identified were not only applicable to the Irish operators, but to any operators that compete in a similar marketplace, i.e. one that is mature in terms of saturation levels and that is facing increasing competition.

REFERENCES

3G Americas, 2004. "IP Multimedia Subsystem IMS: Overview and Applications" 3G Americas, USA,http://www.3gamericas.org/pdfs/ims_july2004.pdf

Barnes, S. J., 2002. "The Mobile Commerce Value Chain: Analysis and Future Developments" International Journal of Information Management, Vol. 22, pp 91 – 108, Elsevier Science

Ericsson AB., 2004a. "IMS – IP Multimedia Subsystem: The Value of using the IMS Architecture" Ericsson Whitepaper,

http://www.ericsson.com/products/white_papers_pdf/ims_ip_multimedia_subsystem.pdf

Keshav, S., 2005. "Why Cell Phones Will Dominate the Future Internet" ACM SIG COMM Computer Communication Review, Vol. 35, Issue 2, April, pp 83 – 86, ACM Press, New York

Mc Mahon, B., 2005. "Internal Communications within O2: Part 2", Follow up interview with O2 employee, Tuesday 15th November

Paavilainen, J., 2002. *Mobile Business Strategies,* Wireless Press, Addison-Wesley, Great Britain

Rao, B. & Minakakis, L., 2003. "Evolution of Mobile Location-based Services"

Communications of the ACM, Vol. 46, No. 12, New York, ACM Press

Siemens AG, 2004. Siemens IP Multimedia Subsystem (IMS): The Domain for Services, Siemens, Whitepaper,

http://communications.siemens.com/repository/729/72935/Backgrounder_IMS.pdf

Tadault, M., Thiebaut, L. & Soormally, S., 2004. *Network Evolution towards an IP Multimedia Subsystem,* Compagnie Financiere Alcatel, France,

http://www.alcatel.com/doctypes/articlepaperlibrary/html/ATR2003Q4/ATR2003Q4A16_EN.jhtml

Turban, E., King, D., Viehland, D., & Lee, J., 2006. *Electronic Commerce 2006: A managerial perspective,* Prentice Hall, New Jersey

UTMS Forum, 2002. *IMS Service Vision for 3G Markets,* UTMS Forum Report, Report No. 20, May,http://www.umtsforum.org/servlet/dycon/ztumts/umts/Live/en/umts/MultiMedia_PDFs_Reports_report20web.pdf