Where's the Money? Mobile AR Revenue Streams
A Position Paper for Mobile AR Summit @MWC 2010

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Abstract— In well-developed markets, those who benefit from a product or service are willing to recompense the supplier for the value which the customer or user receives. Direct customer payment for value is not the only manner in which businesses are encouraged to continue development and innovation. In print, on the web and in some mobile markets, advertisers pay for the ability to present their message to target audiences. In some markets entrepreneurs and investors are motivated by the promise of a lucrative buy-out.

In mobile AR, no one is certain which business models will be best. Indeed, few have been tried. In order for future development of Mobile AR to be well-funded there needs to be greater clarity about the sources of revenues.

In this position paper, we describe existing strategies for generating revenue from AR technologies, products and services. We encourage all businesses embarking in mobile AR to begin putting the business structures for monetization into place and to test different models periodically in order to ensure that the best return on investment can be reached.

I. INTRODUCTION

Many people are donating their time to the growth of AR. Some take the time to blog about AR applications. Others dedicate their evenings and weekends to writing small applications using AR Toolkit or another non-commercial platform or making concept videos they post on YouTube. Hundreds are preparing and publishing content in AR format for viewing in the Layar or Wikitude browsers and thousands are making Social AR content because they want to experiment or share their information in this new way but don't expect to receive any money in return.

For most businesses, however, there needs to be a financial return on investment. In order for companies worldwide to truly invest resources in Augmented Reality technology development over the long run and to bring new innovative services with AR capabilities to the mass market, there needs to be clear (and quickly proven) business models to warrant their investments.

This position paper describes potential revenues streams for those who are providing products or services which use AR technologies for mobile subscribers. It also calls for all those in the industry who seek financial compensation for their investments in relation to new AR-enhanced products or services to begin building the measurement and monetization tools as soon as possible. Finally, it encourages ecosystem partners to conduct market research with consumers in order to determine price sensitivity and the best ways to communicate the AR value proposition to end users.

II. THE OPPORTUNITIES

When value is recognized, revenues can be generated for the supplier of the product or service by establishing a business relationship with those people and companies who benefit directly. Consumers and businesses have paid for telephony services. Paying by the minute is simple to understand and to manage. In some countries, mobile subscribers are offered easy-to-understand packages and are now paying for mobile data traffic. Users pay for digital music by the song but they are not paying for search. Search is an example of a valuable service which is monetized indirectly. Social networking services are cherished by those who use them but the metrics to express this value have yet to be put in place. Providers of social networks must use a mixture of direct (billing customer for premium services) and indirect (advertising) business models.

It is difficult to develop and validate a model which accurately measures the total financial picture of a new user interface, such as Augmented Reality, on the world. One attempt to model the geo-location-based portion of the mobile AR financial opportunity was published in late November 2009 by Juniper Research. The model developed by Juniper estimates that revenues derived from mobile geo-location augmented reality software and services through a combination of paid-for app downloads, subscription based services and advertising will reach $732 million by 2014. [1]

In the opinion of the authors of this paper, the impact of AR will be far reaching, less tangible and, though it must include these revenue streams, the total revenue generated will be far greater than that attributable to paid-for app downloads, subscriptions and advertising. To whom is the added value of having information (original digital content or the information which is also available in a "traditional" scenario) presented in a new, contextually-relevant manner worth paying for and how much? How will the value of having parts of the real world enhanced with AR be measured? These difficult and important questions need to be answered, but for the businesses currently offering or preparing AR-enhanced solutions and services, the questions are simpler:

- Who will pay for what I provide?
- How much will I charge the customer?
- How will the transaction be executed?
- What will be the metric for which the customer will pay?

There are at least four categories of customers: corporations with local and global objectives, small businesses seeking to reach prospects and customers nearby, public service and educational institutions, and consumers.

III. Corporations

In 2009, medium and large corporations contracted with software publishers and custom application developers to use AR for a variety of purposes. The vast majority of the projects were for marketing applications, hence did not seek to generate revenues directly. Most were deployed only to small numbers of users (e.g., attendees at a tradeshow). A few reached thousands of customers who purchased a special collector's card or a special issue of a magazine.

Total Immersion, the provider of the D'Fusion AR platform, reported in an interview [2] that in 2009 the company was involved in the delivery of over 150 Web projects for marketing. Many other companies use this business model today. In some projects, the provider of the software platform is involved in the execution and delivery of the final applications. These are "direct to merchant or brand" contracts, generating a one-time fee. Future modifications might be necessary and there could be repeat business for the service provider.

Custom applications for enterprise end users are also possible sources of revenues for developers in the future. For example, a company could contract for the development of an application for use by employees in a warehouse, in a hospital or in a public facility.

AcrossAir, the developer and publisher of Nearest Tube, Nearest Metro and other AR applications for iPhones, also has one-off agreements with brands that wish to have their Points of Interest appear in the end user application. This is advertising, however, since the application stores all the POIs locally to the user, the fee is not based on the number of impressions or click-throughs.

Some applications for corporate customers are delivered by a licensee of an AR software development platform. This is characteristic of a "tiered" market in which the supplier of the platform generates revenue from the developer using the software. The fee paid by the developer can be negotiated on a one-time basis and, if the developer's software application is commercialized, may involve a royalty payment to the developer or provider of the platform. This is a "white label" business model.

Another model which is being used is to offer access to the content management system to anyone who requests it and then to charge only those who wish to have their information be given a higher placement in an end user's application. Layar, the provider of an AR browser, provides preferential placement of layers for a fee. The fee is negotiated to reflect the level of placement desired, the geography and the duration of the preferential placement agreement.

A platform provider can also give away the mobile AR client application and charge a content hosting fee or a fee for the use of the Content Management System. This software-as-a-service system is the model which Nokia uses with corporations which wish to use its Point-and-Find platform. The Point-and-Find platform is available with or without support for geo-location tagging of Points of Interest.

Finally, the traditional Web advertising model, wherein a corporation will pay the service or application provider using metrics such as impressions or click-throughs, is being explored.

Figure 1. Value for Revenue from Corporations

Value for which provider receives money	Metric	Examples
Development of custom software application	Project	Marketing, Helper application for transportation system
Brand or merchant's POI appears in publisher's app	Pre-loaded POIs	AcrossAir with Stella Artois, Geodelic
Use of software platform to create custom applications	License and/or royalties	Metaio, Total Immersion, AR Toolworks
Preferential placement	Level in application	Layar
Content management system account (SAAS)	Level and month	Nokia Point and Find
Advertising	POI views and/or clicks	Geodelic

We should also not neglect, in this analysis of potential revenue streams, the impact which AR could have on the sale of smartphones. Handset manufacturers, mobile network operators and other retailers of mobile devices receive a higher margin for these prestige devices. To what degree is the upselling of users to models of phones with GPS and compass accelerated as a result of users seeking to use mobile AR applications?

Similarly, when a complete feature extraction package or image recognition system is integrated on the mobile device, will the user be willing to pay a premium?

When mobile device manufacturers bundle their hardware with special mobile AR applications and services (e.g., the device will be pre-loaded with AR functionalities), should the mobile handset manufacturer pay the software provider for the value of their application? Or should the software provider pay the handset manufacturer for including the application on the device?

There are many questions which remain to be answered around the distribution of revenues for value within the Mobile AR ecosystem.

IV. Small businesses

One of the less well understood aspects of mobile AR, one which mainstream technology bloggers and media are not focusing at this time, is the effect of AR on local events or the opportunity for small businesses with local markets. As described in another position paper for the Mobile AR Summit [3], with AR, the information presented to the user is highly local. Businesses which do not have the means or interest in marketing their specialties to remote customers can use mobile AR technologies in combination with or in place of billboards and paid print advertising for addressing their local customers and attracting prospects which are in their proximity.

With mobile AR, this "proximity" or "hyper local" market may develop into interesting new business opportunities. We should expect this to be particularly attractive when, with the integration of image recognition and object recognition, AR is an indoor as well as an outdoor experience.

Small businesses may pay developers to create custom applications which are ideally suited to the needs of local customers. They may also wish to develop their own information and publish it in a format which is viewable through a mobile AR browser.

Once a customer understands that the local business is offering a special, bonus experience, this may differentiate the business and encourage word of mouth marketing and publicity. Local merchants who do not have the creative or engineering skills in-house, may want to syndicate content from larger information publishers who have digital content relevant to a local or timely topic. For example, what is in a Mardi Gras costume? A local event sponsor may wish to use the digital content of another publisher to enrich the experience of visitors. Perhaps putting virtual costumes on friends, or learning about the customs of other countries whose flags are printed on a beverage cup (the mobile AR application would recognize the flag and produce a person in costume, dancing).

Mobile AR technology enabling providers may also receive a commission or royalty on new business (revenues) which they bring to the local merchant by way of interactive (AR) navigation applications.

V. PUBLIC SERVICES, CULTURE AND EDUCATION

City, regional and national governments may seek to use Augmented Reality applications to provide services to citizens and visitors. A tourism office, or chamber of commerce may wish to sponsor the development of a unique application for a city or region. In this model, a developer of mobile AR applications and content may be commissioned to execute the project.

Museums are very eager to provide richer experiences to the visitors in their cultural attractions and may, as with the city, regional and other governments, seek to license content or have custom applications developed for sale to end users, or to have the cost of development included in the entry price.

Schools and other establishments promoting the education of citizens may also wish to contract for the development of mobile AR applications.

In all these cases, the most likely business model is one which follows a project basis, in which the end user receives the value added experience which is subsidized and managed by the provider but paid for by the public service, cultural establishment or institute of learning.

VI. END USERS

Consumers are likely to be the most important source of revenue streams for AR in the long term. The value propositions to consumers are highly varied and will evolve rapidly in some areas and more slowly in others.

End users may elect to purchase a stand-alone application on an application store. For example, the Lonely Planet guides are published and sold on the Apple AppStore and Android Market. There are also applications such as games, travel/transportation assistants and AR-based restaurant finders (Yelp Monocle) on these application stores.

End users may also wish to download a free application as a sample and then to purchase additional content on a modular basis. Premium content will certainly be an attractive model for many content publishers however, the units of measurement for these transactions are difficult to describe.

People who have an ongoing need for AR of a particular type may be interested in a contractual relationship with an information publisher which offers unlimited access to new features. Subscriptions can be for one day or for a longer period of time.
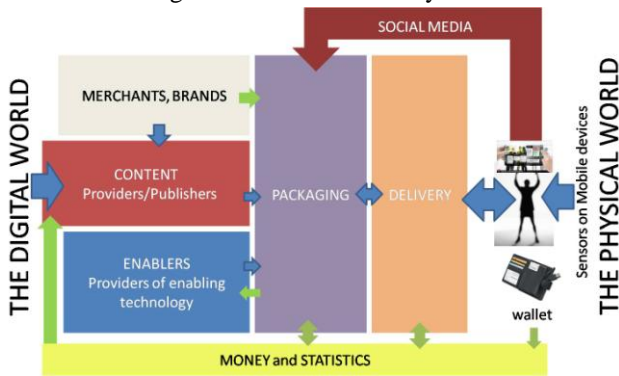
Figure 2. End User Revenue models

Revenue	Metric	Revenue
One-time app purchase	Per application	$0.99-$9.99
Free app, premium content purchases	Per unit of premium value	
Subscriptions/contracts for unlimited content and experiences	Per unit of time, or geography	$1-$20/month
Add a content filter (e.g., remove all tags not relevant to what I seek)	Per unit of time, or content type	

Content filtering will be another revenue-model. Filtering makes sure that relevant content comes to the user, instead of the user needing to search for relevant content. Users may be willing pay a premium to see only that which is of importance at their time, location and history. In other words, helping people to solve their (real-time) information overload based upon personal/business interests could be a value-added service and AR could play a significant role in filtering.

VII. BUSINESS TO BUSINESS

Many of the scenarios for generating revenue mentioned in this paper involve multiple providers of technology, content and specialists in the packaging and delivery of the AR experience to the target audience. In Figure 3, an ecosystem model illustrates how there are multiple layers between the digital content provider and the wallets (and minds) of end users.

Figure 3. Mobile AR ecosystem

Source: PEREY Research & Consulting

In some cases the packaging and distribution of AR content and technologies are tightly controlled or managed by the content provider. For example, the provider of a customized mobile AR "event assistant" provides the application and content to the user of certain mobile devices via a kiosk when the user is in the event venue. In other cases, the content and the delivery system (e.g., an operator's application store) are not in direct financial relationship.

How and how much do distributors of applications or content ("Delivery" in figure 3) pay the contributors of enabling technologies and platforms for the value they provide? Who shoulders the burden of customer service? When a transaction occurs in an AR application, how are the revenues distributed? As previously pointed out, it is important for partners to negotiate a fair redistribution of revenues within the ecosystem in order for the companies providing value to continue development and innovation.

VIII. CONCLUSION

There are many potential revenue streams for mobile AR but the participants in this industry must begin to put their plans for monetization in place as soon as possible in order to ensure the smoothest, clearest communication to the customers about the value of mobile AR.

The participants of the ecosystem must also begin talking about how they will distribute the revenues amongst themselves in a fashion that correctly attributes revenue to value.

ACKNOWLEDGEMENTS

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