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BUSINESS MODELS FOR LOCATION BASED SERVICES¹

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1. INTRODUCTION

The combination of mobile telephone and positioning technology allows for an array of new types of services. But the rapid evolution of mobile services in general, and location based services in particular, has left many issues unresolved. This sector, characterised by rapid technological change, is facing *uncertainty* in a range of domains:

- *User value*: Is the customer willing to pay for these kinds of services?
- *Complex network*: Does the number of players involved hinder the launch of location based services?
- *Roles and marketing strategies*: Do the network operators want to fulfil the role of the service provider or will there be network independent service providers?
- *Technology*: What technologies could be used and what is the level of standardisation?
- *Regulatory aspects*: What will be the role of European legislation in the development of location based services?
- *Public policy uncertainty*: What rights do people have, concerning property (copyrights) or private information (location)?

The purpose of this research is to resolve some of the uncertainty surrounding the commercial provision of location based services by focusing on viable business models for these services.

2. NATURE AND RELEVANCE OF THE PROBLEM

An overview of the technological and social trends, legal aspects and the value propositions of location based services highlights the following issues:

- the (almost) general applicability of the 'location element' to a whole range of mobile services may be partially responsible for the current state of uncertainty in the field of location based mobile services with respect to placing these services in a specific 'box' or category. This may also have implications for the marketability of these services.

¹ This paper is produced as part of the research carried in BITA (Business Models for Innovative Telematics Applications). BITA is a research project jointly undertaken by the Telematic Institute and TNO FEL e-business (both in Enschede), and the Technical University of Delft and TNO Strategy, Technology and Policy (both in Delft) in the Netherlands. BITA is oriented towards speeding up innovation in business through the introduction and use of ICTs, offering enhanced or previously unavailable services. BITA considers the business model issues related to offering such services.

- owing to their general applicability, in the long term, location-based mobile services are likely to be integrated and seamlessly available to the end-customer to offer customised, localised content wherever and whenever necessary and applicable. In terms of the value added, this will have implications for singling out the location-aware component of content.
- the market demand for location-based mobile services is not well known and this creates uncertainty for network operators about which positioning technology to choose and, implicitly, what categories of location-based services to offer.
- the different forms of positioning technologies network operators have to choose from can create lock-in effects for them. Moreover, the value proposition that the different positioning technologies imply varies and the usability for the different categories of services will also differ.
- managing services with dynamically changing content is a technical as well as an organisational challenge. Hence, network operators may decide to let others offer the services - and bear the risks.
- user profiles and personal location information facilitate access to relevant information and can improve the usefulness of services. Yet they can also raise privacy concerns of end-users which may be an important stumbling block for the take up of MIES and location-based mobile services.
- regarding the risks and benefits for different players, three types of players are likely to strive for a dominant role in the value web: mobile network operators, content providers, or intermediaries between them. Hence, a range of different value web constellations is conceivable with varying levels of complexity and intermediation. The selected cases fit into this schema as follows;

Given these issues, the main research question addressed in this paper is: What kind(s) of business model is necessary for location-based services to be viable? To this end, in this paper we group location-based services into useful categories in order to scan services currently available in the market; select innovative cases from them for case study research; and examine the business models underlying these services.

3. RESEARCH

3.1 Taxonomy of location based services

For the purpose of this research, we define location based services as follows: **Location-based services** are services that exploit information of where a device (mobile user) is located. Furthermore, they are based on the mobile telecommunication network, accessible by the mobile station of an end-user, and they make use of the automatically determined location of the mobile station. The focus in this research is on value added services that provide location-specific content (rather than emergency (112) and road assistance services or services supporting business processes such as fleet management).

Location-based services can be categorised according to the following approaches:

- *Service model*: push or pull (Koeppel 2000)
- *Application*: tracking & tracing, navigation, etc. (Autodesk 2002; the Ministerie van Verkeer & Waterstaat 2001; Swedberg 1999)
- *Market segment*: consumer, business, public sector (Niedzwiadek 2000)
- *General type of location information*: positions, events and etc (Niedzwiadek 2000)

For this study, it is most useful to draw on a distinction among these services in terms of *content* (approach IV). We therefore select three specific types of location information from Niedzwiadek's (2000) information-based overview which distinguishes among location-

based services by the general types of location information relevant for different market segments (consumer, business, public sector).

- *Positioning and tracking information*: location information of people (rather than assets or fleet) who are on the move;
- *Routing and navigation information*: routing information (based on the current location) to a certain location, thus from→ to;
- *Directories*: list of point(s)/event(s) of interest based on current location, e.g. shop information in a geo-coded database.

Often location-based services are a combination of these specific types of information, e.g. first positioning a friend and then getting routing information to a meeting place. Coupling this with the more general types of content categories for mobile information and entertainment services, we arrive at the following taxonomy of location based services (see Table 1). In this taxonomy, the focus is on customer value and thus it contains market-oriented service categories and the value-added functionalities of those services.

Content categories	Location-based services		
	Positioning/ tracking	Routes/ navigation	Directory (nearest...)
Information services:			
<i>News/weather/sport</i> : Weather information & forecast; scores, reports, etc.	Location-based weather status, forecast		
<i>Financial</i> : Stock exchange			
<i>Transportation</i> : General traffic / public transport information	Position information	Location-based traffic information, navigation	Location-based taxi information
<i>Shop</i> : Yellow pages, advertising		Routing information (e.g. to PoI)	Location-based Points of Interest (e.g., ATM, pharmacy, restaurants, accommodation)
Entertainment services:			
<i>Leisure</i> : Lifestyle, events	Position (e.g. friends)	Routing information (e.g., to friends, events, cinema)	Location-based events, cinema information (location & programme)
<i>Fun/games</i> : Community, gaming, jokes	Location-based community, gaming		
<i>Melody/images</i> : Ringtones, images, cartoons		Maps	

Table 1 Taxonomy of location based services

3.2 Selection and case studies

Table 2 (below) presents an overview of the potential cases that were identified. This overview is not intended to be exhaustive or 'state-of-the-art'. Rather, a limited number of services that present realistic opportunities for research are presented. As far as possible, innovative cases were identified for each category.

	Location-based services								
	Find and Seek	Botfighter	LBS directory	I-mode Finder	mRegio.ch	Info Here & Now	ONE Compass	FindFriends	FriendPosition
Information:									
News/weather/Sport									
Financial									
Transport/Taxi									
Shop									
Entertainment:									
Leisure/events									
Fun/games									
Melody/images									

Table 2 Overview of potential cases

For the case study research, the following three cases were selected according to a number of selection criteria²: (Botfighter (Sweden), LBS directory (anonymous case) and i-mode Finder (Germany). For basic details about each case, please see Appendix. Based on a detailed interview protocol, face-to-face interviews were carried out with different actors of each value network. Interview transcripts were produced for verification by the interviewees and then formed the basis for the case description and analysis.

3.3 Results

Business models can be considered a conceptual tool consisting of a set of elements and their relationships to express the business logic not merely of a specific firm but of a network of firms that together are 'producing' a specific service (such as a location-based service). The basic set of components and tools we considered for each case were the following:

- *Value proposition*: What is the product/service innovation? Service description and assumed customer value
- *Technical view*: How is the service produced technically?
- 3a. *Value network level 1* (actors): Who is part of the value network?
- 3b. *Value network level 2* (actors and roles): How exactly is the service 'produced'? Who does what?
- *Revenue model*: How are revenues distributed?

Furthermore, we distinguished between structural, contributing and support partners in order to understand which players are essential and which are replaceable in a given value network. Applying these tools to different cases proved to be a useful approach to disentangle the business model aspects of existing location based services and to provide a basis for generalisation across cases, thus alleviating some of the uncertainty surrounding the implementation of viable location based services.

4. REFERENCES

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² True location based service, innovative service (technically and range of players involved), complexity of value network, availability and accessibility of information.

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- [3] Ministerie van Verkeer & Waterstraat (2001) 'Location Based Services (LBS)', Afdeling Telematica, 7 March.
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5. APPENDIX – CASE DETAILS

Name	Botfighter
<i>Service</i>	A location based mobile game where one designs one's robot on the game's website, then battle against other players out on the streets. Players can use a standard GSM phone and battle each other over WAP and SMS.
<i>Company that offers service</i>	Telia Mobile, Swedish Network Operator DNA, Finnish Mobile Operator
<i>Country</i>	Sweden and Finland, US will follow soon.
<i>Companies involved in 'producing' service</i>	Ericsson (Positioning technique provider) LocusPortal (upgrading location technique of locating system of Ericsson) It's Alive (Content provider) Mobilieris (platform & application provider) Signalsoft (gateway provider)
<i>Assumed customer value</i>	Interactive gaming, with location-aware dimension
<i>Model (pull or push)</i>	Pull model, it's a service that utilises the geographic position of a wireless device (user) that uses the location-awareness to enable interactive gaming.
<i>General type of location information</i>	Positions, Routes
<i>Market segment</i>	Consumer
<i>Positioning Technology</i>	The Ericsson Mobile Positioning System (MPS) enables the whereabouts of mobile phones to be made known to providers of location-based services, while protecting the end user's privacy. Network-based Time of Arrival technology.

Name (<i>anonymous case, name changed</i>)	LBS directory
<i>Service</i>	WAP/SMS location based service that provides location (address) information with additional details for selected content.
<i>Company that offers service</i>	anonymous
<i>Country</i>	anonymous
<i>Companies involved in 'producing' service</i>	Content providers Network operator
<i>Assumed customer value</i>	Enabling easy access to relevant information related to the customer's current location.
<i>Model (pull or push)</i>	Pull model
<i>General type of location information</i>	Listings of nearby points of interest
<i>Market segment</i>	Consumers
<i>Positioning Technology</i>	Cell-based (network) positioning.

Name	Finder
<i>Service</i>	Location based services of I-mode in Germany to find a range of Points of Interests (such as ATMs, restaurants and hotels), results displayed on a map.
<i>Company that offers service</i>	E-plus, German network operator
<i>Country</i>	Germany
<i>Companies involved in 'producing' service</i>	Webraska (LBS provider) NEC (handset provider) Cellpoint (positioning application provider) Schober.com, Varta, fastfood, Taxi, Fovium (content provider) Schober international (content supplier) Navtech (geographical information provider)
<i>Assumed customer value</i>	Information provisioning with a location-based dimension
<i>Model (pull or push)</i>	Pull model, it's a service that utilizes the geographic position of a wireless device (user) that inform the users on near-by services and information. If you choose a service you get the information on the requested service within the coordinates you are located. You can also opt out.
<i>General type of location information</i>	Listings of nearby points of interest
<i>Market segment</i>	Consumers
<i>Positioning Technology</i>	Cell-based (network) positioning.