Forecasting Market Demand for Mobile Broadcast Services: Project Plan

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1 Introduction

Mobile broadcasting is an inexpensive way of distributing lots of data very quickly. The effective bandwidth is around 11 Mb/s [5]. It functions like a television channel. Users may use their mobile phones to choose the content they wish to view and then they can use their portable devices to download and enjoy the content.

Converging content, networks and connections has resulted in having content in digital form, all networks using Internet protocol, and all devices having wireless communications. Value systems are being restructured as content is accessible through an ever growing set of connections: physical, fixed Internet, cellular systems, digital broadcast, or a combination of any of the above.

DVB-H (Digital Video Broadcasting - Hand-held) is based on DVB-T (Digital Video Broadcasting - Terrestrial, the same that is used for digital television transmissions), which was found not to fulfil all necessary demands. It was developed and DVB-H was made, which is suitable for mobile connections. The signal can be received with small portable devices and GSM/3G is used as a return route to allow interactivity. Regional differences in technology arise due to differences in existing principal technologies.

It is the purpose of this project to build a framework, which can be used to forecast market demand for a mobile broadcast service in Finland. The challenges lie in the fact that there exists no data on the subject. The technology is new and it has not been implemented anywhere. A test network has been built in Helsinki by Radio- ja televisiotekniikan tutkimuskeskus and since September 2002, they have sent DVB-H broadcasts. At the moment it still requires a PC and an additional device to receive the signal [4]. In October 2004, it is planned to begin a pilot, where people could use portable devices to receive the broadcasts.

This project will research the demand for a portable television. We aim on building a framework which can be used for the forecast. The project should result in a graph showing the diffusion of the end devices and in discussion on affecting factors.

Portability and usability of the device are comparable to Nokia 7700. The device will be sold in normal consumer electronics stores, and identification will function through a normal SIM card, which enables both cellular mobile telephony and DVB-H. Three different service sets have been planned:

SS1 includes the free national digital-TV channels and some additional mobile channels; television license is free (it is already paid in the household), but a monthly fee of 4 €

SS2 SS1 + interactivity; interactive usage free, transport charge at normal

GPRS rate

SS3 SS2 + pay TV channels

2 Methods

The goal will be approached from two directions. 1) We will produce a diffusion model that is based on comparable previous technologies and/or parameters derived from previous forecasts that are recalculated in the present and used to forecast the future. 2) A value chain analysis is done to find potential deal-breakers.

The technology life cycle is often used to describe the different phases in the evolution of a product. The cumulative sales of a product that follow the product life cycle is represented by an S-curve. Frank Bass developed a diffusion model in 1969, that describes way a new product is adopted by users [1].

A literary review and discussion with Professor Salo have led to the choice of the Bass model

$$n(t) = \frac{dN(t)}{dt} = p[m - N(t)] + \frac{q}{m}N(t)[m - N(t)], \tag{1}$$

where p is the coefficient of innovation and q is the coefficient of imitation and m is the potential number of ultimate adopters [3]. $n(t)$ is the number of adopters at time t and $N(t)$ is the cumulative number of adopters at time t. In addition to (1) we will also develop a more refined regression model.

Existing data can be found from similar technologies. Analogies will be used to estimate the parameters of the diffusion models, just like Bass did in the case of DIRECTV, when he used the parameters of the adoption of cable television [2]. The analogies will be 1) satellite television in the UK 2) Walkman 3) i-TV in the US. The analogies represent content/service proliferation, portability, and interactivity, respectively.

2.1 Scaling

Identified factors affecting total diffusion are coverage and price of total ownership. A coverage plan has been established, and TeliaSonera will to figure out how mobility affects the effectivity of coverage.

The prices of the new product will be compared to existing analogies of

- consumer device 250 €
- GSM subscription 4 €/month
- GPRS monthly fee 6 or 18 €
- pay TV monthly fee 6 to 20 € depending on the number of channels

3 Resources

The team is comprised of five members

Toivo Kivirinta A student at HUT's department of Engineering Physics and Mathematics. He is the project manager.

Timo Ali-Vehmas A graduate student at HUT, has formerly worked at Nokia. he knows the technology used for the transmission and reception of the signals.

Teemu Mutanen A student at HUT's department of Engineering Physics and Mathematics.

Matti Vuorinen A student at HUT's department of Engineering Physics and Mathematics.

Tero Tuominen A student at HUT's department of Engineering Physics and Mathematics.

The mathematical and analytical skills of the group together with Timo's expertise on the technology backed up by TeliaSonera give the project an opportunity to succeed.

Participants are given 3 credits for the completion of the project. It equals 120 hours of work per person and totals 600 hours. The project manager is given one additional credit (40 hours) for administrational and managerial tasks.

The team has access to the databases and electronic journals available at the main library of HUT. Also the literature available at the main library of HUT is at our disposal. The WWW is accessible from almost anywhere and it also contains a wealth of information as long as we remember to question the reliability of our sources.

The team has contact people at TeliaSonera and the team can also depend on help from course staff.

4 Schedule

This project plan has to be done by February 18. A mid-report is to be handed in by March 19. The final report is due on April 19.

Division of hours between different tasks is presented in Table 1. All team members will allocate the same amount of time for the different tasks in the project, but they will concentrate on different aspects of the problem. That makes the total contribution of all team members equal, but enables the team to address all the aspects of the problem.

Table 1: Tasks division to the team members.

	Course meetings	Kick-start	Analysis	Documentation	Project Management	Total
Matti	12	18	70	20		120
Teemu	12	18	70	20		120
Tero	12	18	70	20		120
Timo	12	18	70	20		120
Toivo	12	18	70	20	40	160
Total	60	90	350	100	40	640

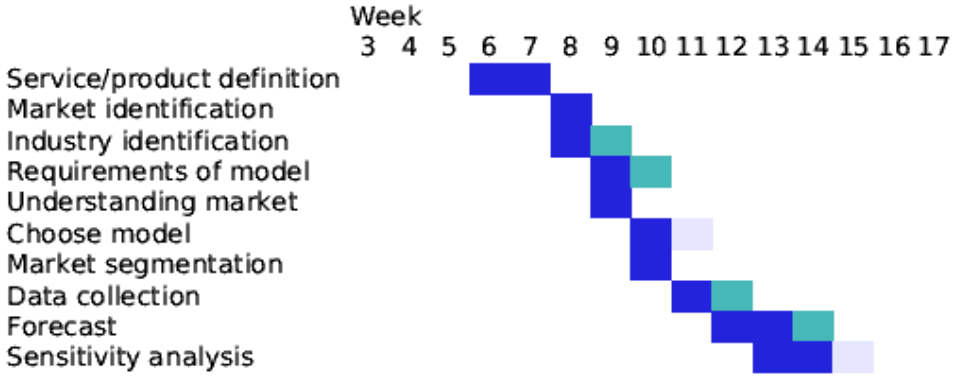

Figure 1: Project tasks.

Course meetings are the compulsory lectures of the course. The reports will be presented during these meetings.

Kick-start includes meetings and preliminary reading before the formulation of this project-plan.

Analysis is the main task. It is further divided into subtasks presented in Figure 1 and Table 2.

Documentation includes writing reports and preparations for presentations and possible presentations at TeliaSonera.

The subtasks have been scheduled separately into an order which takes into consideration the order in which the tasks have to be completed. Figure 1 shows how the subtasks are scheduled on the weeks 6-15. Dark blue shows the time when the subtask is scheduled to take place. Turquoise represents float and light blue represents free float.

The team will divide into two pairs G1 & G2, according to individual preferences. These pairs will work according to Table 2. The project mana-

Table 2: Hours allocated to subtasks.

Subtask	**G1**	**G2**	**Total**
Service/product definition	7	7	35
Market identification	12		30
Industry identification		12	30
Requirements of model	6	6	30
Understanding market	7	3	25
Choose model	14	14	70
Market segmentation	7		17,5
Data collection	15		37,5
Forecast		14	35
Sensitivity analysis		14	35
Sum	68	70	345

ger will participate in both of the pairs. Division into pairs is necessary so that more than one subtask can be performed simultaneously.

4.1 Milestones

In order to see that the project proceeds as planned, milestones have been designated. Milestones are clearly defined subgoals of the project and each of them is given a deadline. They will be an efficient management tool that will force the project to proceed and they will give warning if the project is lagging behind of schedule.

The designated milestones are

Table of contents of the final report Feb. 6, week 6.

Definition of the service to be modelled Feb. 13, week 7.

Project plan Feb. 18, week 8.

Choice of model Mar. 11, week 11.

Collection of data week 12.

Mid-report Mar. 17, week 12.

Final report Apr. 19, week 17.

5 Communications and Documentation

Members of the project team pairs will meet regularly with each other and the project manager to discuss their findings and dispute the reasoning of

each other. E-mail is used to throw out ideas and questions for the whole team. E-mail is also used as the main way of communications to inform about meetings etc. The team has also exchanged telephone numbers to be used in case of emergency.

A web page is updated at http://skald.ath.cx/u/tmjk/ipdc.html, which contains links to the material that has been read by the project team. Most of the material can be found in electronic form so the articles are easily accessible.

The project manager will write weekly to the contact people at TeliaSonera and report on the state of the project. It is a good way of keeping the client committed to the project and they also have a possibility to influence the decisions made during the course of the project.

All reports are written in English. A project plan is made in the beginning and a mid-report will be made during the project. The final report will be presented to TeliaSonera and to HUT in pdf-format. Typesetting will be done using LaTeX.

6 Summary

A report on the Forecast of Market Demand for IPDC will by written by a group of five people as project work for the course Mat-2.177 Operaatiotutkimuksen projektityöseminaari.

There exists no data on the sales of portable IPDC televisions. A diffusion model will be used for the forecast. The diffusion model's parameters will be taken from analogies. The analogies will include satellite television in the USA, Walkman and i-TV.

The final report will include a section on sensitivity analysis. Some thought will also be given to the total feasibility of the whole concept. The project group will consider the value chain of the industry and try to find major deal-breakers.

References

[1] Frank M. Bass. A new product growth model for consumer durables. *Management Science*, 15(5):215–227, January 1969.

[2] Frank M. Bass, Kent Gordon, Teresa L. Ferguson, and Mary Lou Githens. Directv: Forecasting diffusion of a new technology prior to product launch. *Interfaces*, 31(3, part 2):94–107, 2001.

[3] Vijay Mahajan, Eitan Muller, and Frank M. Bass. New product diffusion models in marketing: A review and directions for research. *Journal of Marketing*, 1990.

[4] Ip datacast test network launched in helsinki, September 2002. Accessed 2/16/2004.

[5] Medialab Sonera. Ip datacasting content services white paper, March 2003. Accessed 2/16/2004.