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m-Mag: The Mobile Magazine Services Platform

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Abstract

The m-Mag platform advances the state of the art in mobile services by bridging the gap between mobile Operators and content Publishers, enabling the creation of a new category of mobile service called a mobile magazine. An m-Mag mobile magazine is a next generation mobile publishing service that is made available from a mobile operator's portal, that is integrated with value added mobile data services and that uses the operator's billing capabilities to charge consumers for access to the magazine. Using Parlay/OSA as an open approach, the m-Mag platform can integrate into an operator's network using standardised APIs and is portable across different operator networks. A discussion of the commercial potential analyses the route to the market.

Keywords: *Mobile Entertainment Services, Mobile Data Services, M-commerce,*
Wireless Multimedia Platforms

1. Introduction

The global publishing industry, that so successfully took advantage of the Internet as a distribution channel during the 1990s, has not been able to exploit the *mobile* Internet to date. This is due to a number of technical, financial and business issues. Recently a number of the these barriers to success have been addressed with new types of colour mobile phone and technologies such as GPRS and UMTS – but still a number of critical problems persist.

Much has been speculated about why appropriate services are not being developed and used in Europe and the US, in contrast, NTT DoCoMo has convincingly demonstrated the public's appetite for these services with i-mode in Japan. Takeshi Natsuno, Managing Director for i-mode Strategy, NTT DoCoMo [1] believes that the problem is one of market structure; that in Europe and the US a value chain that supports the creation of a mobile services ecosystem is still missing, hindering the fully automated creation / conversion of time-sensitive, premium multi-media services.

Mobile operators do not have the resources or content to build a sufficiently critical mass of revenue generating 3G services to make 3G a success by themselves – they need to create an eco-system of third party service providers.

The Mobile Magazine Services Platform, m-Mag, addresses two critical issues that currently prevent mobile publishing from taking-off, namely:

- enabling publishers to partner with mobile operators for the distribution of content
- the creation of mobile services by publishers that are tuned to the mobile channel.

Tuning content to the mobile channel is critical to success for publishers because mobile devices have different form factors and usage patterns to the wired Internet, and publishers need to create attractive content that is integrated with premium value added mobile services such as SMS (Short Message Service) MMS (Multimedia Messaging Service) and LBS (Location Based Service).

The metaphor to support these needs is the *mobile magazine*, which is publishers' content adapted for mobile devices and integrated with value added mobile services – see Table 1 for illustration.

Partnering with mobile operators to create mobile magazines is critical to success for publishers, because mobile Internet users do not use search tools to discover mobile content and services as they do on the wired Internet – rather they access their mobile operator's portal.

Given this, it is critical for publishers to position themselves on the portal. Furthermore publishers need to have a way of charging for their content; mobile operators can facilitate this through their billing systems. Also premium value added mobile services such as SMS, MMS and LBS can only be delivered by working with mobile operators and connecting to their low level gateways that enable these services.

Table 1.What is a Mobile Magazine?

What is a mobile magazine?

It's the mobile version of a traditional magazine such as GQ, Loaded, Cosmo, tuned for delivery over the mobile channel.
It could also be the mobile version of newspapers and TV stations – in fact any multimedia publication.
It is mobile web technology integrated with value added mobile services such as messaging, video, Flash and location based services.
It is integrated into an operator's portal and billing system.

What types of Value Added Services are integrated into a Mobile Magazine?

SMS – Short Message Service (Text Messaging)
- Alerts
- Voting
- Feedback
- Chat

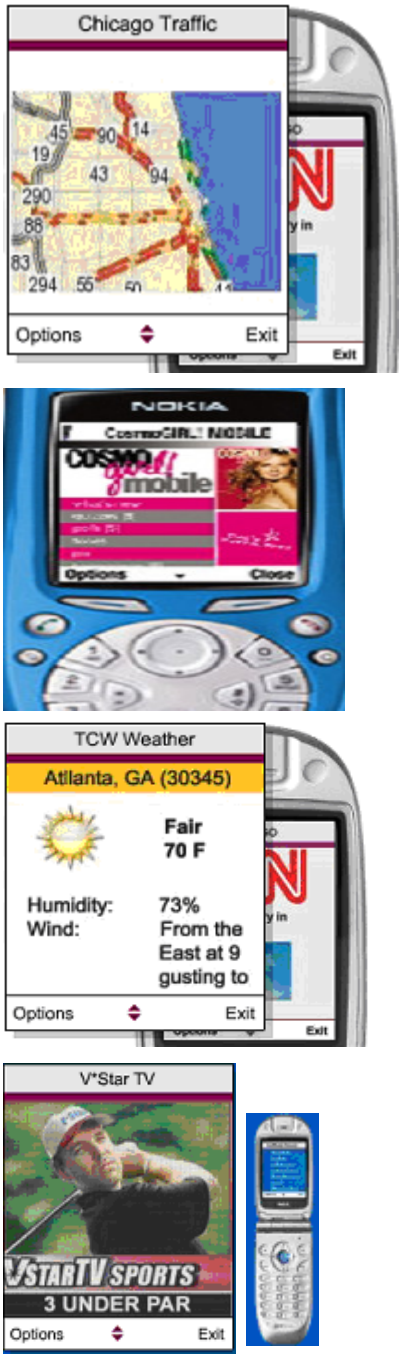
MMS – Multimedia Message Service
- Alerts
- Video Clips
- Slide Shows
- Animations

LBS – Location Based Services
- Local alerts
- Local information
- Positioning
- Personalisation based on area

Macromedia Flash
- Enables sites to use advance animated design for
- Infotainment
- Advertising
- Delivery of content

Other Widget Services
- Chat
- Bulletin Boards
- Dating

Download Services
- Java Games
- Java applications
- Brew Games
- Ringtones
- Screensavers



Hence, without mobile operators, publishers can neither position their offerings, nor tailor them to the mobile channel. However, partnering with a mobile operator, and gaining access to the operator's mobile portal and services such as charging, messaging and location is incredibly complex from a legal, financial, and technical perspective and is out of the reach of almost all publishers.

Operators do not want it to be so difficult for content providers to deliver content and services over their networks. However, they have complex networks that were not designed to enable a myriad of service providers to connect to them, and their business processes are not flexible enough to support them.

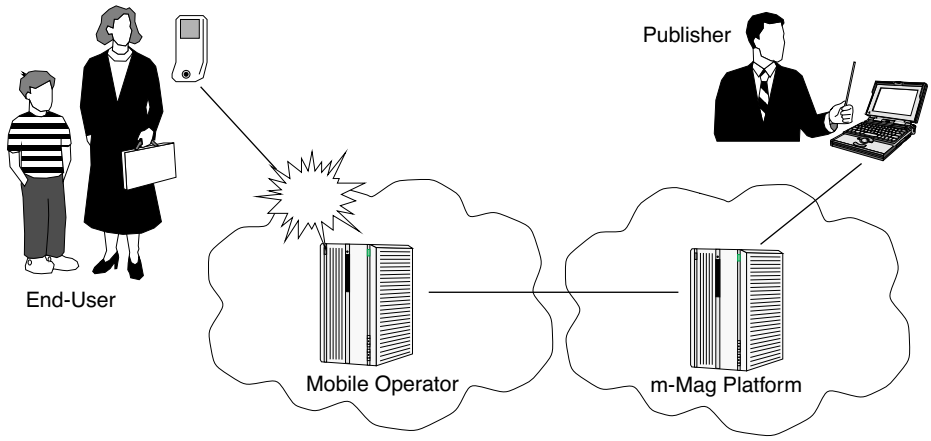


Figure 1.m-Mag overall scenario

What is needed to advance the state of the art is an integration platform that enables publishers to create mobile content using their existing tools, integrate mobile value added services using pre-built controls that require no programming, deliver their content over mobile networks, and automatically charge subscriptions for content and per usage charges for value added services. The m-Mag platform addresses these needs by providing an open integration platform that links mobile operators and publishers together seamlessly.

Within this paper, we introduce in the next section the scenario based analysis, the technological approach and the data modelling. In Section 3, the implementation is discussed, in particular the server architecture. In Section 4 we highlight the commercial potential of our development, while Section 5 concludes and discusses future work.

2. Design and Modelling

2.1. Scenario Based Analysis

The *Scenario Based Approach* [8][9] has been used to understand the operation between Publishers, Operators and End-Users – and the provider of the m-Mag platform as illustrated in Figure 1. These usage scenarios have been defined as follows.

Publisher Scenario

1. A publisher decides to use the m-Mag service after being advised of it by one of their local mobile Operators.
2. They download and install the m-Mag toolbar (plugin) for their publishing environment Adobe Go Live from the m-Mag public web portal, and use it to register their organisation and magazines with the m-Mag portal and with selected Operators.
3. They create their mobile content using Adobe GoLive CS, utilising their magazine content from their Adobe print and web magazine publishing system. They can format this content using predefined m-Mag templates or create their own.
4. They drag and drop value added services and Macromedia Flash content into the magazine from the m-Mag toolbar. For example, they drop in an alerts service into the magazine and are guided through a wizard set-up to create their alerts.
5. They create MMS slide shows and video clips in Adobe GoLive and then link them into the magazine by dragging and dropping MMS controls from the m-Mag toolbar into the magazine, whereby they are taken through an MMS creation wizard, which enables them to link the MMS documents they created, along with their end-user cost, with the magazine and the Operator that transmits the MMS message.
6. They then upload the magazine to the m-Mag portal using the m-Mag toolbar site management controls, then preview it and put it live on one or more Operator's networks. The mobile Operator can review and approve the magazine's content before the magazine can go live for the first time.
7. Using the m-Mag toolbar they can change the content or services on the live site at any-time. Later they can view statistical reports on subscriptions and value added services revenue from the m-Mag toolbar reports controls.

Operator Scenario:

1. An Operator decides to launch mobile magazines using the m-Mag platform, as they already have a Parlay gateway installed. They contract with the m-Mag Portal operator which specifics the terms and conditions of portal access and revenue sharing.
2. A secure connection is established between the Operator and the m-Mag Portal ASP (Application Service Provider) environment.

3. The Operator creates a menu link on their mobile services Portal to the m-Mag Portal called "Mobile Magazines". The Operator advertises the service to Publishers in their territory. The Operator is asked to approve each magazine's content before it goes live for the first time.
4. Once the Magazine is live the Operator and m-Mag Portal Operator exchange revenue share reports on a monthly basis and the m-Mag portal operator shares revenue with content providers.

End-User and m-Mag Portal Scenario:

1. The User selects their mobile Operator's Portal on their mobile phone – they establish a GPRS/UMTS context and connect to Operator's WAP gateway.
2. They select the "Mobile Magazine" menu, which links to the m-Mag Portal, browse through the list of magazines and click on the desired mobile magazine.
3. The m-Mag Portal communicates with the Parlay Gateway to determine the terminal capabilities and selects the most appropriate WCSS (Wireless Cascading Style Sheet). The user is delivered to the home page of the selected magazine.
4. The User can browse a few sample pages and is invited to subscribe (e.g. € 4 per month).
5. The User accepts and the m-Mag Portal communicates with the Parlay Charging API, to determine if the user has € 4 in their prepaid account (prepaid phones billed immediately). If yes an RBS (Rating Bureau Service) accounting record is written and the user is billed immediately through the Parlay gateway.
6. The m-Mag Portal server then communicates with the Client Provisioning server to update the user's terminal settings via a WAP push over SMS. Service settings are a bookmark and possibly userid and password. The user is then free to access the full magazine.
7. If the user decides to download a Java application such as a game, the m-Mag Portal communicates with the Download Server to download the application, and then the Parlay Charging API to charge the user for this value added content.
8. Similarly if the User downloads a video-clip, the m-Mag Portal communicates with the Value Added Services Server (which integrates to Parlay messaging) to deliver the MMS clip, and then the Charging API to charge the user for this value added content.
9. In both cases an accounting record is written to the RBS to enable revenue share to be reported on in the Customer Management Server and in all cases prepaid credit is checked first.

2.2. Technology

To validate that the critical issues as discussed in the introduction can be addressed, we have developed a prototype of the m-Mag service platform. The prototype is hosted as an ASP (Application Service Provider) service for operators and publishers, enabling publishers to create mobile magazines and operators to deliver them to their consumer base.

In collaboration with industry, namely O_2 Ireland Ltd. on the operator side, we have collected the requirements and validated the commercial viability. Currently, the prototype is analysed based on industry feedback, leading into the route to commercialisation. The prototype m-Mag platform has been designed to comprise of three major subsystems, as discussed below.

2.2.1. m-Mag Operator Integration. All operator integration is being achieved through Parlay/OSA [7]. Parlay/OSA provides an open interface created by a consortium of 65 companies in the IT and telecom industries, which enables the creation of new telecommunications services. It has been defined jointly between the European Telecommunications Standards Institute (ETSI), Parlay, and the Third Generation Partnership Program (3GPP).

Parlay [6] is implemented as a gateway that is integrated into an operator's network, which then exposes an API to third parties to enable them to access network capabilities. The m-Mag Operator Integration subsystem focuses on using the AePONA Parlay 3.1 APIs to enable charging, delivery of messages across an operator's network (SMS and MMS), obtaining the location of a mobile phone (terminal) and its capabilities (screen size, resolution etc).

This subsystem integrates with Waterford Institute of Technology / WIT's Rating Bureau Service (RBS) for reporting on subscriptions and revenue shares. The RBS is a product that WIT has developed (supported by Enterprise Ireland funding) which uses a flexible XML based tarrifing scheme to rate and report on mobile services. Using the RBS greatly simplifies the job of tracking and reporting on revenue sharing data for operators and magazine providers.

The key reason for using Parlay/OSA was to validate that the m-Mag platform can integrate into an operator's network using standardised APIs and to validate that the platform is portable across different operator networks. The key reason for using the RBS was to validate that the m-Mag platform can adequately perform rating and calculate revenue shares for all parties in the value chain.

2.2.2. m-Mag Portal. The m-Mag Portal hosts the content provider's mobile magazine and is a web server which:

- Provides the mobile magazine portal that is linked into a mobile Operator's portal.
- Integrates with the m-Mag tool bar to enable a content provider to upload and maintain a mobile magazine on the m-Mag portal.
- Integrates value added services into the mobile Operators network via the m-Mag Operator Integration subsystem.
- Provides reporting and statistics to the mobile Operator and the mobile magazine owner on subscriptions and revenue share. This reporting module uses WIT's RBS product to report on individual magazine and publishing company revenue shares.
- Provides basic Customer Relationship Management (CRM) functionality to support churn management, customer queries, and market research.

The key reason for creating the m-Mag portal was to validate that an ASP hosting and management service for mobile magazines for Operators and Publishers can be created and is of value.

2.2.3. m-Mag Toolbar for Adobe GoLive CS. Adobe GoLive is one of the leading web publishing tools for the publishing industry. The latest version of the product Adobe GoLive CS is the first publishing toolset to provide support for the mobile Internet that fully integrates with the rest of its suite of products. As a result, publishers are able to design their mobile magazine using a combination of their existing publishing tool GoLive and the m-Mag Toolbar. The m-Mag Toolbar has been implemented as a GoLive plug-in, adding the following capabilities:

- Registration services - legal, financial, publisher and operator details for the m-Mag platform.
- m-Mag custom controls to design and integrate value added mobile services such as SMS, MMS, Macromedia Flash and LBS into the magazine (e.g. alerts, voting, personalisation).
- Subscription and accounting services for magazine content.
- Magazine hosting management tools to upload and maintain the magazine on the m-Mag platform.
- Circulation and revenue share data reports.

The key reason for creating the m-Mag Toolbar prototype was to validate that publishers can use their standard publishing tools to create and maintain mobile magazines.

2.3. DEN-ng Information Modelling

A Directory-Enabled Network (DEN) [3] integrates user profiles, applications, and network services through a common information model that stores network state and exposes network information. This information then enables bandwidth utilisation to be optimised; it strengthens security; it enables policy-based management; it provides a single point of administration of all network resources; and all this serves to lower total cost of ownership, and improves the services that end-users can rely on regardless of their physical location.

DEN-ng (DEN – New Generation) is a TMF (Telemanagement Forum) standard which is also in the process of being adopted by the ITU (International Telecommunications Union) and ISO (International Standards Organisation). DEN-ng also provides the unique service lifecycle perspective required by the m-Mag platform.

The information model of the m-Mag platform has been developed using an eTOM [4] based DEN-ng model, based on the user requirements captured. This information model represents real world objects, not software, and is developed in a platform, language and protocol agnostic way. The model includes:

- Things of interest (entities)
- Relationships between these things (associations)
- Details/characteristics of these things (attributes)
- How these things work (methods, which represent behaviour).

The DEN-ng information model is part of the TMF SID framework and thus takes the TMF NGOSS views: Business Needs (what is required); System Capabilities (what is possible); Distributed Functionality (how it works); Product Offerings (vendor building blocks); Monitoring and Performance (is it working?).

m-Mag has extended the DEN-ng model for multimedia services and will engage with the TMF to standardise these extensions.

3. Implementation

3.1. m-Mag Server Architecture

Figure 2 provides an overview of the m-Mag platform. It is anticipated that the final commercialised version of the m-Mag prototype will be comprised of a number of servers as outlined with their functionality below:

The *m-Mag Portal* hosts the publisher's magazine, providing the capabilities as discussed in Section 2.2.2.

The *Download Server*:

- Uses Java MIDP OTA (from the Java Community Process) to download Java applications to the user terminal (mandatory for MIDP 2.0).
- Provides Ring tones etc., via OMA OTA download mechanism.

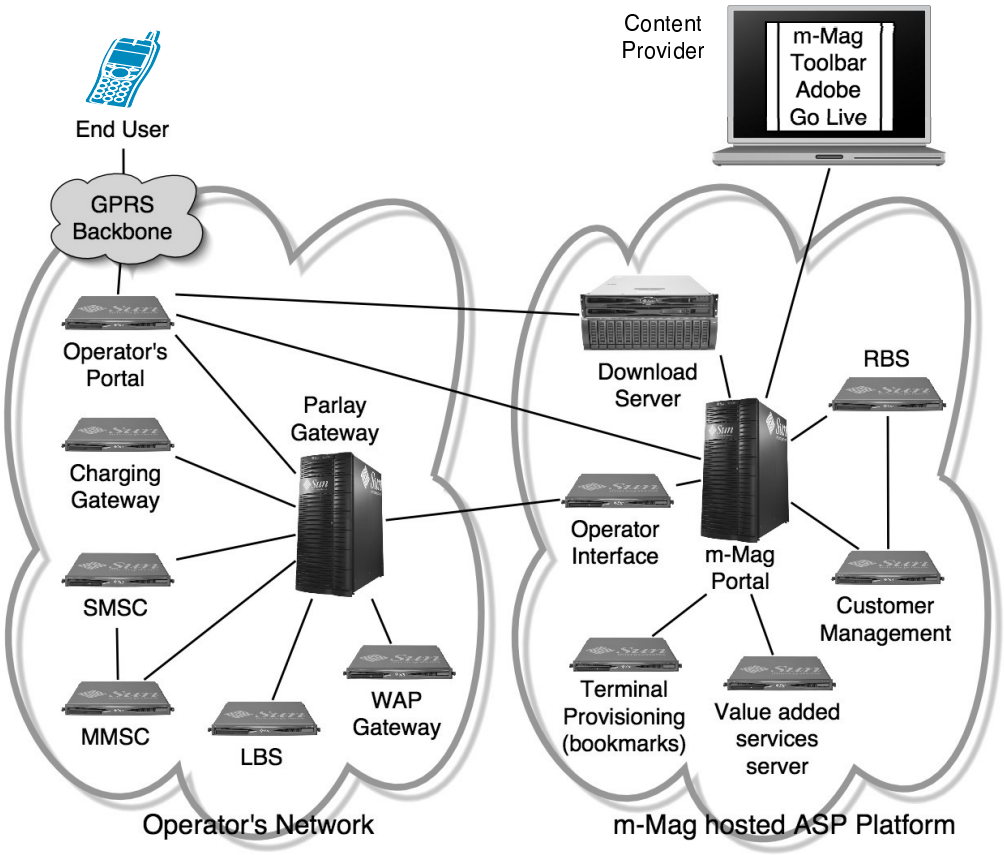


Figure 2.Overview and interconnection of the m-Mag hosted ASP platform

The server for *Terminal Provisioning*:

- Uses OMA Client Provisioning 1.1 to configure service settings on the User Terminal for example to bookmark the magazine URL on a terminal via a WAP push over SMS.

The *Value Added Services Server* integrates to operator gateways and provides wizard based service design for:

- SMS, MMS, Flash and LBS content.
- Also has a set of predefined widget services that can be dropped into the magazine: Alerts, Voting, Chat, Bulletin boards, Feedback/letters, RSS feeds.

The *Operator Interface* serves the Parlay Interface, which uses the following Parlay APIs:

- Charging.
- Messaging (SMS, MMS).
- Terminal Capabilities.
- User Location.

The *Rating Bureau Service* (RBS) has been previously implemented at Waterford Institute of technology (WIT). This is a fully functioning Rating service that uses the IPDR specification for designing charging rules and schema and is used by the m-Mag platform for determining magazine revenue share.

The *Customer Registration and Management* serves to:

- Registers customers.
- Registers magazines.
- Uses RBS to report on revenue share.

These servers are logical rather than physical servers, but are built so that their functionality can be partitioned over one or more servers for security, scalability and performance as needed in the ASP environment.

Figure 2 represents a fully-grown commercial version of the m-Mag service platform, which includes a Download Server for Java Games, Ringtones and Screensavers and also a Terminal-provisioning server for updating mobile phone bookmarks OTA (Over The Air).

3.2. Implementation status

In the first iteration, a basic working version of the m-Mag platform has been built, focusing on enabling a publisher to create mobile content using the m-Mag Toolbar, upload it to the m-Mag Portal, maintain it, then put the content live and charge for it. The second iteration will focus on adding advanced features such as value added services, namely SMS, MMS and LBS integration into the m-Mag

Toolbar, Portal and Operator interface. This second iteration will also focus on RBS integration and reporting.

4. Commercial Potential

Mobile Magazines are part of the Mobile Entertainment market, which is a sub-segment of the Mobile Data Services market. This market is large and rapidly growing. According to the EITO (European Information Technology Observatory) 2002 Report [5], mobile entertainment services represent the largest revenue opportunity in the mobile Internet marketplace and they expect revenues to grow from € 1.4 billion in 2001 to € 21.8 billion in 2006 (CAGR 73%) in Western Europe alone.

The EITO believes that mobile games will drive most revenues in 2006 and total € 6.8 billion. We believe that the total market size of the mobile magazine market will ultimately be very similar to that of mobile games, but will lag behind games by about two years. Thus we believe the total market size for mobile magazines will be around € 7 billion in 2008 in Western Europe.

The m-Mag platform links together the publishing industry with mobile operators – but it is the mobile Operators that have the need to drive mobile data revenues. Data services revenue for most Tier 1 and Tier 2 operators is currently around 15% of total revenues (even less for Tier 3), with SMS comprising on average 10-12% of total revenues. However most mobile operators are experiencing significant price erosion on voice and SMS services and need to find innovative services and content to maintain and grow ARPU (Average Revenue Per User).

Thus the target customer for the m-Mag platform is the mobile operator. It is the operator that has the greatest need to introduce the m-Mag platform – and it is the operator that has the commercial resources and reach necessary to promote mobile magazines both to publishers and ultimately to end consumers.

The m-Mag platform can broadly be viewed as part of the mobile services infrastructure industry or more narrowly as part of the Parlay value added services industry. The Parlay industry is a favourable industry to compete in for those organisations that can bridge the high barriers to market entry, which are primarily knowledge based, contacts based, technical and financial.

The TSSG (Telecommunications Software & Systems Group), a special research unit at WIT, has been part of this industry since it initiated. It has managed and participated in the Opium project [10] (which recently achieved the world's first inter-network Parlay roaming) and has built a substantial knowledge base, technical expertise and set of contacts in the industry.

The TSSG is currently establishing a campus company to commercialise the m-Mag platform.

The main challenge for new entrants in the industry is the power of the customer – the mobile operator in this case. However, if the mobile operator can see the revenue potential in a particular product or service they will make a purchasing decision.

The other key issue within the industry is the long sales cycle (requiring a substantial capital reserve), which can be months to get to trial and over a year to final purchase decision. However this applies mainly to the gateway vendors as operators have recently shown great speed in buying and installing value added Parlay services where a gateway is already in place.

The broader mobile services infrastructure industry is similar, and in general this is a competitive industry, but the rewards for creating a sustainable competitive advantage are high. We believe that by embedding substantial knowledge and intellectual property into m-Mag platform in the areas of Parlay, Billing, and Multi-media services that it can form the basis of a sustainable competitive advantage.

Regarding the route to market, Parlay/OSA vendors such as AePONA use a direct sales force to sell their gateway and professional services to mobile operators. An operator buys a gateway, not for the gateway itself, but rather for the new services to be introduced. Thus Parlay vendors such as AePONA work hard to establish an ecosystem of vendors that deliver services on top of their gateway.

The vision of the project had been to make the development and management of advanced programmable and content services easy for service providers with the m-Mag platform, and in doing so, reduce the barriers to entry in the mobile services market for third-party service providers, which will enable this market to explode.

5. Conclusion and Future Work

We believe in the concept of the mobile magazine, which is mobile publishing integrated with mobile data services, is a new media service category with significant revenue potential. We also believe that the creation of the m-Mag integration platform to link Publishers and Operators is also a key innovation that advances the state of the art in the delivery of mobile services.

The indicators that have been used to confirm the feasibility of the concept are two fold: firstly we have assessed the technical feasibility of project by building a prototype; and secondly the commercial feasibility of the concept by engaging with Industry. Both approaches gathered requirements and assessed that the final prototype does address the two critical issues of: (i) adapting content to the mobile

channel and (ii) providing access for publishers to mobile operators networks, in an economic way, that creates value for all participants in the value chain.

We would see it as essential to add support for different national languages in the future so that the service can be marketed across Europe. In addition, Parlay is the only Open Services platform of its type in production at the moment, but competing Web Services initiatives are being developed by the OMA (Open Mobile Alliance) and a Microsoft/Vodafone alliance. As these initiatives come to market we believe it would be necessary to enhance the m-Mag platform to interface to them. We also see enhancements to the m-Mag tool bar such as increasing the number of publishing systems that it is developed for, including adding support for Quark and Dreamweaver. We also believe that there could be value in additional custom controls such as a control for adding Java game downloads to magazines and similar controls for ringtones and screen savers. Looking further into the future we could see initiatives that could enable the m-Mag system to become the outsourced data services platform for tier 3 operators worldwide.

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