

Title: Title
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Problem description:

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

This is the second paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

Responsible professor: Firstname Lastname, Affiliation
Supervisor: Firstname Lastname, Affiliation

Abstract

Sammendrag

Preface

This thesis presents my final work and research for my Master of Science degree in Communication Technology at the Norwegian University of Science and Technology (NTNU). I have specialised in ICT economics at the Department of Telematics (ITEM), belonging to the Faculty of Information Technology, Mathematics and Electrical Engineering (IME).

I wish to extend thanks to my supervisor Thomas Jelle and responsible professor Jan A. Audestad for their everpresent support and valuable input throughout the semester. Furthermore, I wish to thank the respondents of the survey for their contributions, without these answers this thesis could never have been written.

Kristian Tagesen
Trondheim, June 2016

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Chapter 1 - Introduction

This chapter will introduce the reader to this thesis, where the motivation, scope and contribution is presented, which (along with Chapter 2 - Background) will serve to bind the thesis together and to set things in perspective to the reader.

1.1 Motivation

as

The indoor mapping service MazeMap (MM) started as a venture from Wireless Trondheim, an R&D company working closely (and cooperating) with NTNU whose goal it is to create sustainable ventures from new ideas. MazeMap's main service is providing an indoor mapping service aimed at large institutions such as universities, hospitals, conference venues, shopping malls and more. Users are able to access the service on any computer, tablet or smartphone, where the indoor maps themselves is the main focal point. Navigation services are also available in many different forms, but using Wi-Fi is a readily available and easily deployed solution which has been co-developed with Cisco. This particular service uses a technique called trilateration[BMJK14], and is easily implemented as it uses existing Wi-Fi infrastructure to facilitate the service.

MM has a very scalable technical platform, in which a robust indoor-map-creating engine resides. This engine is able to convert digital floorplans into full-scale digital indoor maps that can be accessed from any device capable of running MM's application. Given its scalable nature, the time needed per customer is drastically reduced, and little involvement is needed from MM's perspective. Thus, in order to accelerate customer acquisition, a proposition can be made to change or alter the business model: A free model has been detrimental in the success of several start-ups in the consumer market, e.g. Dropbox, Skype, Waze and Snapchat, but can this also be applied in a Business-to-business (B2B) or a Business-to-business-&-consumer

(B2B&C) setting?

1.1.1 asda

1.2 Scope & Objectives

In order to achieve the goal of determining the effectiveness and feasibility of a free model in an international B2B&C-market and proposing a fitting business model, it is necessary to narrow down the aspects considered in this thesis. Furthermore, the aim is also to give the reader a clear and concise overview of the matter at hand.

1.2.1 Scope

MazeMap already serves a large base of customers around the world, with their main bottleneck in expanding further being customer acquisition. As means to remedy this and to accelerate customer acquisition the free model is being proposed. Given MM's robust map-generating-engine, the main focus is shifted away from any technical limitations or inherent flaws on MM's end, and is shifted towards the viability of a free model. Given the scale of a global survey, the survey presented later in the thesis will focus on an already established customer segment, namely HEIs. This restriction is in place in order to more specifically target this thesis's goal of proposing a business model and determining if a free model is feasible, rather than exploring new customer segments.

1.2.2 Objectives

This thesis aims to determine the viability and feasibility of a free model in a B2B&C-market, and to propose an appropriate business model in this particular paradigm. In short we can describe the objectives in the following manner:

1. Investigate if there is a demand for an indoor mapping service operating under the free model
2. Discuss and interpret the viability of such a service at an international level
3. Propose a business model based on the findings and its surrounding discussion

Taking the scope into consideration, this forms the basis of the main research question for this thesis: Is a free model viable as a business model in a B2B&C-market on an international level, and can this model potentially accelerate customer acquisition?

1.3 Contribution

Mainly, the contribution and novelty of this thesis is aimed at business owners wishing to expand their offerings to their base of customers, by enabling an indoor mapping service such as MazeMap. Furthermore, the central theme of the thesis regarding the viability of freemium in a B2B&C market, may also serve businesses looking to expand their offerings and who dares to venture in new and alternative business models. The key contributions consists of the market survey made to target the objectives set in 1.2.2 Objectives, and the resulting proposal of a business model based upon the data gathered.

1.4 Outline

1.5 Related Work

Wireless Trondheim along with MazeMap have both provided several semester projects and master theses in cooperation with NTNU.

Chapter 2

Chapter 2 - Background

2.1

Chapter 3

Chapter 3 - Methodology

This chapter introduces the reader to the methodology of the research, investigative work, the subjects under scrutiny and how these leads to the results of this thesis.

3.1 International Potential for Free Indoor Mapping Services Survey

In order to get relevant information regarding the international market for free Indoor Mapping Services (IMSs), and to obtain empirical evidence, a survey was conducted. The survey was done at an international level where respondents were asked to reply to a survey estimated to take between six and eight minutes. The main factor in choosing which HEIs to contact was the size of the institution, as these might have a larger and inherent need and demand for an IMS.

The different institutions were contacted exclusively via email, with email and name of institution being kept in a spreadsheet to avoid double-contacting people and institutions, while enabling the respective contacts of the survey to be re-contacted. Respondents were also welcome to answer the survey in other ways than Google Forms, but no respondents opted for this. Initially, only the absolute highest ranking official of any given institution was contacted, but consequently the invitation letter was altered slightly, to state that any person with relevant experience may answer the survey. The scope was then widened to include anyone from building- and facilities management, property management, information services management and a larger than initially group of senior officials. Media and communications departments were also contacted, as the invitation letter pleaded recipients to forward the letter to whom it might concern. To follow up non-respondents, each respondent was asked to state their email address and affiliation to avoid being contacted after completing the survey. A new list of non-responders was formed throughout the survey period, and sendouts were performed periodically. Furthermore, they were informed that

the survey data was to be handled confidentially, and as such every email address from the survey has purposely been redacted in this thesis. The results can be found as a spreadsheet attachment. The first round of send-outs were conducted in March 2016, and the survey was concluded late June the same year.

3.1.1 Purpose of the Survey

The primary goal of the survey was to assess and evaluate if customers in the B2B&C-market would be interested in a free IMS. The secondary goal of the survey was to assess the potential customer's willingness to pay for additional services, as this is crucial for the freemium model to be profitable. Additionally, respondents were asked whether or not an IMS was desirable in the first place. Lastly, a question was raised regarding the potential concerns in the event of a procurement, concerning demand, price and security concerns.

3.1.2 Response Rate, Difficulties and Risks

The main concern when formulating and conducting the survey at an international level, is in many cases the response rate. Given the importance of the empirical data from the survey, this was a concern from the beginning.

The invitation letter was aptly changed to accommodate for any shortcomings the plan for sending out emails had, to increase the number of respondents. Through an iterative process, the invitation letter was changed so that it was made clear that it was possible to answer the survey in a different way than through Google Forms i.e. via telephone or video conference, but none of the respondents opted for this option. Given the low response rate from the initial sendout, telephone calls were considered as means of getting in contact with the correct personnel, but this proved to be time consuming and to little use. During the time of a telephone call, the author would manage to get around ten more contacts through email leading to the abandonment of this method of reaching out. From initially only contacting between one and three individuals from an institution, this number was greatly increased through looking up email addresses from the websites of the respective institutions. This tactic increased the response rate from 5% to nearly 20%. The length of the survey was engineered to be short, as leaders and other senior personnel often have a busy schedule. Additionally, the questions in the survey required little to no knowledge of any technical aspects regarding an indoor mapping solution. This was done in order to appeal to as broad an audience as possible. In total 198 institutions were contacted with 39 answers submitted. A total of 5517 emails were sent, making the average number of emails sent to each institution around 28.

During the first phase of the send-out a script handling sending emails spread-

	A	B	C	D
1	Email address	Letter	Name	Answer (1=yes, x=not interested)
2		Dear Sir or Madam, I am writing a mail to you regarding a survey that we are conducting. I wish to ask a few questions. The survey is pre-surveyed. Should you prefer to participate? For more information, please contact: Email: tagesen@ntnu.no Telephone: +47 47 00 00 00 Thank you in advance. Sincerely, Kristian Tagesen Example University		
	name@example.com			1

Figure 3.1: Spreadsheet used to keep track of potential respondents

sheet was used. As described above, the spreadsheet contained a column with the numerous email addresses, while another column contained the invitation letter. The last two columns contained information whether the institution had already given an answer or didn't want to be involved with the survey, and the last column contained the name of the institution in order to have a better overview. The scripting language itself resembles JavaScript, and runs remotely on Google's servers [Goo] offering its user seamless integration across the various applications and services provided by Google. The source code of the script was inspired by online tutorials, and was customised for the purpose of sending emails using the information in the spreadsheet. The source code of the script can be seen in Listing 3.1. It should be noted that this way of sending survey invitations was abandoned at a later stage due to inherent limitations in Google's Gmail platform: A limit of 100 recipients per day was simply not enough when the total emails that was due for sending was over 5000. This resulted in abandonment of the script, in favor of using blind copies when sending the huge volume of emails. NTNU's Microsoft Office365 Mail was used instead, as it imposed fewer limitations in number of emails allowed to send during a 24-hour period.

The survey itself was conceived and presented in Google Forms, an easy and widespread method not only for making surveys, but also handling replies in spreadsheet form. The invitation letter contained a short URL of a link to the survey. Appendix B shows the survey as presented to the respondents, and Figure 3.1 shows how respondents were being tracked.

```
1 function sendEmails() {  
2   var sheet = SpreadsheetApp.getActiveSheet();  
3   var startRow = 2; // First mail to send
```

```

4  var numRows = 73;    // Number of emails to send
5  // Fetch the range of cells included in this script
6  var dataRange = sheet.getRange(startRow, 1, numRows, 2);
7  // Fetch values for each row in the Range.
8  var data = dataRange.getValues();
9  for (i in data) {
10     var row = data[i];
11     var emailAddress = row[0]; // First column
12     var message = row[1];      // Second column
13     var subject = "Market potential for free indoor mapping services -
        MSc Survey";
14     GmailApp.sendEmail(emailAddress, subject, message, {from: '
        tagesen@stud.ntnu.no', name: 'Kristian Tagesen'});
15 }
16 }

```

Listing 3.1: Email Sendout Script

3.2 Business Model Canvas

This section introduces the reader to the framework that is Business Model Canvas, used to describe the proposed business model in REF(CHAPTER XX). This particular framework has its merits in that it is used to invent, challenge and describe a business model [Str16]. Further advantages include that it strips away any superfluous elements, improving its readability and enables users and business owners to focus on the most vital elements of a business model. It is also immensely flexible, as changes can be readily made without changing everything thanks to its modular design [OP13].

Table 3.1: Building blocks of the Business Model Canvas

Product	Value proposition
Customer interface	Customer segments
	Relationship
	Distribution channels
Financial aspects	Cost structure
	Revenue stream
Infrastructure management	Key partnerships
	Key activities
	Key resources

The framework consists of nine building blocks with varying degrees of importance, but an important relationship between them. When all building blocks are determined, they make up the total strategy of how a business would operate, make money and if desired, capture market shares. Table 3.1 shows the different building blocks by their respective categories, and Figure 3.2 shows the empty template for setting up the business model. The business model canvas is described here, as it will serve as a template for the proposal of the business model. Below follows a step-by-step description of the respective building blocks.

3.2.1 Customer segments

This building block consists of the different customer segments a company wishes to concentrate on and reach out to. A market may be single or multi-sided, containing at a minimum a segment per market side. Media companies, credit card companies and to some extent social networking sites among others fall into a multi-sided market category. It is important to note that when offering a value proposition to a market, market size is an important factor, as smaller, niche markets may be a viable market segment as opposed to a bigger market. Finally, diversified products offered through the value proposition may be used to reach smaller subsets of the market.

3.2.2 Value proposition

The value proposition is the building block that describes how a company is different from other competing companies. It details how a company's products or services can create value for their respective customer segments, where values may be qualitative or quantitative. Several means of creating value among customers includes lower pricing (price-sensitive segments), design (aesthetically appealing products), status (well-known brands), customisation (tailor-made services or products) and performance-driven products. Additionally, introducing a brand new disruptive technology i.e. cell-phones may benefit a business' customer segment, even though it may initially be viewed as unnecessary. Offering consultancy services can also be a value proposition in itself, for instance IT-consultancy services. Concretely, in the framework one wishes to map a value proposition to a particular customer segment, in order to identify the needs of this particular segment.

3.2.3 Distribution channels

Distribution channels concerns how a value proposition is delivered to a customer segment. A channel serves multiple purposes, with the most important being raising awareness around the products or services a company is offering and aiding customers in understanding the value propositions. It also serves a perhaps equally important function in allowing for products or services to be purchased. Furthermore, the

channels can be broken into different phases, depending on what phase a product is in. These include:

- **Awareness:** Raising awareness among customers.
- **Evaluation:** How customers are able to evaluate the value proposition.
- **Purchase:** How products are purchasable from the customer's point of view.
- **Delivery:** How a value proposition is delivered to a customer.
- **After sales:** How on-going customer support is handled post-purchase.

Along with the next block, Customer relationships, the channels block forms how a business interfaces with their customers.

3.2.4 Customer relationships

The different types of relationships a business establishes with their respective customer segments are detailed in the customer relationships block. From a business' perspective, having good customer relationships may entail several benefits in increasing their sales volume, gaining new customers and keeping their existing customers from leaving. The perhaps simplest relationship between a business and a customer lies in personal assistance, where actual, dedicated personnel from the business side is serving any customer need from any part of the sales cycle. In a B2B market one may have one dedicated person or team per customer, while in a Business-to-consumer (B2C) market this might not be manageable and call centres or e-mail respondents serves the purpose better. On the flipside, having customers manage themselves entirely either through robust online self-services or inter-customer relationships is also an option depending on the product or service provided. Lastly, co-creation where companies and customers share responsibility for the product is a modern take on a customer relationship, seen in social networks and user-creation oriented services i.e. YouTube.

3.2.5 Revenue streams

How much cash-flow each customer segment generates constitutes the revenue stream building block. It is essential for the profitability of a product or service, with revenue streams being either a one-time fee or recurring payments. Several ways to generate revenue streams include:

- **Subscription fees:** By selling a service, a business may charge its customers of that service for any given time period.

- **Licensing:** In companies where some form of intellectual property is made, it is possible to generate revenue by the sales or lending of these properties.
- **Advertising:** This type of revenue stream is generated from advertising a product or service on the behalf of some other business entity.
- **Brokerage fees:** By providing services between two parties and taking a fee for the transactions that take place.
- **Asset sale:** Selling the rights to one instance of a product falls into this category, and is the most traditional way of exchanging goods.

At this point of setting up the model, the customer segments are linked to its respective value propositions. Each of these should at this point be linked with a revenue stream.

3.2.6 Key activities

The key activities are the detrimental matters that a business needs to attend in order to deliver its value propositions. Together with key resources they are vital in creating and offering the value proposition to the customers, earning revenues and keeping customers satisfied. Consultant and service-oriented businesses often revolve around problem solving as a key activity, helping others with new and existing problems. For manufacturing companies and businesses, proposing, making and delivering products is a key activity, while software and banking service businesses may have a robust platform they offer their customers. In the case of the latter, the platform itself is the main component of their key activities. Lastly, it is important to connect the key activities to the value propositions, as the key activities are the main drivers of the value propositions.

3.2.7 Key resources

The key resources in this framework is absolutely vital for businesses in order to provide and create value propositions for its customers. Together with the key activities, they enable the generation of revenues, maintaining customer relationships and reach markets. Several types of key resources include: physical (buildings, manufacturing plants), human (consultancy and r&d services), financial (gaining and edge on competitors by lowering the price point) and intellectual (intellectual properties, brands etc.). The goal of the key resources is for the business to surpass competitors on key areas of the key resources.

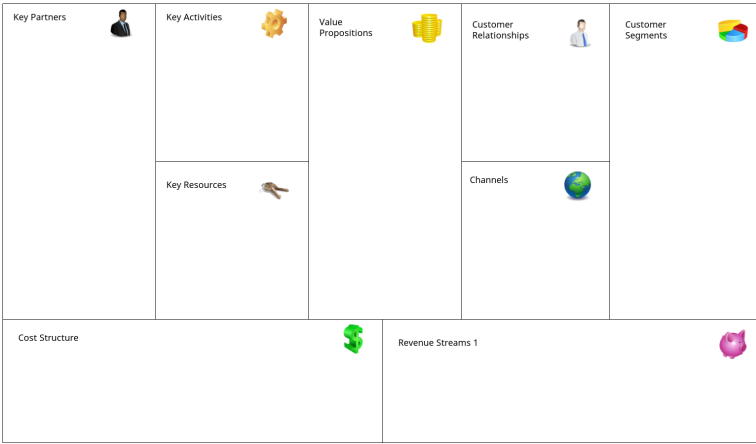


Figure 3.2: Business Model Canvas template. ©businessmodelgeneration.com

3.2.8 Key partnerships

This building block concerns the partnerships, suppliers and other third party entities needed to make the business model work. The partnerships can vary in nature, where competitors and non-competitors can forge alliances or creating joint ventures. Any non-in-house solutions have to be supplied by third parties be it manufacturing parts or personnel. Motivations for creating partnerships include optimising the allocation of resources, reducing risk and to cut down on activities not vital in delivering a final product or service. As such, key partnerships can be linked with activities that aren't necessarily key to drive a business' value proposition.

3.2.9 Cost structure

Different cost structures include fixed costs, variable costs, economies of scope and economies of scale. Fixed costs are volume-independent, and is usually examples of employee salary, rental costs and other facilities. Variable costs are volume-sensitive, while economies of scale concerns the costs changing as a result of a change in the scale of operation. Economies of scope on the other hand benefits businesses that diversify the number of different products or services offered, and is volume-insensitive in this regard. Different cost-structures exist in cost-driven and value-driven models. The former focuses on minimising the costs, and the latter model fits companies that less concerned with price and focuses more on value creation. Lastly, it is important to note the relationship between cost structures and key activities, as the key activities drive a business' cost structures.

Chapter 4

Chapter 4 - B2B Case Studies

In this chapter, B2B solutions that have previously been under scrutiny will be discussed. Firstly, two case studies Jepson, Lundin (2011) [JL09] and B2B Sales and Marketing Plan For Limecraft, Kalle Lamminpää (2014) [Lam14] will be reviewed, then the author will look at two proven and successful freemium-based businesses. This is done in order to propose a better business model in Chapter 5 - Proposal of Business Model.

4.1 Freemium for Large Enterprises by Jepson, Lundin (2011)

This master's thesis concerns the viability of freemium as a business model in expensive and advanced solutions in an enterprise market, and revolves around the Swedish software development company Teleopti.

4.1.1 About Teleopti

Teleopti is a world leading company in delivering software solutions for strategic workforce management (WFM) and telecom expense management (TEM). Their product offering is twofold, consisting of Teleopti CCC from WFM and Teleopti Pro for TEM. As far as sales channels are concerned, their products are purchasable directly from them as well as from partner resellers throughout the world. A Workforce Management (WFM) product makes sure that appropriately skilled personnel is placed at the correct place at an correct time. WFM contains six core parts: forecasting, staffing, scheduling, operating, analyzing and reporting, with the forecasting module being a main proponent given its function is to try to predict staffing needs at various times. These parts can be seen in Figure 4.1.

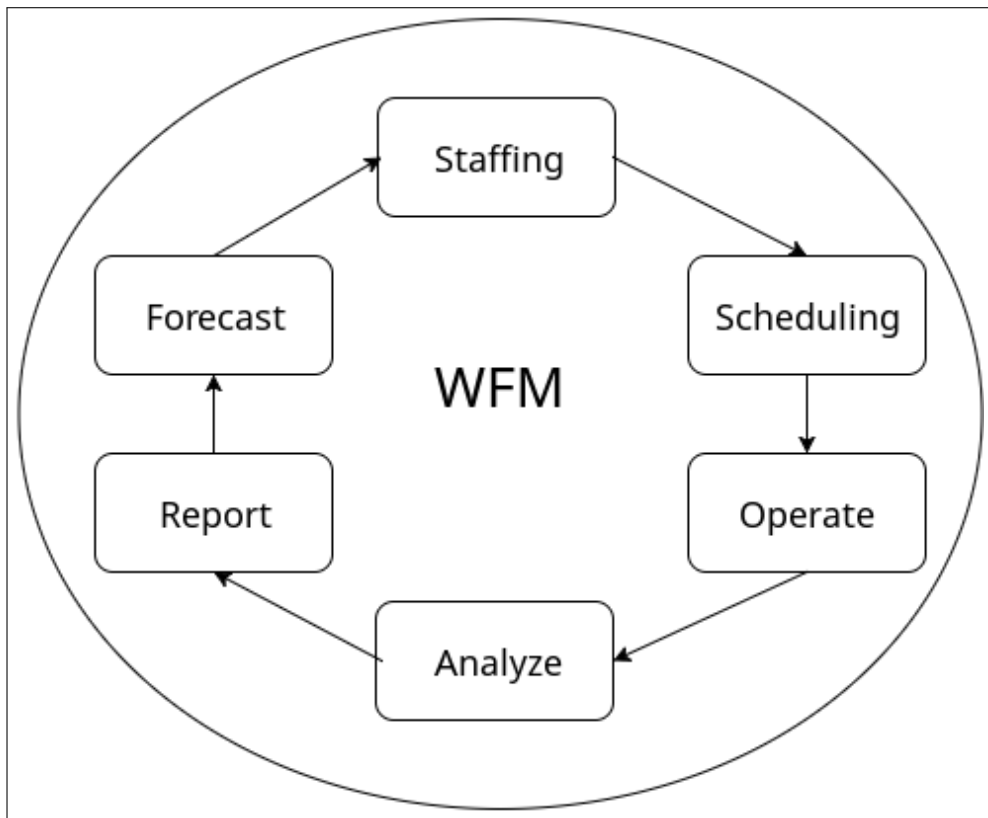


Figure 4.1: WFM process

Teleopti's CCC product has a modular design and features a basic package and a number of additional modules available for purchase. The basic package contains the modules Forecast, People, Shifts, Schedules, Intraday, MyTime and Reports. The Forecasts module predicts workload, Shifts optimizes the schedule from predicted workload generated by the Forecasts module, People manages staff, Intraday monitors workload in real-time and takes action should workload exceed a certain threshold. Reports generates logs, enabling an evaluation of operations and MyTime is used by staff to view reports and schedules. Optional modules include Performance Manager for a more advanced Reports module, Real Time Adherence for monitoring staff in real-time, Payroll Integration for salary management and Employee Self Service, an employee tool for messaging and shift planning. The main building blocks of Teleopti CCC can be seen in Figure 4.2.

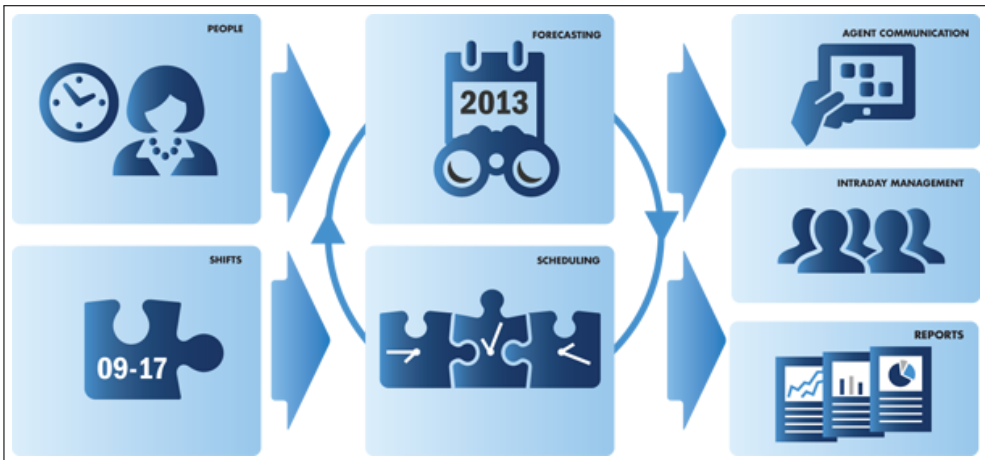


Figure 4.2: Teleopti CCC's main building blocks [Tel16]

4.1.2 Results

Teleopti already had an established premium product in Teleopti CCC, and with it being modular in design a module could be selected as being the focal point in generating leads in transitioning to a freemium model. Reasons for selecting just one particular module for giving away for free included modularity, creating demand for premium parts of the product and less adjustments needed to be made. Their recommendation fell on the Forecasts module as its features were possible to be used in isolation. Furthermore, this module was seen as a high-intensity feature of the product, as well as being a cornerstone in any WFM solution. It was further speculated that this module itself would generate the most demand for additional modules. A potential downside in choosing this model was the requirement of data from external sources.

Several points were made to make demand for the premium parts of the product, and as such it was suggested that additional paid features were left in the software, but greyed out leaving some of the features visible but not usable. However, technical limitations made this impossible and these additional modules were instead featured on the Teleopti Help webpage. In an effort to create as low entry barriers as possible, it was decided that the best course of action was to simply require registration from users of the product. An emphasis was put on leads generation as a main proponent of a freemium model, and as such contact information from the free users was deemed necessary in order to raise demand for the premium parts of the product. Manual authorisation of new customers of the free part was suggested, as having documentation and instruction only available to authorized users making it harder

for competitors to gain a competitive advantage on Teleopti as well as bringing a feeling of exclusiveness to its users.

It was pointed out that thorough documentation needed to be in place in a freemium product, to make sure new users adopt to the product and to minimise support costs. Comprehensive documentation of different levels of user proficiency was therefore suggested, to minimise support costs for the Teleopti support team. Having a larger user base as a result of freemium would also lead to more bug discoveries and fixes, easily remedied by patching the product for premium and free users alike. This can be seen as a positive externality as a result of an increased customer base using a freemium business model.

Marketing Teleopti's brand and product were viewed as key success factors. The two main goals of launching a freemium product were to increase leads generation (thusly accelerating customer acquisition) and to raise awareness around Teleopti's brand. It was pointed out that Teleopti wished to state clear intentions when gaining new customers, in that their goal was to eventually sell their premium product, as having a hidden agenda may prove to have adverse effects in a B2B setting. It was deemed important that in all communications had a clear message of what they were selling, how much it cost and that the free product is a part of a larger software package. Given that B2B marketing differs from B2C marketing, it was suggested that the channels used for marketing include the Internet, newsletters, business partners and press releases. Since Teleopti's intentions on eventually selling their premium product it was deemed necessary to rigorously follow up on free customers. This was realised by sending out a questionnaire to and telemarketing the customers of the free product.

In conclusion, several success factors are listed as detrimental for a freemium model in a B2B market:

- **First-to-market:** More attention for the target market, through PR and word-of-mouth.
- **Adequate marketing communication:** Make sure there is no gap between the target market of the free and premium product, given the lead-generating aspect of freemium. Use appropriate marketing channels. Stimulate partners to market the free product, and clearly convey the type of product offered.
- **Stimulating demand for the premium product:** Make users aware that premium features or products exists, aswell as the brand of the premium product while following up on potential leads among the free users.
- **User-friendly processes and product:** Having a robust and informative website with a simple and straightforward registration and installation process.

Easy to follow and comprehensive documentation to reduce support costs, with support being free of charge.

- **Self-serviced customer services:** No internal resources needed for using the free product among customers, and keeping the free and premium equivalents close in function to avoid high maintenance costs.

4.2 B2B Sales and Marketing Plan For Limecraft by Kalle Lamminpää (2014)

This thesis revolves around the Belgian start-up company Limecraft, in the business of media production. Founded in 2010, it delivers a product called Flow; a cloud-based software allowing media producers to share and collaborate their productions with each other [Lam14]. This is a new way of moving footage between different personnel as opposed to the traditional way of transferring physical media physically.

According to the thesis, Limecraft surveyed the large market that is the media industry, and estimated that around 2.5 million professionals worked in this field worldwide. In its infancy, Limecraft marketed their Flow product in the Small and Medium Enterprises (SME) market, as a freemium service. Onwards they discovered new markets in universities that often handle huge amounts of video in digital lectures etc. As in Freemium for Large Enterprises by Jepson, Lundin (2011), a large emphasis is put on leads generation. In Limecraft's case this was done at a large scale at the Marché International des Programmes de Télévision (MIPTV) event in France where media professionals meet annually. Other trade fairs are also cited as being valuable venues for leads generation, as well as having a orderly website with clearly stated goals.

Limecraft's freemium model was also described in a different manner than Teleopti's in the previous section: A free product was offered upon registration with 2.5GB of media storage, with this being expandable by inviting new users to the product or by upgrading to a premium payment model. However, issues arose when this particular model allowed for perpetual expansion of storage space and was consequently changed to a hard limit in volume of 5GB and only lasting three months. This is radically different from the freemium model proposed by Jepson & Lundin (2011), and thusly the model offered by Limecraft can be viewed as being a trial version as opposed to freemium. A problem that followed was that the user-base didn't churn towards the premium product as expected.

To remedy this several proposals were made by the Lamminpää: A larger social media presence, namely at Twitter, LinkedIn, through blogs and Slideshare, in order to be more visible on Google's search engine. Limecraft's sales cycle was reported

at being around six months, making each customer more valuable. Freemium can possibly shorten the sales cycle [SkoNA], but this is not mentioned by the author in this case. In conclusion, Lamminpää notes that a more aggressive marketing strategy should be employed, by empowering the social media presence of Limecraft, in addition to focusing on attending more trade conventions for leads generation. As a final note from the author of this thesis, this particular case was included to demonstrate a company that has somewhat failed at employing the freemium model successfully. This may be attributed to several factors including an inappropriate market for freemium products and Limecraft's reluctance in developing their product into the business paradigm that is freemium.

4.3 Successful B2B Freemium Products

This section will review three products within the B2B market that has successfully implemented a freemium model: Box and Splunk. These will be introduced in addition to listing possible success factors.

4.3.1 Box

About

Box was founded in 2005 by Aaron Levie and Dylan Smith, offering online file sharing and content management services for businesses. The free part of Box is limited to personal accounts for one users, with limits imposed on both storage and maximum file size. The premium side allows for enterprise and business accounts with potentially limitless storage options. Several users per account is also allowed, with better collaboration, administration and security features [FreNA]. In 2010 they reported having a userbase of 10 million users divided amongst 120,000 businesses, with a free-to-premium churning rate of 8%. Additionally, Box claims that 82% of the largest companies in the world uses Box.

Success factors

Some of Box's success can be attributed to the ideas emerging from Box's leaders: They have stated that technical solutions are first and foremost used by its actual users, not management. This is reflected in their business model which only offers free Box accounts to non-enterprise entities, in the hope that that these users will act as proponents of Box's products in their respective businesses. Another important philosophy stated by Levin is the importance of keeping customers in a Software-as-a-service (SaaS)-setting happy [TT14][You11]. They believe happy customers are more willing to pay as long as a good product is in place to begin with, a prerequisite of the freemium business model. The use of the freemium model (albeit in an indirect way in a B2B setting), allows for penetration in markets previously being thought of as

unreachable. Furthermore it is pointed out that in a freemium paradigm, non-paying customers are not lost to competitors.

As a company that delivers SaaS services, revenues has to be viewed in a different manner than traditional means, where Annual Recurring Revenue (ARR) is a better metric. It is self-explanatory that in the long-term this can be more profitable, and this is shown in the Gross Recurring Margin for Box estimated at 79% in 2014 [TT14]. This shows that their costs are acceptable, and furthermore, their Recurring Revenue Margin (ARR minus sales, R&D and G&A costs) grew from 8% in April of 2013 to 20% in January of 2014. These facts combine may indicate that Box is an expanding and profitable business. Lastly, Box also has an Application Programming Interface (API), enabling users of Box to customise and integrate Box into existing systems, apps and services. Box also allows external innovation through their provided API, making it possible for developers to make apps in the Box ecosystem and monetise these apps.

4.3.2 Splunk

About

Splunk was founded in 2003 by Michael Baum, Erik Swan and Rob Das, and is a software company producing software for analysing, monitoring and searching big data [Har10]. Splunk offers their software either as a platform or SaaS, and features these either as an Enterprise package or a Light package with the latter being aimed at smaller IT environments. The difference between these two lies in their respective premium packages: Light has a limit on daily data volume and maximum users, while Enterprise does not have this limitation. The rest of the differences are smaller in magnitude, but Enterprise customers can also access APIs, and enjoy more rigorous support. The SaaS versions operate on a free trial basis with a limit on 5GB of cloud storage per day, while the platform versions have a limit of 500MB of indexed data per day. After 30 days of usage, the users of the platform-version may continue with a free license or upgrade to a premium version. Splunk's revenues were estimated to have increased by 50% from 2015 to 2016, expecting annual revenues around 850 million USD. They have more than 10 000 customers across 100 countries and 1700 employees.

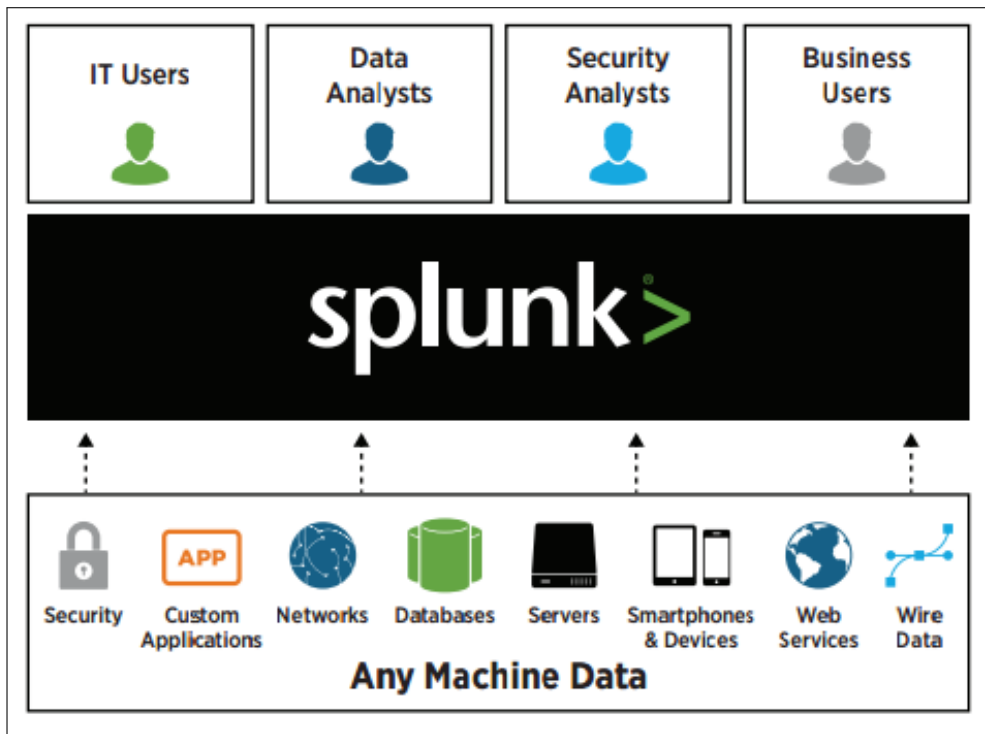


Figure 4.3: Splunk's Enterprise product [Inc16]

Success factors

Initially, only the platform version of Splunk was offered but they later expanded to a subscription-based SaaS offering, representing 37% of revenues. Focus was also shifted towards enterprise customers as opposed to Small and Medium Business (SMB) customers, and they report that up to 70% of customers convert their free licenses to premium ones, utilising the additional features the premium model allows [Lay14]. Much of Splunk's success also comes from providing a mission-crucial service in security and IT services, and focuses more and more on sales and customer support given its growth. The rich information and real-time analysis provided by Splunk enables its customers to avoid security threats, monitor customer preferences, launch new products faster and saving money in the process. One of Splunk's main value propositions is to provide its customers with usable, valuable and accessible big data, eliminating any inherent inefficiencies among the customers.

Chapter 5

The International Market Survey - Results

This chapter is intended to present the results from the International Survey to the reader, with the questions and responses being presented here. In total, 193 different HEIs were contacted and 39 respondents submitted answers. This yields a response rate of roughly 20%. The responses are further discussed in REF:CHAPTER-

5.1 Respondents

Replies from different countries are represented in Table 5.1, and geographically in the map in Figure 5.1. The color code used in this figure represents which countries that had HEIs contacted, where red indicates no reply from any HEI in that country, and green indicating one or more reply from a HEI in that country. The "Other" category that contains four answers, and these were respondents which failed to denote what institution they were representing, and no indication of who they were representing were given whatsoever. After the initial sendout, the chosen HEIs contacted were adjusted in order to obtain more data from the survey. This was done by contacting more HEIs from countries with a good response rate. Countries with English as a first language are also more represented, and as such there may exist a correlation between this and the response rate from these countries. In general more European countries replied to the survey, and apart from any possible language barriers, the websites of the HEIs from western count were generally more open and informative, making it easier to find the correct personnel to contact.

Several respondents indicated that they were some sort of leading figure (as per request in the invitation letter); building- and facilities managers, senior leadership and general operations managers. In one case, a European university opted to have three different personnel take the survey. These results are also included, due to the varying nature and different point of views these persons may have. Given the anonymity of the survey, no names of personnel or institutions will be given in this thesis, given that no contacted HEI allowed to disclose such information. However,

Table 5.1: Number of contacted HEIs, replies and response rate by country

Country	Contacted	Replies	Response rate
Austria	3	1	33.3%
Denmark	3	3	100.0%
Finland	5	3	60.0%
Germany	12	3	25.0%
Indonesia	3	1	33.3%
Ireland	4	3	75.0%
Italy	3	1	33.3%
Japan	3	1	33.3%
South Africa	3	2	66.7%
Switzerland	5	3	60.0%
Thailand	3	1	33.3%
The Netherlands	14	5	35.7%
United Kingdom	17	5	29.4%
USA	65	3	4.6%
Other	50	4	8.0%
Total	193	39	20.2%

the country of origin and the respondent's position is revealed where possible.

5.2 Introductory questions - Question Group 1

Figure 5.2 shows all questions asked in the survey according to their respective group of questions. Questions have been grouped in a manner that will present the survey results in a clear way for the reader. The first group of questions are introductory questions, concerning the respondent's current indoor mapping situation. After respondents stated their affiliation, the question "Are you currently using an indoor mapping service?" (Q1) was asked, with results shown in Figure 5.2. The rationale behind including this question, was to see whether the possibility of churning existing IMS users existed in the event the respondent replied "yes". Conversely, respondents replying "no" are also interesting subjects for the surveyor. These are potential first-time procurers of IMSs, and together with Q2 they make up potential customers.

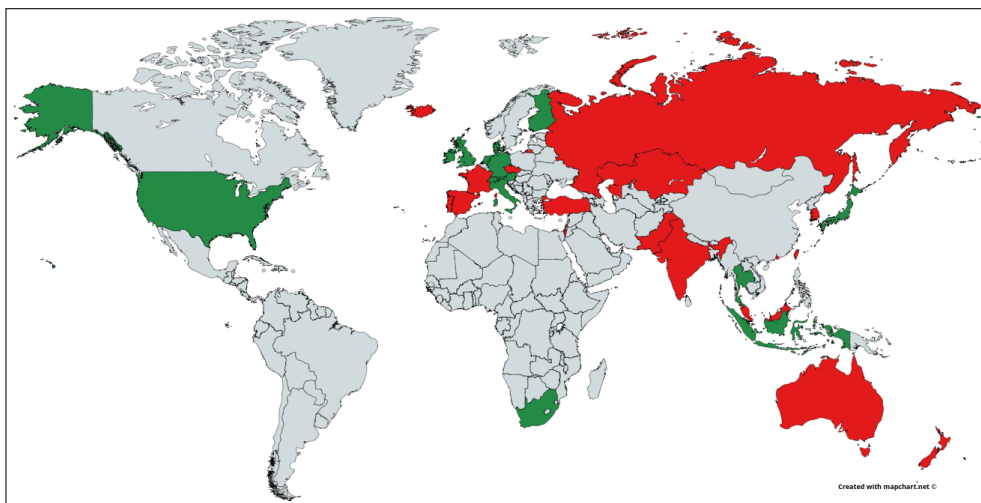


Figure 5.1: A geographical representation of countries in which HEIs were contacted. Red denotes no replies from that country, while green indicates one or more answer being submitted

The majority of respondents (64,1%) had no IMS in place, while 35,9% stated that they have an IMS in place.

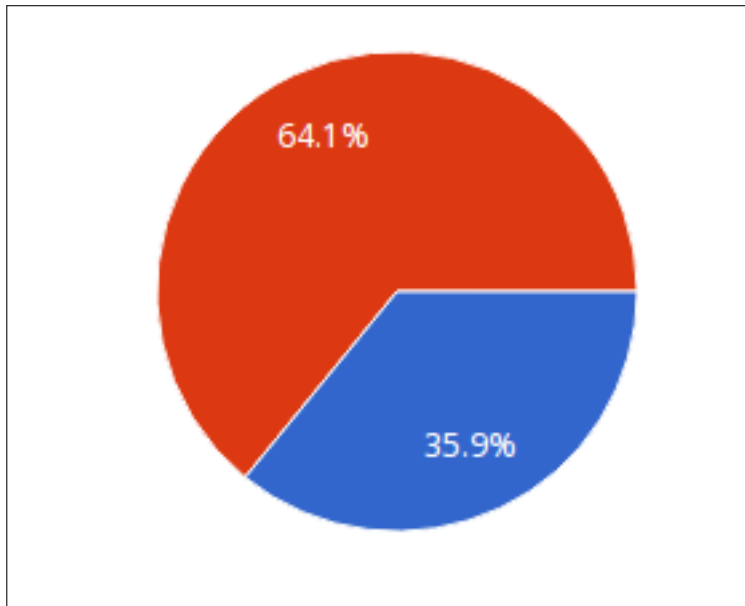


Figure 5.2: Q1: "Are you currently using an indoor mapping service?". Blue indicates "yes" and red indicates "No"

Based on the response given in Q1 respondents were either forwarded to Q2 or Q3. Respondents stating that they already employed an IMS were forwarded to Q3, while those without an IMS were routed to Q2. Q2 asked respondents without an IMS if they were willing to consider using an IMS. This was posed in order to gauge and measure the respondent's willingness for procurement and interest in an indoor mapping system, with results shown in Figure 5.3. A total of 25 respondents replied to this question, due to this question being irrelevant for those previously stating that they already have an indoor mapping system. A majority of 68% replied that they were willing to consider using an IMS, while 32% stated that an indoor mapping system was not something they would consider using. To follow up on the latter group, a qualitative question in Q2.2 was asked, where respondents were asked to state the reason as to why they would not consider such a service. Question 2.2 was not mandatory, but 3 respondents chose to reply.

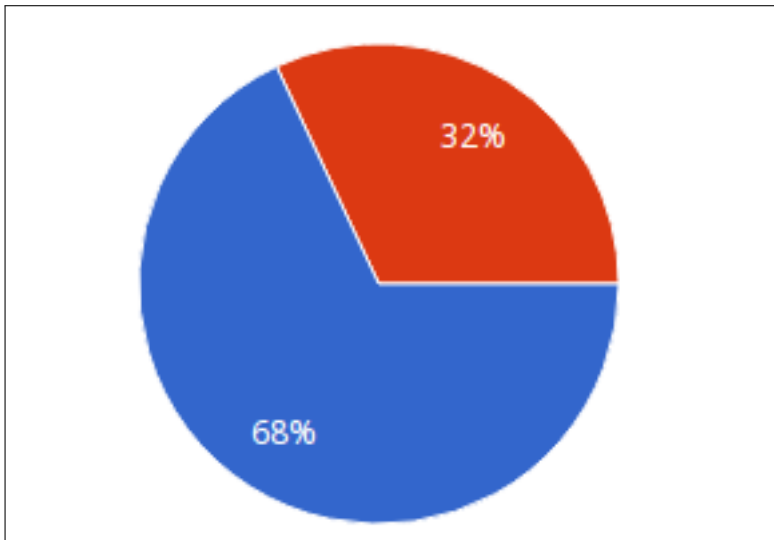


Figure 5.3: Q1: "Are you currently using an indoor mapping service?". Blue indicates "yes" and red indicates "No"

Table 5.2: Questions asked in the International Market Survey

Keyword		Question Group	Question phrasing
Q1		1	Are you currently using an indoor mapping service?
	Q2	1	Are you willing to consider using an indoor mapping service?
	Q2.1	1	If no, please state the reason as to why this is not desired
Q3		2	Given an indoor mapping service that will entail several benefits for your institution, please rate the initial interest in such a service
Q4		2	How much of an concern would price be in procuring an indoor mapping service?
Q5		3	Please rank the following services in terms of willingness to pay: "Navigation and indoor pathfinding", "Timetable integration", "Integration with SMS, apps, IT-infrastructure etc." and "Automatic updating of maps"
Q6		4	Which factors would be of concern when procuring an indoor mapping service?

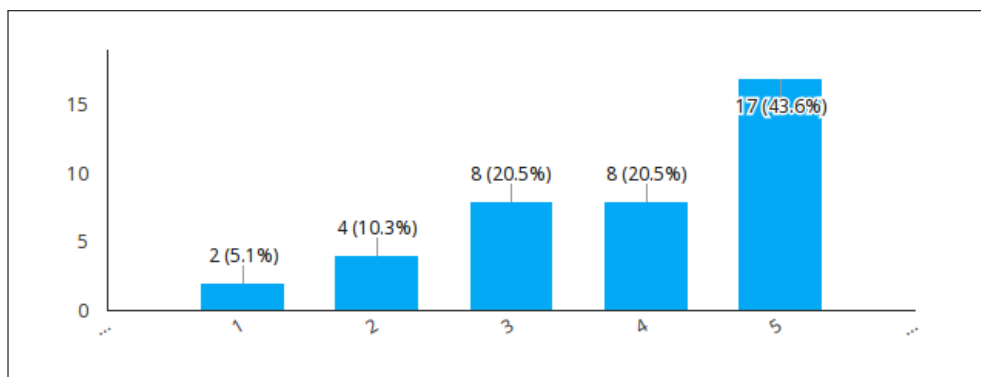


Figure 5.4: Results of Q3: "Given an indoor mapping service that will entail several benefits for your institution, please rate the initial interest in such a service". Vertical axis denotes number of responses.

5.3 Measuring Interest - Question Group 2

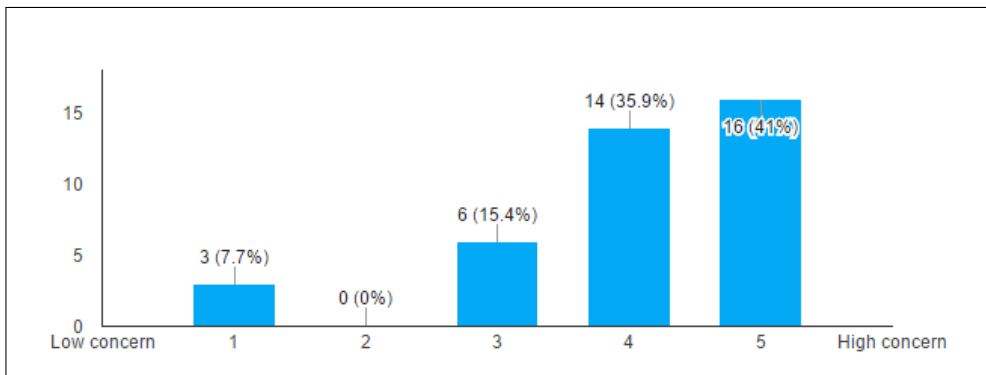
This section contains questions engineered to measure the interest for IMSs in a quantitative manner. The first question Q3 was formulated as follows: "Given an indoor mapping service that will entail several benefits for your institution, please rate the initial interest in such a service". Additionally, respondents were presented with examples of how an IMS could benefit their institution ¹. Possible answers were presented on a Likert scale with 1 denoting "Not interested at all" and 5 denoting "Highly interested".

Figure 5.4 shows the results from Q3. Looking at the statistics from Table 5.3 a mean of 3,872, standard deviation of 1,239 and the most common answer being "Interested (4)", it can be argued that an initial interest for IMSs exists. This further reinforced by the fact that 64,1% showed initial interest in such a service. These results can be said to conclusively point towards a definite interest in IMSs among the respondents. 32% were initially not willing to consider using an IMS (Q2), but after being presented with the potential benefits of an IMS, this number was lowered to 15,4%. This can be viewed as a positive trend, but it can also indicate that the market surveyed in this case is not aware of the possible positive benefits an IMS entails.

¹Improve visitor experience by showing them where to go, how to get there and even where to park. Improve employee efficiency by showing new personnel i.e. cleaning personnel around campus without the need for a dedicated guide. Improve the experience for students by alleviating stress and uncertainty by showing students and staff alike to the correct location in time for class. Additionally, an indoor mapping enables service personnel to readily locate the place of interest as opposed to decoding a textual description.

Table 5.3: Statistics Question Group 2

Parameter	Q3: Interest	Q4: Concerning price
Sample size	39	39
Mean	3,872	4,026
Standard deviation	1,239	1,390
Median	4	4
Mode	Interested (4)	Somewhat High Concern (4)

**Figure 5.5:** Results of Q4: "How much of a concern would price be in procuring an indoor mapping service?" Vertical axis denotes number of responses.

Similar to Q3, Q4 was posed as a quantitative question and asked respondents "how much of a concern would price be in procuring an indoor mapping service?" This question aimed to measure the viability of freemium in the B2B&C paradigm. A low concern for price might indicate that freemium itself is not a main proponent in accelerating customer acquisition, and conversely a high concern for price would indicate a certain viability for freemium among price-sensitive customers. Compared to Q3, this question garnered even more positive results: A mean of 4,026, standard deviation of 1,390 and median of 4 indicates a trend that the respondents were price-sensitive. Further cementing this notion is the fact that 76,9% of respondents viewed price as a somewhat high to a high concern. In a non-freemium business paradigm these results would potentially be negative indicators, as price-sensitive customers could potentially lead to a prolonged sales pipeline. However, in the freemium paradigm these are excellent results, since price seems to be a major factor in the potential procurement of an IMS. The results from this question can be seen in Figure 5.5

Table 5.4: Statistics for Question Group 3

Parameter	Q5.1	Q5.2	Q5.3	Q5.4
Sample size	39	39	39	39
Mean	2.59	2.538	2.769	2.872
Standard deviation	1.312	1.274	1.266	1.341
Median	3	3	3	3
Mode	Neutral (3)	Neutral (3)	Neutral (3)	Neutral (3)
Willing to pay (4 & 5)	24.4%	31,7%	31,7%	36.6%

5.4 Interest for Premium, Value-Adding Services - Group 3

This group of questions contains one question, divided into 4 subquestions. Thusly, the different questions will hereby be referred to as Q5.1, Q5.2, Q5.3 and Q5.4. For this group of questions, respondents were asked to rank four different IMS-related services in terms of willingness to pay, where 1 indicated a low willingness to pay, and 5 indicating a high willingness to pay. Under each service, the respondents were informed about why these features might be beneficial to their institution in a similar vein to how Q3 was asked. The statistics of these questions can be seen in Table 5.4. In the freemium paradigm with the few paying for the many, it is important that premium features are in place for the sake of profitability. However, freemium in a B2B or B2B&C market is more than often used as a potent leads-generator [JL09]. Due to this, the willingness to pay for the premium features are not detrimental for successfully applying freemium in this case, thus making any negative feedback on premium, value-added not necessarily speak against freemium. Lastly, it should be noted that any disinterest from respondents are further compounded in this group of questions, and the numbers should be viewed accordingly.

For this question the respondents were given the following potentially beneficial features of indoor navigation and pathfinding:

While not a necessary component of an indoor mapping service, navigation and indoor path finding can help users find their desired location. A plethora of technologies exist for this purpose using existing Wi-Fi infrastructure, Bluetooth, beacons, smartphone sensors, magnetic positioning etc.

Figure 5.6 shows results from Q5.1. The statistics show a mean of 2,59, standard deviation of 1,312 and a median of 3 making the mode "Neutral (3)". These numbers

do not indicate a strong willingness or lack thereof of this particular feature, and represents the third most popular premium service. The numbers are however slightly on the positive side of the scale with a non-negative median, however there were equally many neutral as there were those with low willingness to pay for this type of service. MM has stated that their primary focus is making the indoor maps themselves, and as much as 80% of its users do not use any form of indoor navigation (Jelle, personal communication 17.09.2015). This fact is to some extent reflected in these results. The respondents were however not informed that an IMS such as MM has a partner in Cisco that enables usage of existing Wi-Fi infrastructure for positioning and navigation. Given that indoor navigation techniques are in its infancy, it can perhaps be expected to see a rise in the technologies applied in this field in the future.

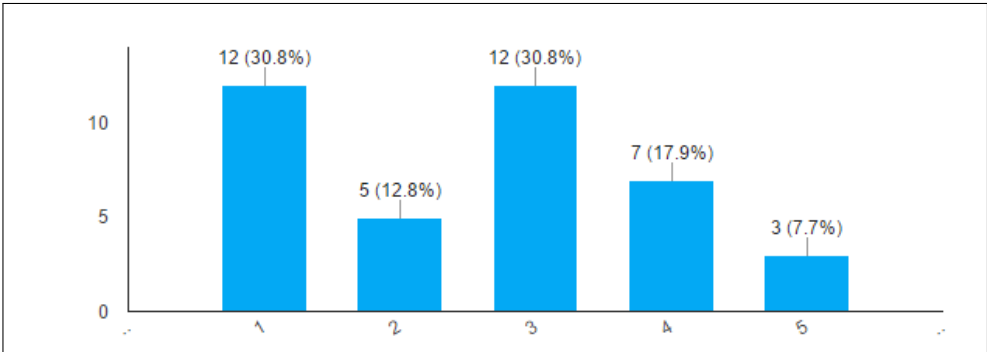


Figure 5.6: Results of Q5.1: "Navigation and indoor pathfinding". Vertical axis denotes number of responses.

Q5.2 asked the users to rate their willingness to pay for timetable integration. Respondents were presented with the following potential benefits:

"Where", "how" and "when" are commonly asked questions when an appointment is due or a meeting is taking place. Timetable integration aims to answer the two former questions by providing an indoor map and which path to take to get there.

With a mean of 2,538, standard deviation of 1,274 and median of 3, this was the least popular of the presented value-adding services. Figure 5.7 shows the results being quite even on all but one of the alternative answers, possibly indicating a divided set of responders. As with Q5.1, these numbers do not indicate any trends or strong or weak desires towards this type of service, but it is important to emphasize

that some respondents were unfamiliar with IMSs in general, or had no desire to acquire one. In hindsight, the author could have provided respondents of the survey with visual rather than textual examples of the value-adding, premium services to give respondents a better overview of the implications and usefulness of these services.

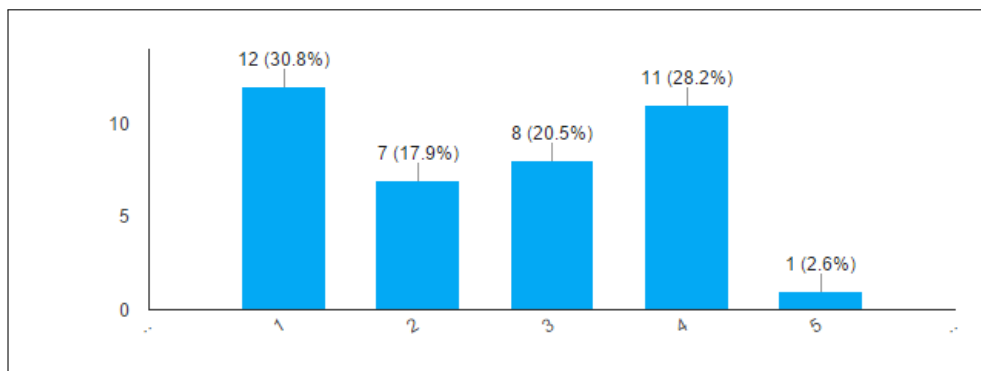


Figure 5.7: Results of Q5.2: "Timetable integration". Vertical axis denotes number of responses.

The next question in the group concerned the integration of an IMS into SMS, apps, IT-infrastructure etc. Potential benefits were proclaimed as follows:

An API that integrates indoor maps with the existing services mentioned above, aims to enable seamlessly integrating indoor maps into already existing systems and services without the need to manually do so for every service.

The results of this question can be seen in Figure 5.8, with a mean of 2.769, standard deviation of 1,266 and median of 3. This makes it the second most popular service presented, with 61,6% of replies being Neutral (3) and above. As stated previously, it must be stressed that it might be hard to visualise how these premium features work in a concrete scenario. If potential IMS buyers are largely unaware of the benefits, it can make this particular service a hard sell. Furthermore, integrating an IMS into existing infrastructure might represent a security risk, especially when dealing with sensitive data. Therefore, it was expected that this question would score low, but the results shows it being on par with the others.

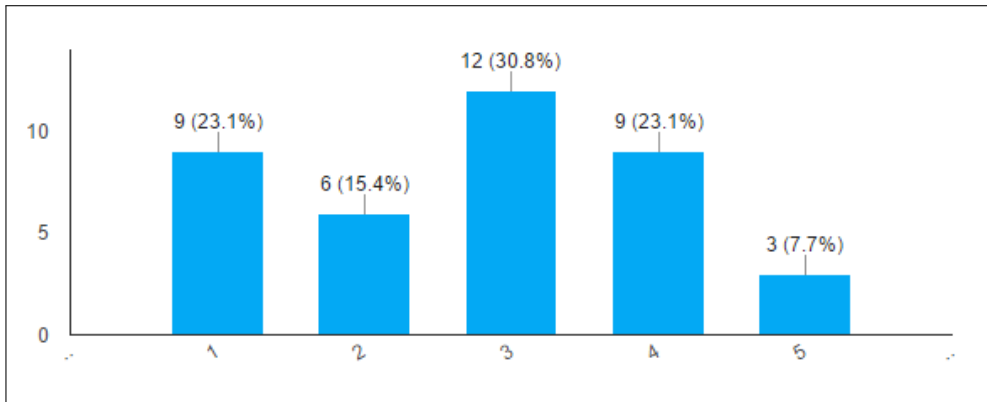


Figure 5.8: Results of Q5.3: "Integration with SMS, apps, IT-infrastructure etc. ". Vertical axis denotes number of responses.

The last question in the group, Q5.4, asked respondents to rate a service that automatically kept maps up to date. Respondents were presented with the following key features of this particular value-adding service:

Larger establishments tend to change over time, and often see around 10% of buildings change annually². Manually updating indoor maps can therefore be a tedious and time-consuming activity.

Figure 5.9 shows results from Q5.4, with statistics showing a mean of 2.872, standard deviation of 1.341 and median of 3 (Neutral). For respondents completely unaccustomed to IMSs, this question would perhaps be the hardest to answer, since it directly revolves around an IMS. As stated in the features listing, HEIs may see over 10% of its structures change during the course of a year. This is possibly reflected in the statistics, as they show this feature being the most popular of the four. It also had the highest number of interested respondents at 35,9%. It can be speculated that the HEIs contacted in relation to the survey were aware that updating floor-plans could be quite an undertaking, and an IMS with this feature would be well received.

²Jelle, personal communication, 25.09.2015

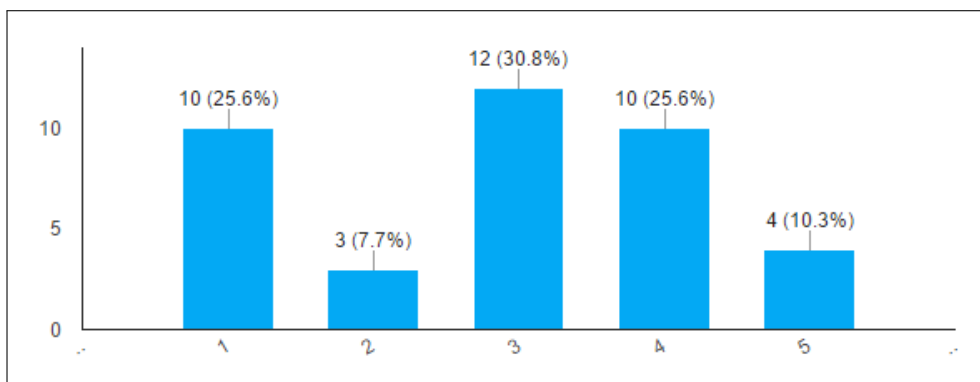


Figure 5.9: Results of Q5.4: "Automatic updating of maps". Vertical axis denotes number of responses.

5.5 Potential Procurement Concerns - Question Group 4

The final group of questions asked concerned potential aversions the HEIs contacted might have. At the end of the survey, respondents were welcome to freely add anything concerning the survey, the free model or IMSs, but few chose to do this. The rationale behind having this question group was to map the potential hinderances in procurement of an IMS. The question asked in this section consisted of checkboxes where respondents were free to mark as many options as desired, and an overview of the replies is shown in Table 5.5.

Table 5.5: Overview of data from Q6

	Price	Demand	Security Concerns	Other
Sample size	39	39	39	39
Quantity	33	19	23	8
Percentage	84.6%	48.7%	59.0%	20.5%

Q6, the final question of the survey prompted the respondents with the following: "Which factors would be of concern when procuring an indoor mapping service?" Four different factors were presented, and respondents were allowed to choose all four should they so desire, with the different options being "Price", "Demand", "Security concerns" and "Other". The "Other"-option allowed respondents to shortly describe a potential concern not applicable to the above. The results of this question can be seen in Figure 5.10, and some of the "other"-factors were suggested as follows:

- *"Accuracy and legibility"*
- *"Maintenance"*
- *"Integration with reservation system"*
- *"Ease of use, accessibility and [the] ability to administer system locally"*
- *"Quality of the service such as usability and features"*
- *"Content"*
- *"Campus user experience"*

Some of these pertains the actual usefulness of the service itself, while some concern the user experience. As is reviewed at the end of the chapter, it can be said that the market under scrutiny is more concerned with the user experience than

price. Although B2B and B2B&C markets have many similarities, this can be said to be a difference in this case. As the business part of B2B&C can be said to govern the consumer product choices in the matter, quality, ease of use and usefulness seems to be factors that must not be overlooked in the case for HEIs.

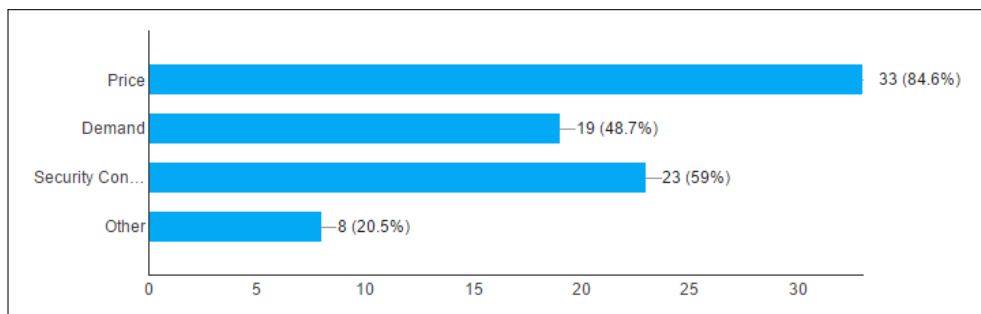


Figure 5.10: Results of Q6: "Which factors would be of concern when procuring an indoor mapping service?". Horizontal axis represents number of responses. Option 3 not wholly visible: "Security Concerns".

The most chosen factor was "Price" at 84,6%, followed by "Security Concerns" at 59%, "Demand" at 48,7% and "Other" at 20,5%. Given that Q4 showed that most of the respondents were concerned about price, this trend is further confirmed in this question. For unaware readers, it might be hard to grasp that citing "Price" is not a given factor in the procurement of a service or product. It is interesting however, due to the market segment discussed in this thesis (HEIs) might not be as price sensitive as other parts of the market. Many of these are publicly owned, and as such long-running costs may be more of a concern. In the case of potential public procurements, countries in the EU and countries like Norway have laws regarding public procurement practices and regulation [Com][pro15]. In the preliminary research paper, the author reviewed a similar research question constrained to the Norwegian market. It stated that if any public entity wishes to purchase a certain service, that type of service has to be announced publically. Offering bids from potential outreachers is usually the norm, and after a certain amount of time an eventual procurement can take place. A similar survey was offered in this paper where one respondent from a Norwegian Hospital stated [Tag15]:

"We have to deal with the rulings of public procurement, and it would be the total cost that is the underlying factor. The content of the "basic" package is detrimental to a potential procurement, as it may trigger further needs for more services. If a(n) [indoor mapping] system can

satisfy the demands and rules of a public procurement, then [a freemium-based IMS] is of interest".

In terms of the viability of freemium in this scenario, this can be viewed positively and negatively: The positive aspect of this is that potential leads and prospects in an organization that is in a procurement phase, can have an easier time convincing board members etc. of obtaining a service that will cost nothing. On the other hand, long-term and total costs may be more concerning for potential procurers, than a service or product being free initially. As stated by the above respondent, the contents of the non-premium parts were detrimental, and may trigger the need for purchasing premium parts of the product or service.

Chapter 6

Discussion

This chapter includes discussion surrounding the findings and

6.1 Competitors

6.2

Chapter 7

Proposal of Business Model

This chapter will present the reader with the freemium-based business model proposal for MazeMap. It will be proposed based on findings and results from other parts of this thesis, particularly from Chapter 4 & 5. The Business Model Canvas described in Chapter 3 will be used as a fundamental framework to describe and realise the model.

7.1 The Freemium Indoor Map Service Business Model

Some parts of the business model will be more relevant in terms of the applying the freemium model

7.1.1 Customer Segments

While this thesis has primarily been focused on one customer segment, namely HEIs, an IMS such as MM may have several other customer segments in addition to this: Hospitals, venues and shopping malls (along with HEIs) constitutes MM's self-described customer base [Maza]. In addition to this, more specific and niche markets can be described in cruise ships, sporting arenas (football stadiums, car-racing arenas etc.), airports and museums. The actual procurers of MazeMap are senior personnel within any aforementioned institution or organisation, that govern the procurement activities. Focusing on the customer segment present in this thesis, a divide can be said to exist between publicly owned HEIs and privately owned HEIs, given rules of public procurements prevailing in a vast majority of countries. These may have different emphasis on price in long or short terms. Public institutions may be more concerned with total costs and the quality, ease-of-use and usefulness of a service, while private institutions may be more sensitive to price in order to satisfy shareholders by keeping procurement costs down. All HEIs contacted were selected on a criterion of being of a certain size in terms of staff and enrolment. In the survey, Q6 indicated that "demand" was cited as a reason against an IMS, and this option was more than often selected by HEIs smaller in size compared to the rest of the

respondents. As such, this should be taken into account when targeting HEIs as a customer segment.

From the customer's perspective, a low amount of financial means is needed in order to obtain MM's IMS. Having existing infrastructure such as Wi-Fi for implementing navigation features, might seen be a base requisite from the customer's perspective, should they desire navigational features. Given the characteristics of B2B&C, any procurers of an IMS should have an already established consumer base, but this is hardly the case among HEIs. To sum up:

- Procurers of MazeMap: Someone who governs procurement activities
- Freemium might be harder to implement due to regulatory affairs
- What needs to be in place customer side: Low amount of financial means, optionally Wi-Fi for navigation and an existing consumer base

7.1.2 Value Propositions

How a service generates value is instrumental in choosing target customer bases. HEIs are able to benefit from an IMS such as MM for a plethora of reasons: As explored in International Business Potential for Analytics of Room Utilization [Bin15], by increasing room utilisation through analytics of how space is being utilised leads to several potential benefits: Increasing enrollment, reducing maintenance cost, alleviating environmental stress and reducing opportunity costs. HEIs experience an influx of new students and staff at the beginning of semesters, and an IMS can save both time and frustration among these in relation of finding their way around campus. Additionally, visitors are able to streamline their visitor experience by having an IMS provide parking instructions or options. Furthermore, HEIs are often the site of conferences consisting of first-time visitors who can also benefit greatly from finding out where to go and at what time, given MM's integrability with time-table and scheduling systems. Among both external and internal maintenance personnel, an IMS enable less time being spent on finding the correct place to be and lets personnel do their tasks more effectively, while greatly reducing the need for new staff to be shown around.

With interactive maps allowing both customised and automatic generation of meta-data, an IMS can provide its users with fleet management. This is related to how users can find and locate equipment, both emergency-related equipment such as fire extinguishers and non-critical equipment such as printers. In this context, the emergence of the Internet of Things is also applicable, given that a lot of previously autonomous systems are now interconnected. An IMS enables tracking of these assets, and can satisfy the demand for making these things visible to its users. Another

important use-case is how a fire department can save time in critical moments by using an IMS to discover and locate fires or other accidents, as opposed to decoding messages from a fire alarm system. In the context of another customer segment not explicitly discussed here (hospitals), it is possible to save costs by reducing the number of missed appointments [Mazb], by employing an IMS. This can also be applied to HEIs albeit at possibly smaller cost savings, due to HEIs not being as appointment-based as hospitals.

In terms of freemium, there are obvious cost savings for procurers of freemium-based IMSs. As the B2B sales pipeline is longer than in a B2C setting, a try-before-you-buy product may prevent compounded costs as a result of a long sales process. As was stated by the respondents of the survey, price presented an entry barrier to the potential purchase of an IMS, and there were some willingness to pay for some additional services. By taking this into account, this bodes well for implementing a freemium-based IMS. To summarise:

- Optimise utilisation through analytics
- Directions for meeting-place and nearest parking for visitors
- Reduces uncertainty and stress for new students and staff
- Maintenance personnel: Professions that see frequent changes of staff and working locations. Indoor maps enable these to find their way quicker, saving personnel costs
- Fleet management, equipment tracking and the Internet of things
- Alarms shows up on maps rather than a code for a specific location. Can save time in emergency situations
- Reduce missed appointments
- Provide places of interests visually as opposed to textually
- For freemium: Cost savings by being free initially
- For freemium: Try before you buy, no big initial investment. buy after need
- Further value-adding services

7.1.3 Channels

In order to be able to deliver its value propositions to the customer, an IMS must use appropriate sales channels. Given that indoor maps is still a relatively new service, determining what channels to use can be difficult. It should be stressed that given

the survey's respondents unfamiliarity with indoor maps, that such a service needs to emphasise its potential through value propositions, and bring awareness around them. Being an early mover proved to be important in the case of Teleopti discussed in Chapter 4, and given the fact that only 35% of respondents already employed an IMS, further validates this notion.

In terms of accelerating customer acquisition, the direct approach often taken in other B2B scenarios may prove to be counter-productive for this purpose. First, the value proposals have to be brought forth to decision makers at an HEI. Then a top-down or a down-top recommendation may occur: If senior personnel take a liking to the service, their authority on the matter may influence its users (which are the consumers in the B2B&C setting) to start using a service. This is the top-down approach. The down-top approach occurs whenever demand for such a service starts with the consumers either through word-of-mouth or by users who have seen an IMS in action at another institution. This may in turn influence decision makers by wanting them to satisfy their respective consumers. As an IMS obtains more customers, the latter approach becomes more attractive, as its user base expands and may create demand where scarce in the first place. The former approach can also greatly benefit from this through cross-references such as success stories between HEIs are shared. This of course can also generate bad-will, should the service provided turn out to be lacking. In the initial phases of a freemium-based IMS direct contact may be an important channel, however, as customer acquisition and leads generation become more important factors, direct contact becomes too time consuming and should be reserved customers who represent a larger business potential. As suggested by Lamminpää in Chapter 4, being visible at trade conventions may be a good tool for leads generation by direct contact. As opposed with the previously mentioned outreach-based direct contact, being visible at events hosted by organisations such as Society for College and University Planning (SCUP), Tertiary Education Facilities Management Association (TEFMA), Center for Effective Learning Environments (CELE) and APPA: Leadership in Educational Facilities (APPA), may prove to be a more effective way of acquiring new customers from the HEI customer segment. Lastly, this channel type handles almost all of the product phases mentioned in Chapter 3, barring after-sales.

MazeMap's webpage may also be used increasingly as a sales channel in the case of delivering a freemium-based service. As discussed in Chapter 4, entry barriers should be kept as low as possible. If the webpage is used as a sales channel it needs to provide adequate information regarding the value propositions offered to enable users to evaluate these propositions. Additionally, a service such as Google AdWords as employed by Limecraft, may also strengthen the webpage as a sales channel, by bringing awareness around the service provided. Given the SaaS-nature of the product, the webpage can be used as a vessel to deliver the product to

customers, and while users in the freemium paradigm do not purchase anything in the traditional sense of paying, the purchasing part could be handled by requiring users to register as the only barrier for using the service. To go with this, thorough and clear documentation should also be provided for these customers. Any premium parts of the service could be greyed out, but made readily purchasable depending on the service.

Through MM's partnership with Cisco, the Cisco marketplace is another available sales channel [cis16]. This platform provided by a well-known actor such as Cisco presents great publicity through the its brand, which provides services that are confirmed to meet any security concerns (as was a concern among survey respondents). Cisco is also a licensed, worldwide reseller, which may yield great value as a sales channel. Below is a summary of the various channels:

- Direct approach
- Develop leads inside businesses
- Webpage
- Cisco marketplace
- For freemium: Hard to argue against initial high costs as with a non-freemium system

7.1.4 Customer Relationships

The need for establishing good and reasonable customer relationships is vital, and in the case of freemium generating leads is the most desirable outcome. These relationships changes with as the product goes through different phases. Table 7.1 shows a possible strategy for customer relationships under a non-freemium model, which focuses mostly on personal relationships. In a freemium model with a rapidly accelerated customer acquisition process, this can possibly lead to increased cost in staffing, sunk costs and costs resulting from failed sales. Therefore a more automated customer relationship model must be presented, seen in Table 7.2. This attempts to combat the need for staffing dedicated to different parts of the sales cycle, by moving towards an autonomous, self-servicing system as the service matures. By providing rigorous documentation and self-help tools for the non-paying customers, as well as reaping potential benefits from communities around the product getting traction, this should be implemented readily. Lastly, as the service grows in users the number of bugs may increase, and as such, patches that are platform-wide and payment model-agnostic should be in place to maintain customer satisfaction.

Table 7.1: Customer relationships for different product phases, classic model [Bin15]

Phase	Customer Relationship Strategy
Pilot	Co-creation, key partnerships
Introduction	Dedicated Personal Assistance
Growth	Personal Assistance
Maturity	Communities
Decline	Self Service

Table 7.2: Customer relationships for different product phases, freemium model

Phase	Customer Relationship Strategy
Pilot	Dedicated personal assistance, co-creation
Introduction	Self-service, personal assistance
Growth	Automated services
Maturity	Communities
Decline	Self-service

Emphasis should also be put on the creation of communities and cross-reference sales, hereunder inter-customer interactions. This to enable users to share knowledge and develop good usage practises, alleviating some of the need for customer service, should the service expand with the freemium model applied. The nature of the service does not induce competition among customers, and as such there is little to no point in not sharing experiences with an IMS. On the contrary, the value and performance of the service may increase for all parties involved, which can only be viewed in a positive way.

With freemium comes additional freedom in how a product is bundled. A solution like MM's can easily be modularised, with more full-fledged customer support, guidance or even Customer Relationship Management (CRM) as premium features. By monetising this part of the service at a mature product stage, means that any early movers will not feel deterred from obtaining this type of service. Smaller and medium sized venues who may have less requirements from an IMS would ideally not need support if the self-support tools are sufficient in themselves, and larger institutions may be the target customer segment for more extensive and paid support features. Below is a summary of the proposed customer relationships:

- As service matures, less active relationships, more automation
- Interactions between the businesses under the B2B&C paradigm, sharing of experiences
- For freemium: Guidance as a service

7.1.5 Revenue Streams

Given that IMSs are still in its infancy product phase-wise, establishing that these services can be value-adding is important. Additionally, even though no monetary investment is needed upfront from the customer's perspective, the survey indicated that there are other factors such as demand and security concerns that may hinder the procurement of an IMS. It must therefore be communicated extensively that those factors should be of no concern by, for instance, pointing out the partnership with Cisco for security concerns and clearly communicating the value proposals in order to create demand. The future might bring additional need for services hitherto unknown, and these should be included as part of the MM product range, to create a lock-in effect.

In choosing which parts to be free and which ones that should be monetised, several considerations must be made: Create too few free modules and the service provided might be lacking for its purposes and create no demand. Creating too many free modules will risk cannibalisation the low end of the market [KPJ11] and generate little to no revenue. Considering these options, it might be better to initially offer too few modules as MM already has an established customer base. While the survey showed that the lack of demand of an IMS is present, it could be risky to dedicate too much resources in offering non-paying customers modules or features that needs to be monetised.

Several parts of MM's product exists, which can be decomposed into different modules described in Table 7.3. For applying a successful freemium strategy, the choice of module(s) to include for free is crucial. The free parts should include the bare minimum for an IMS: An indoor map, basic map editor and an application to view the indoor map. Any additional services should be monetised in a way. There are several ways to monetise the modules not included in the free package and as such two different payment models can be presented:

7.1.6 Subscription

As with Box (presented in Chapter 4) a subscription model for the premium, value-adding services may be implemented. For services such as analytics and automatic updating of maps and metadata a recurring payment model makes sense, given that they depend on several variables that may change from the customer's perspective.

Table 7.3: Modules of MazeMap

Indoor maps	Integration	Navigation
Map editor: basic	SMS notification	Indoor positioning
Map editor: advanced	Room reservation	Indoor pathfinding
Interactive maps (browser only)	Applications	
Interactive maps (any platform)	IT-systems	
Facility management (automatic updating of maps)	Timetables	
Analytics	API/SDK	
Automatic updating of maps		

Other premium modules such as advanced map editors, platform independence and integration may not be as applicable to a subscription based payment model. However, there is nothing directly speaking against this way of monetising a service. Given that MM delivers a SaaS, operational costs must be taken into account, and subscription based features may cover these costs accordingly. After registering and uploading floor plans, users should be presented with a dashboard of the services available to them. The additional, premium modules may be greyed out and activated when desired. This will then in turn induce either monthly or yearly recurring payments, depending on the type of service. Given that buildings change more slowly than points of interest, different rates of recurrent payments should be presented depending on the module. Additionally, usage quotas may be introduced. This works slightly different than the previously mentioned model, where every module is free to use and try out. The difference between the free and premium in this instance, is that free users are able to use premium features, but only up to a certain cap. This cap may be imposed as letting the premium features be time limited or data volume limited, with restrictions removed upon setting up a payment plan.

7.1.7 One-time payments

More in line with traditional, non-recurring payments, several of the modules fit better into this category, as opposed to the subscription model. Under this model customers would be presented with the premium modules greyed out, and pricing info on the respective models. Customers wanting to activate a particular module for their institution may do so after paying a one-time fee for said module. Under this model, the aforementioned time or data volume limitations on premium features may be imposed as an alternative way of trying out the various services. It should be noted that combining these two models is also a possibility, by having some modules appropriately subscription-based and some one-time-fee-based.

Free trials of the different premium modules can also be offered to be more in line with the try-before-you buy sentiment, central to the freemium business model. Additionally, some features can be free on rotation, for instance from one month to the next, which may increase the interest in some of the less popular features. This also opens up the possibility of evaluating the premium features available, by adjusting the price for less popular modules, while increasing price for the modules in demand. It is also possible to bundle some of the premium features, as a technique to reduce customer's ability to evaluate and reserve themselves at given price points. This provides a lock-in effect among customers, and may reduce the starting costs associated with enabling each one of the premium services. To sum up:

- Concept of freemium: The few pays for the many
- Subscription based premium modules
- One-time-fee premium modules
- Bundling

7.1.8 Key Activities

Along with the key resources, the key activities form the way value propositions are delivered to the customers. Given the SaaS nature of the product delivered, software development can be listed as one key activity, which relates to the ongoing development and maintenance of the key resource that is MM's platform. While under a freemium business model, a more secluded approach might be taken in terms of business development. Targeted marketing and sales should be reserved to larger customers, since one of the main goals of freemium is to accelerate customer acquisition. On that note, it is important for a supplier of an IMS not to completely forego this type of customer under the freemium paradigm, as that will leave the larger enterprise market largely untouched. When a customer has registered in order to use the free parts of the IMS, it is important to provide sufficient support and documentation, in order for customers to get up an running, and retaining the customer base. Customers will quickly lose interest in a new type of service provided such as an IMS, if adequate introduction to the product is absent. As such, providing this can be seen as a key activity.

Roughly 80% of MM's user-base don't use any form of positioning services, so customers wanting the indoor navigation and pathfinding modules may be directed towards the solution provided by MM's partner Cisco for implementation of the Wi-Fi based navigation feature. There are however, a plethora of emerging technologies that provide this, some with far greater accuracy than possible with Wi-Fi: iBeacons (Bluetooth Low Energy (BLE)-based, signals between smartphone and

beacon) [iBe16], IndoorAtlas' IPS system (geomagnetic indoor positioning, smartphone with magnetic sensors reacting to earth's magnetic fields) [Ind16a] and Sensor Fusion by indoo.rs (using a smartphone's built in sensors) [Ind16b] to name a few. MM has stated that supporting more positioning and navigation features will be made possible should there be a demand for them in the future (Jelle, personal communication 17.09.2015). Integrating maps into a customer's existing IT-systems and maintaining the map data and metadata can also be viewed as a key activity, providing a certain lock-in effect among customers.

After purchases, emphasis should be put on maintaining the platform assuring a good and stable service is provided to the customers. The premium modules should act as means of revenue, and together with maintaining the platform it forms an important key activity, as it is vital for customer retention and will hamper the creation of communities. Enabling community creation post-sales should also be paramount. This can be done through official forums, where users share both share knowledge and solves problems together, as should be necessary in the event that the customer base expands rapidly. Again, this to minimise supporting costs, but some customers with more advanced needs who operate on a larger scale may need dedicated personal assistance. In turn, this customer group is also expected to pay for more premium features, offsetting the support cost margin.

- For freemium: Providing adequate level of support, particularly during the implementation phase
- Key Account management and business development - large customers with many needs
- Indoor mapping constitutes roughly 80% of usage
- Accommodating for indoor navigation and pathfinding via Cisco and other partners
- Integration of maps
- Reworking and updating map data and metadata
- Integration into booking systems
- Marketing, sales and customer support
- After purchase: Revenue through added modules
- After purchase: Enabling community creation

7.1.9 Key Resources

Since the method of delivery of MM is SaaS, several resources need to be allocated in order to provide and create the service needed to fulfil the value propositions. MM's servers containing the service provided is a hugely important asset in this case. Without these, the service would not be able to be offered as a SaaS. Having a centralised, consolidated infrastructure enables faster bug-fixing, and will provide customers with an up-to-date version of the service at all times. Regarding freemium, the most important aspect of the key resources is the engine that converts floor plans to interactive maps. This also makes it possible to lower the price point drastically, and through this gaining a competitive advantage over competing businesses, as discussed in Chapter 3. In a scenario where freemium is implemented, the rapid onset of an expanding customer base would simply be infeasible if a manual process was in place to make the interactive indoor maps. With a robust engine generating maps, little has to be done from MM's side per new customer.

In regards to human resources, the software developers with expertise and deep knowledge about the technical aspects of the IMS solution can be seen as a vital key resource. Given that an IMS often has to interface with other existing systems like timetable, room reservation and IT-systems in general, it is imperative that competent staff is in place in order to satisfy the needs of the customers. Furthermore, personnel working in R&D and marketing may be easily overlooked in this situation, but these groups provide vital services in obtaining new customers (vital part of the freemium paradigm), and expands the value offerings towards the customers by meeting or creating demand. By having a partner in Cisco providing a distribution channel for the product, can also be seen as a key resource. Additionally having a close relationship with early movers such as NTNU, can function as a test-bed for new features, as well as being a point of potential success-stories. There is also a benefit of having HEIs as a customer, enabling recruitment to further strengthen the workforce. A categorised overview of the most important key resources can be seen in Table ??, and a summary follows below:

- Servers
- The floor-plan-to-interactive-map engine
- Software developers
- Partners
- Customer's mapping data + metadata

Table 7.4: My caption

Category	Resources
Physical	Servers
Human	R&D, marketing and software development personnel
Financial	Customer acquisition through a free part of the product and revenue through premi
Intellectual	Floor-plans-to-interactive-maps engine and partnerships

7.1.10 Key Partnerships

In the previous sections the partnership with Cisco has been affirmed, and can therefore be viewed as a key partnership. Having Cisco as a distribution channel can be a tremendous asset in a freemium model, as Cisco's existing customer relationships may be more easily transferable over to MM if a service is offered through a freemium model. Furthermore, given the Cisco's leading position and brand name, this also alleviates some of the risks potential customers may associate with an IMS. As the customer base expands, further partnerships with other actors on the market is also possible, however, this may deteriorate an already existing relationship, should Cisco's competitors form partnerships with MM.

Unless customers are reserved or exempt from it, gathering usage- and metadata may also be the backbone of new partnerships being made. In this bi-lateral relationship between customer and company, mutual benefits may be obtained on both sides: Customers are able to receive a more tailored product according to their needs, increasing the exclusiveness of the service provided and companies are able to further evaluate and assess the service provided based on operational intelligence gathered from the customers. Several of respondents of the survey cited security as a concern in the context of potential procurement, making trust between customer and company an issue that should be addressed by reassurance and appropriate usage of data provided. As the customer base expands to customers worldwide, partnerships with companies providing redundancy nodes might be necessary. This is entirely optional, as such services may work as a separate B2B transaction between companies. However, given the nature of an online-based SaaS it is important to provide a fast and reactive IMS in order to maintain good relationships to customers. Redundancy nodes may improve this performance for customers far away from the servers of the IMS. Summed up, the most important key partnerships are as follows:

- Positional services i.e. Cisco
- Distribution channels in Cisco

- Operational intelligence
- Cloud storage: servers and redundancy nodes for better access throughout the world.

7.1.11 Cost Structure

The last building block of the business model is also one of the most vital parts, as it is detrimental for operating a successful business. This pertains to which key resources and key activities that drive the costs. An IMS such as MM is primarily a value-driven venture, as most of the activities concerns the creation of value among its customers in addition to counselling. However, in the case of freemium, the venture can stray further away from a value-driven business towards a more cost-driven one. In startup phase and during development of key value propositions such as the mapping engine, the costs will be relatively high, but the business will in time benefit from economies of scale. This may be even larger as freemium is implemented, as expanding the customer base will achieve this, and great returns in investments may be had. In general, SaaS-like services will in most cases be an expensive venture, and apart from initial costs, the running cost of maintaining a highly qualified staff consisting of R&D, marketing and software personnel can be expensive. However, given that the customer segment of HEIs also can act as a recruiting arena, these recruitment costs may be kept down.

Given that each customer presents a liability in terms of costs, it is important to keep these costs as low as possible, with this pertaining to the freemium model in particular. Some of these costs include integration costs, customisation of maps and interfacing with existing infrastructure should the need for this present itself. A possibility in keeping these costs low, lies in benefiting from the scale of operation that freemium as a business model might bring. If several institutions use similar interfaces for the premium one-time-fee based services, the marginal work needed and costs of this is lowered as the customer base expands. The survey results indicated a general interest in indoor maps, and particularly a freemium based IMS among the respondents, and as such it would be expected that the aforementioned benefits of scale would come into fruition.

Not to be overlooked is the cost of renting or purchasing facilities such as offices or support centres. This cost will increase as the size of the operation expands, with offices in more countries and more customers which possibly presents a larger demand for supporting services. The latter can be somewhat mitigated through monetising advisory and extensive supportive services, thus providing this as a premium service. If sufficient means is put towards making thorough and easily understood documentation of the service provided, this cost can be lowered even further. Lastly, after the initial setup phase the running costs should not be of

Table 7.5: Overview of costs

	High	Low
Fixed costs	Worker salaries Software development	Costs of operation (platform) Rental of facilities Servers & redundancy nodes
Variable costs	Deployment of services Counseling Integration of services	Hardware Marketing

any large magnitude. Even if the economies of scale may induce higher costs, the premium features may be adjusted in price or functionality in order to cover the costs related to expanding the customer base. Due to the scalable map-generating platform and the fact that customers are largely able to administer their own maps as they see fit, these processes would most likely be inexpensive. An overview of the costs is shown in Table 7.5, and a summary follows below:

- Value driven cost structure: value creation and counselling
- High startup costs: Software development, R&D and marketing team, servers and offices
- Offices/personnel: Development and renting facilities.
- Low running costs: Scalable platform, customer is able to administrate maps themselves (can add POIs etc.)

7.2 Summary of the Business Model Canvas

Below follows a visual representation of the business model in the Business Model Canvas-framework:

Chapter 8

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Appendix

Survey invitation letter

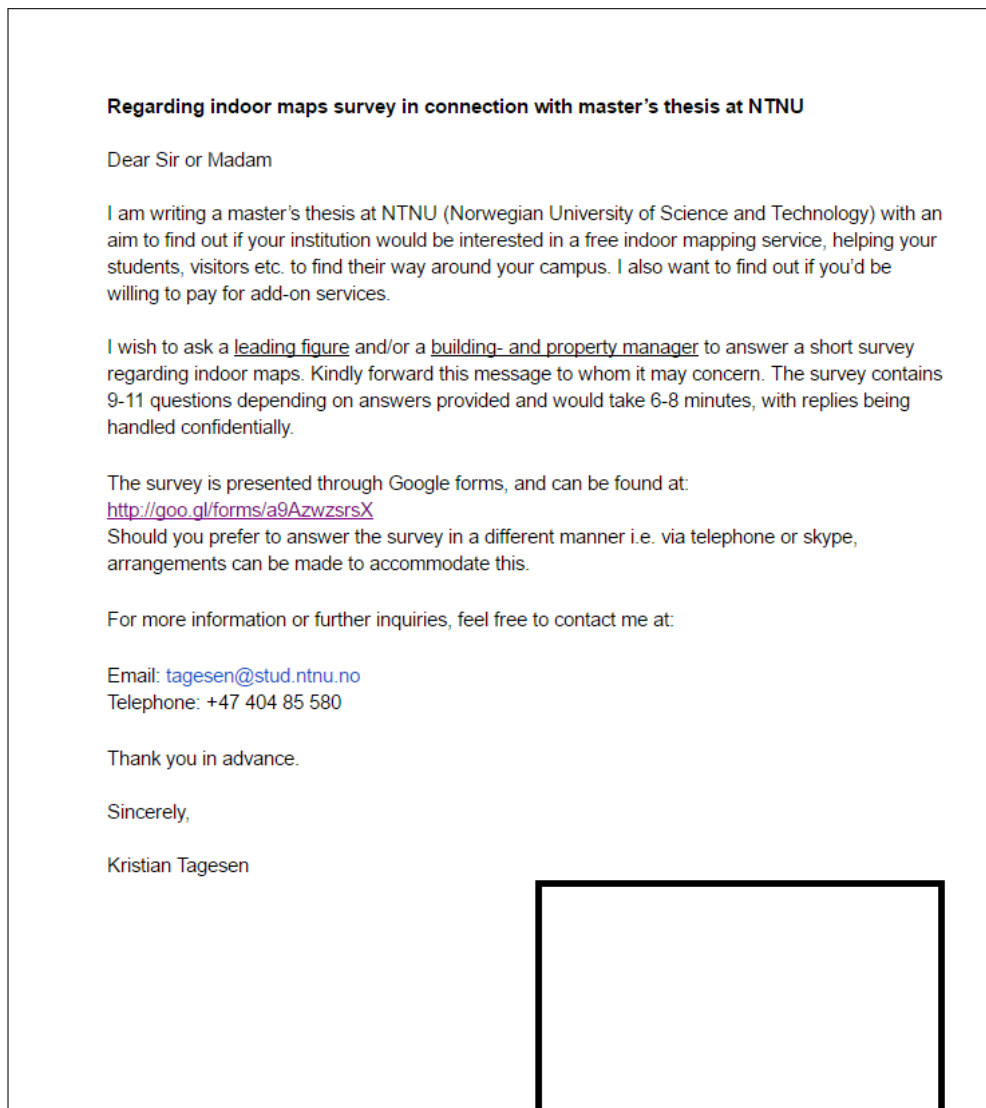


Figure A.1: Invitation letter. The black box is a redacted proof of NTNU enrollment by the author

Appendix B

International Research Survey Response Form

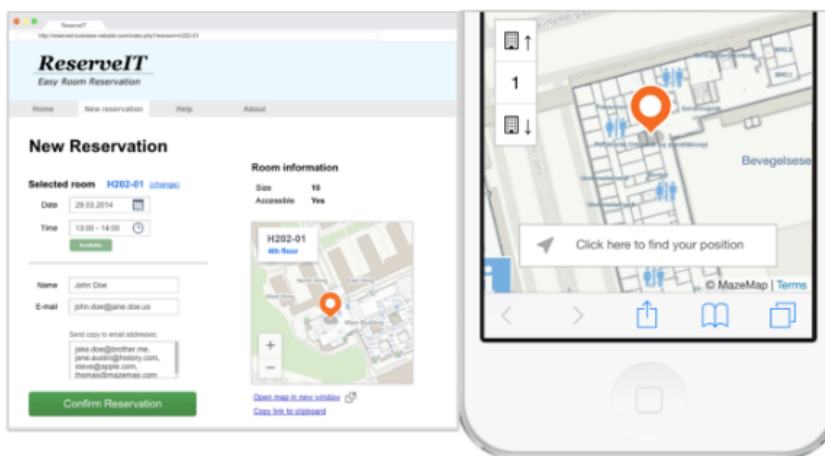
Market potential for free indoor mapping services - MSc Survey

This survey is a part of the master thesis "International potential for a free model in a B2B&C market" by Kristian Tagesen at the Norwegian University of Science and Technology (NTNU).

The questions mainly concern the viability of a free indoor mapping service, and which (if any) paid services that can potentially be beneficial to your institution.

All answers will be handled confidentially, and please don't hesitate to contact me about questions or comments regarding the survey (tagesen@stud.ntnu.no). Thank you for taking the time to contribute!

* Required



Please state your affiliation: *

If you want to hear more about the survey and results, you can also enter your e-mail address here.

Your answer

Are you currently using an indoor mapping service? *

☐ Yes

☐ No

Are you willing to consider using an indoor mapping service? *

☐ Yes

☐ No

If no, please state the reason as to why this is not desired: *

Your answer

Figure B.2: Screenshot of the international research survey response form, part 2

Interest

Given an indoor mapping service that will entail several benefits for your institution (see hint for examples), please rate the initial interest in such a service: *

For higher education institutions: Improve visitor experience by showing them where to go, how to get there and even where to park. Improve employee efficiency by showing new personnel i.e. cleaning personnel around campus without the need for a dedicated guide. Improve the experience for students by alleviating stress and uncertainty by showing students and staff alike to the correct location in time for class. Additionally, an indoor mapping enables service personnel to readily locate the place of interest as opposed to decoding a textual description.

	1	2	3	4	5	
Not interested at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Highly interested

How much of a concern would price be in procuring an indoor mapping service? *

	1	2	3	4	5	
Low concern	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	High concern

Figure B.3: Screenshot of the international research survey response form, part 3

Paid services

In this section, please rank the following services in terms of willingness to pay, where 1 indicates a low willingness to pay for the indicated service, and 5 indicates a high willingness to pay.

Navigation and indoor pathfinding *

While not a necessary component of an indoor mapping service, navigation and indoor path finding can help users find their desired location. A plethora of technologies exist for this purpose using existing Wi-Fi infrastructure, Bluetooth, beacons, smartphone sensors, magnetic positioning etc.

	1	2	3	4	5	
Low willingness to pay for this service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	High willingness to pay for this service

Timetable integration *

"Where", "how" and "when" are commonly asked questions when an appointment is due or a meeting is taking place. Timetable integration aims to answer the two former questions by providing an indoor map and which path to take to get there.

	1	2	3	4	5	
Low willingness to pay for this service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	High willingness to pay for this service

Integration with SMS, apps, IT-infrastructure etc. *

An API that integrates indoor maps with the existing services mentioned above, aims to enable seamlessly integrating indoor maps into already existing systems and services without the need to manually do so for every service.

	1	2	3	4	5	
Low willingness to pay for this service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	High willingness to pay for this service

Automatic updating of maps *

Larger establishments tend to change over time, and often see around 10% of buildings change annually. Manually updating indoor maps can therefore be a tedious and time-consuming activity.

	1	2	3	4	5	
Low willingness to pay for this service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	High willingness to pay for this service

Which factors would be of concern when procuring an indoor mapping service? *

☐ Price

☐ Demand

☐ Security Concerns

☐ Other: _____

Finally, anything you would like to add?

Your answer _____

SUBMIT

16% complete

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Figure B.5: Screenshot of the international research survey response form, part 5