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The Shift to Mobility in the BI Industry

A Study among Consultants and Vendors

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Abstract:
There is an ongoing shift to mobility in business IT, as well as in the consumer space. Users do not demand mobile availability anymore, they simply expect the ability to access business IT with consumer devices. Stemming from this demand, mobile business intelligence (BI) has emerged as a response from the BI industry. Thus, mobile BI is an extension of traditional BI into mobile devices. In line with this, the purpose of the thesis is to explore how the BI industry is approaching the shift to mobility and how this shift shapes mobile BI. Starting in the literature, we constructed a theoretical framework. This was then used for collecting data through interviews with a total of six vendors and consultants in the BI industry. We conclude that the BI industry has a reactive rather than proactive approach to the shift to mobility. BI consultants and vendors follow and adapt to consumer patterns and solutions in the consumer space. Likewise, mobile BI is being shaped by well-established, proven design and technological solutions in the consumer space.

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1 Introduction

In this chapter of the thesis, we will present a background for the field of inquiry. The background will lead to a problem area, which will define a research question, motivated by a purpose and an intended audience. We will also present the delimitations of this study, as well as definitions of commonly used words.

1.1 Background

There is a mobile revolution underway. The last year's explosive growth in mobile devices has fostered an IT-revolution in organizations (Harris et al., 2012). Trends like Bring Your Own Device (BYOD) and technologies like Cloud Computing are transforming the way organizations provide their employees with both IT hardware and software (Voas et al., 2012; Garrison et al., 2014). Additionally, ubiquitous computing through wearables and Internet of Things (IoT) may change the way we interact with technology (Atzori, 2010). The consumerization of IT could provide organizations with benefits, but also pose security risks and concerns (Niehaves et al., 2013; Harris et al., 2012). In 2011, 30% of the employees were already using their personal devices for work (Harris et al., 2012). IDC (2012) predicts that the mobile workforce will reach 1.3 billion employees in 2015, 30% of the total global workforce. Mobile analyst Benedict Evans (2014) argues that "mobile is eating the world". As a result, software industry leaders are enabling and arguing for a mobile-first strategy (e.g., Oracle, 2015; IBM, 2015; Microsoft, 2014). As Satya Nadella, CEO at Microsoft, explains:

> *Microsoft is absolutely focused on empowering people to get more done wherever they need to and on any device. (Microsoft, 2014)*

All of these developments and changes are what we refer to as *the shift to mobility*.

Meanwhile, Business Intelligence (BI) have also experienced explosive growth in the last decade (Chaudhuri et al., 2011), now accounting a $14.4 billion size industry (Gartner, 2014). BI and Analytics are organizations number one IT investment, and has been that for the last six years, as of the latest *SIM IT Key Issues and Trends Study* (Kappelman et al., 2014). According to the study, BI and analytics are both the most important technology and the largest IT investment for the surveyed organizations. The growth of BI has been fueled by declining costs of storing and acquiring large amounts of data, from both internal and external sources. BI can be explained as a collection of decision support technologies, aimed at enabling knowledge workers such as executives, managers and analysts to make better and faster decisions. (Chaudhuri et al., 2011). While the term BI is relatively new, it has its roots in computer-based decision support systems from the 1970's. The term BI was coined by an analyst at Gartner. (Watson and Wixom, 2007). As hardware and software matured over time, these systems grew more sophisticated in their computational and analytical capabilities. (Negash, 2004). What once existed as several different applications for decision support called executive information, online

analytical processing (OLAP) and predictive analysis, among others, are now unified under the term BI (Watson and Wixom, 2007). BI can be explained in the following way:

> *BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal and competitive information to planners and decision makers. (Negash, 2004, p.178)*

In line with the shift to mobility, decisions can and must be supported at any place, at any time. Mobility is necessary in a constantly evolving, dynamic business environment where stakeholder contact is a vital part of the organization's success. Mobile BI has been proposed as a new technology that could potentially disrupt the entire BI industry (Chen et al., 2012). Mobile BI is essentially an extension of traditional BI into mobile devices. Thus, it can be explained as BI applications on mobile devices such as smartphones and tablet computers (Tona & Carlsson, 2014). Nowadays, managers and operations personnel carry decision support tools with them. The success of sales interactions, purchases, and negotiations depends upon accessing information and decision support capabilities in real time. This fast-paced environment challenges managers to deploy data and applications to the computing cloud for easy access. (Power, 2013). To conclude, the growth of mobile BI is fueled by the shift to mobility. This leads us to our problem area.

1.2 Problem area

Tona and Carlsson (2014, p.23) argue that the growth of mobile BI has been fostered by both "… (1) the need to make decisions 'on the move' and (2) the generation of new mobile devices.". Likewise, Bargshady et al. (2014) explains how IT-workers not only rely on their desktop computers for professional duties anymore, but also want mobile access to corporate data. Power (2013) argues that the traditional approach of providing decision support within the restrictions of a predictable office environment is no longer workable.

Bernoff (2014) at Forrester research argues that a mobile mind shift has occurred. This shift is explained as: "I can get what I want, in context, in my moments of need." (Bernoff, 2014). Connecting this to the development of mobile BI, users expect information availability everywhere and it is up to developers to supply this. Thus, users do not demand availability on mobile devices anymore, they expect it.

At the same time, organizations are having trouble responding to this shift in user behavior and demand that comes with the shift to mobility (e.g. Blodget, 2010; Bernoff, 2014; Harris et al., 2012; Husson and Ask, 2014; Pitt et al., 2011). Harris et al. (2012, p.100) argue that "… employees grow frustrated when prohibited from using apps and devices at work that enhance their productivity at home.". Likewise, mobile devices could transform entire industries (Chen, Chiang and Storey, 2012) and function as a disruptive force for whole organizations (Rivera, 2014).

Mobile BI could be viewed as the response in the BI industry for the shift to mobility. However, research indicates that organizations have difficulties to measure and argue for benefits stemming from mobile BI implementation and usage (Tona and Carlsson, 2014). Furthermore, studies show that the user acceptance rate of mobile BI is fairly low, considering the rapid change of the traditional office space (Bargshady et al., 2014). Gartner has positioned mobile BI as

"sliding into the trough" in their hype cycle (Schlegel, 2014). This signifies that "Interest wanes as experiments and implementations fail to deliver." (Gartner, 2015A).

This thesis will treat mobile BI as empowered by the shift to mobility. Based on the opportunities and challenges proposed by the shift to mobility, it is important to study how BI consultants and vendors approach this shift. Consequently, it is also interesting and important to investigate how the shift to mobility shapes mobile BI.

1.2.1 Research Question

The problem area results in the following research questions:

(1) How do BI consultants and vendors approach the shift to mobility?

(2) How do the shift to mobility shape mobile BI?

1.3 Purpose

The purpose of this thesis is to study the effects of the shift to mobility in the BI industry. This will be done by examining how consultants and vendors approach this shift, as well as how the shift shapes mobile BI. Furthermore, this thesis aims to contribute with increased knowledge on how industries and organizations are approaching, and thus effected by, the ongoing shift to mobility. Therefore the thesis will strive to contribute with knowledge in the field of Information Systems concerning the effects of technological innovations and trends on established organizations. It will also aim to increase the knowledge in the emerging field of mobile BI.

1.4 Intended Audience

Stakeholders in the BI industry may benefit from increased knowledge concerning how external forces (i.e. the shift to mobility) affects their businesses. Consultants may gain increased understanding of the consumer-driven forces that affect its customers, and in the end affects BI. For vendors, this study may provide valuable knowledge on the perception of its services among consultants. The research community in the field of information systems may value the increased knowledge concerning mobile BI that will stem from this study.

1.5 Delimitations

This study will not examine the type of data, collection of data, and implementation of mobile BI. The study instead focuses on how BI consultants and vendors approach the ongoing shift to mobility, presumably through the development of mobile BI solutions. Moreover, the study will not focus upon customers of the vendors and consultants, and thus also not on deriving customer value from mobile BI. The physical delimitations of this study regarding mobile BI includes all tablets or smartphones that are capable of running mobile BI applications and that can be carried

and therefore become mobile. Furthermore, the study is delimited to organizations in Sweden and USA.

1.6 Definitions

BI consultant

An IT consultant can be seen as a bridge between suppliers (vendors) and enterprises (customers) (Bradshaw et al., 2012). BI-consultants are partners with the BI vendors within the industry. Our definition of the BI-consultants are those who work with tools developed and proposed by the BI vendors. They offer services such as, analyzing demands, defining problems, as well as proposing and implementing BI solutions.

BI vendor

The BI vendors in this thesis refer to the organizations in Gartner's Magic Quadrant (Gartner, 2015B). According to Gartner's IT Glossary (2012D) a vendor is:

> *... the last entity in the chain that brands a product and sells it directly to end users or through a channel. A vendor may design and manufacture its own products, assemble complete systems from components produced by others, or procure products from an original equipment or contract manufacturer.*

This thesis focus on BI vendors, which have the primary goal to manufacture BI systems and sell these directly to customers or through partner organizations, BI consultants.

Mobile BI

Short for Mobile Business Intelligence. This thesis will rely on the following definition, "Mobile BI enables the mobile workforce to attain knowledge by providing access to information assets anytime anywhere." (Tona and Carlsson, 2013, p.2). Thus, mobile BI is not seen as a replacement for traditional BI, but rather a complement. It could also be viewed as a sub-field of traditional BI (Tona and Carlsson, 2013). An in-depth explanation of mobile BI can be found in chapter 2.3.

Mobile Device

Our definition of mobile devices in this thesis is based upon literature regarding the shift to mobility as well as the IT consumerization. The identified units for the thesis are smartphones and tablets.

Smartphones

According to Gartner's IT Glossary (2012C),

> *A smartphone is a mobile communications device that uses an identifiable open OS. An open OS is supported by third-party applications written by a notable developer community… The OS must support a multitasking environment and user interface that can handle multiple applications simultaneously.*

Tablets

According to Gartner's IT Glossary (2012B),

> *A media tablet is a device based on a touchscreen display, typically multitouch, that facilitates content entry via an on-screen keyboard. The device has a screen with a diagonal dimension that is a minimum of five inches. Media tablets feature connectivity via Wi-Fi or via 3G/4G cellular networks. Tablets typically offer day-long battery life, and lengthy standby times with instant-on access from a suspended state.*

The Shift to mobility

We refer to the shift to mobility as the general increase of mobile devices and subsequent usage. In the context of this thesis, it takes shape through mobile strategies and mobile workforces, IT consumerization, cloud computing and ubiquitous computing. Chapter 2.1 explains the shift to mobility in detail.

2 Literature Review

In this part of the thesis, we will present the acquired knowledge that we will base our research on. The literature review will start with a description of the shift to mobility and its characteristics. Thereafter a short description of the BI industry will commence. The last part is an in-depth description of mobile BI. The results of the literature review will then be summarized in a framework, used later to structure our data collection and guide our choice of methodology.

2.1 The Shift to Mobility

There are currently almost 3 billion people online, of whom 2 billion possess a smartphone. This number is growing every day, and by 2020 it is estimated that 4 billion people will be online, with all of them possessing a smartphone. The connected part of the global population is thus increasing. However, this increase will not stem from PCs, but from mobile devices. (Evans, 2014). As Benedict Evans (2014), one of the leading mobile analysts, argues, "mobile is eating the world.". This part of the chapter will explain the shift to mobility.

In their highly influential 1995 article 'Disruptive Technologies: Catching the Wave', Bower and Christensen explains how leading organizations often fail to maintain their position in the industry as new technologies conquer and markets change. According to Bower and Christensen (1995), disruptive technologies often make way for entirely new markets and therefore they do not appear as a threat or an opportunity to leading organizations at first. To give an example, in the IT-industry, the former CEO of Microsoft, Steve Ballmer first dismissed the disruptive force of the iPhone as the product of the moment since it did not appeal to Microsoft's then main mobile customers, the business users (Blodget, 2010). However, the disruptive force of the iPhone instead created an entirely new market among non-business users of smartphones. As consumers caught on to this new disruptive technology, so did business users too. Since then, Microsoft has changed its CEO and its strategy, now focusing on "mobile-first, cloud first" (Microsoft, 2014). This new strategy means that Microsoft is going cross-platform with its software, offering its applications on all mobile OS's, not just on Windows (Endler, 2014).

Forrester Research (Husson and Ask, 2014) argues that the industry leaders will be organizations that embrace what they call the *mobile mind shift*. Simply put, the mobile mind shift is the notion that "I can get what I want, in context, in my moments of need." (Bernoff, 2014). Thus, consumers and customers don’t ask for mobile access anymore, they expect it to be there. According to Husson and Ask (2014), the industry laggards will be those that treat mobile as "just another channel". Chen, Chiang and Storey (2012) further develops this argument and explains that mobile devices with their complete ecosystems of downloadable content transforms whole industries as well as organizations. Likewise, Rivera (2014) at Gartner predicts that mobile devices, applications and the management of them will be a potential disruptive technology for whole organizations in the upcoming five years. Bharadwaj, El Sawy, Pavlou and Venkatraman (2013) argue for the development of a digital business strategy, stating that IT should not be viewed as an enabler of the business strategy, but rather the main driver of "… business value creation and capture." (Bharadwaj et al., 2013, p.480). Bharadwaj et al. (2013) mentions the utilization of the mobile web, applications and devices as one possible part of a digital business strategy.

Mobile Workforce

The traditional office space is changing as "…a growing share of work-related activities takes place outside of the office..." (Stieglitz and Brockmann, 2012, p.190). Sarker, Xiao, Sarker and Ahuja (2012, p.143) conclude that "… mobile technologies are profoundly affecting both how work gets done and how we live our lives.". The use of mobile devices cause the boundaries between work-life and personal-life to blur or disappear completely as the employee is always expected to be available (Sarker et al., 2012). Thus, research has shown that mobile technologies have a negative impact on work-life balance, which could affect workers "… health, physiological well-being, commitment and productivity." (Sarker et al., 2012, p.143). This is supported by Gajendran and Harris (2007), who argue that telecommuting, the process of working from outside of the office using IT equipment, also could possess negative effects, for instance harming co-worker relationships. Sarker et al. (2012) dismisses generic or universal strategies for addressing these concerns within organizations, instead arguing that managers must acknowledge that individuals have different perceptions of work-life balance. Individuals must hence be allowed to determine themselves the amount work can infringe on their lives (Sarker et al., 2012).

However, research has also shown positive effects of mobile workforces. Stieglitz and Brockmann (2012) argue that an organization can increase its performance by transforming into a mobile enterprise, an enterprise that "... provides access to enterprise systems via wireless mobile devices such as smartphones and tablets." (Stieglitz and Brockmann, 2012, p.190). Mobile IT can be leveraged in the following areas in order to improve organizational performance: ubiquitous data access, improved business processes and unified communication strategy. (Stieglitz and Brockmann, 2012). According to Stieglitz and Brockmann (2012), an organizations mobile IT assets are a combination of the organization's IT resources and the employees' private mobile IT resources. In a case study at Microsoft Netherlands, Heck, Baalen, Meulen and Oosterhout (2012) investigate how the introduction of *advanced mobile work technologies* has transformed the work processes. They conclude that the mobile technologies has "... created an anytime/anywhere workplace that has changed the traditional office culture..." (Heck et al., 2012, p.175). It is "... stimulating flexibility, improved employee productivity and work/life balance..." (Heck et al., 2012, p.175).

Stieglitz, Lattemann and Brockmann (2015) argue that it exists two different groups of users for mobile applications in organizations. These are knowledge workers and field works. The knowledge workers deal with "… unstructured, complex, contextual, unique, and less urgent tasks." (Stieglitz et al., 2015, p.5). In contrast, the field workers deal with "… simple-structured, reoccuring, urgent, hands-on, and coordinating tasks." (Stieglitz et al., 2015, p.5). Stieglitz et al. (2015) conclude that current standardized mobile applications cannot support the different needs of these two groups.

2.1.1 IT Consumerization

According to Gartner's IT Glossary (2012A), consumerization refers to:

> *... the specific impact that consumer-originated technologies can have on enterprises. It reflects how enterprises will be affected by, and can take advantage of,*

> *new technologies and models that originate and develop in the consumer space, rather than in the enterprise IT sector.*

The consumerization of IT is according to Harris et al., (2012) largely driven by employees, who perceive consumer software IT tools to be more useful and easier to use, and the devices to be more attractive. Harris et al. (2012) argues that the life cycle of consumer devices are far shorter than what IT departments are used to, and that this create implications for the organization in supporting these devices with software. According to Niehaves et al. (2013), the IT consumerization is changing the IT innovation in organizations from a top-down from the IT department to a bottom-up approach originating from employee demand. According to Andriole (2012), the past saw technology innovation occurring in organizations, with employees then drawing on their experiences from work when adopting technology at home. However, this has now changed,

> *Today, there's a reverse technology-adoption life cycle at work: employees bring experience with consumer technologies to the workplace and pressure their companies to adopt new technologies... (Andriole, 2012, p.51).*

Harris et al. (2012) argues that executives perceive IT consumerization as a potential risk since it "...raises concerns about data security, reliability and performance..." (Harris et al., 2012, p.100). This is supported by Voas et al. (2012, p.26), who notes that "...bring your own device (BYOD) make trust, security and privacy concerns even greater for mobile devices." Niehaves et al. (2013) also acknowledges the challenges associated with IT consumerization. The authors argue that it creates an increased workload, as the use of private devices for work blurs the difference between working hours and private life. While discussing how the adoption of new IT technologies in organizations is affected by what is *hot* and in *fashion*, Wang (2010, p.66) concludes that:

> *...an adopter's work processes are specifically tailored for a type of IT innovation (such as enterprise software) and are often difficult to apply to another type (such as consumer electronics).*

Thus, it could be argued that the consumerization of IT could be troublesome for organizations. Furthermore, organizations that adopt innovations motivated by *fashion* do this because of legitimacy and performance reasons, and experience increased legitimacy immediately, but only increased performance in the long term (Wang, 2010). However, an organization can also draw on benefits from IT consumerization. According to Harris et al. (2012), it can foster innovation by changing business processes, as well as increase employee satisfaction and productivity.

2.1.2 Cloud Computing

The increased popularity with using private devices for work also reflects on the Cloud Computing industry. Garrison, Kim, and Wakefield (2012, p.1) defines Cloud Computing (CC) as:

> *A model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (such as networks, servers, storage, applications, and services) that can be quickly provisioned and released with minimal management effort or service provider interaction.*

This results in organizations being able to lower their operational costs by purchasing on-demand technology resources (Garrison et al., 2012; Dhar, 2012; Rahimi et al., 2013). Computing

resources such as hardware and storage being outsourced also works as an incentive for mobile BI capitalizing the Cloud according to Rahimi et al., (2013). This technology allows for more flexible and highly scalable systems which provides businesses with a technology platform for operations. CC contributes with a pool of hardware, software, and networking infrastructure managed independently within an organization. (Rahimit et al., 2013). According to Dhar, (2012) there are some major advantages coming from CC such as getting out IT services faster to the on-demand market as well as reduced total costs of ownership through shared infrastructure.

However, Cloud Computing is not all about the advantages and flexibility. Grossman (2009) mentions how cloud services are often remote. This can lead to latency- and bandwidth-related issues. These problems are often associated with any remote application (Grossman, 2009). The issue about remoteness also affects different aspects such as security. Dhar (2012) speaks about how many CIOs are not comfortable with being aware that their data is located on servers in a different country. This way, letting third parties have access to your data can present security, compliance, and regulatory issues (Grossman, 2009). Besides security and privacy, there is a question about maturity and performance of the cloud services. Many of the cloud service suppliers may not be able to provide service 24 hours a day. A power outage could cause severe damage to the services and high availability is a major concern (Dhar, 2012). Also, several clients sharing same cloud service, may cause issues, mobilizing from the fact that multiple customers sharing the same service (Grossman, 2009).

Mobile Cloud Computing

Rahimi et al., (2013) emphasize how there is no single, widely accepted view of Mobile Cloud Computing (MCC) in the industry. One definition of MCC can according to Rahimi et al., (2013, p. 134) be a "...set of techniques that use cloud resources to empower mobile applications". The goal of this definition is to provide a better experience for mobile users who have a device with limited resources and capacities like storage and battery (Rahimi et al., 2013). Dinh, Lee, Niyato, and Wang (2011) has an alternative definition of MCC. They define it as a combination of mobile web and cloud computing.

Even though mobile devices are growing stronger and stronger as Power (2013) express it, they are not strong enough. Dinh et al., (2011) explains some advantages coming directly from the use of mobile devices. The battery lifetime is one of the biggest concerns regarding mobile devices. Several solutions have been proposed to improve CPU performance and to reduce power consumption (Dinh et al., 2011). Migrating the larger, complex computational processes to resources in the cloud, eliminates the application loading time. This results in lower power consumption (Dinh et al., 2011). A second incentive for organizations using MCC is the improved data storage and processing power. A well-known constraint for mobile devices are the data storage and process power which Dinh et al., (2011) explains. With the help of MCC the brute force could be applied through the cloud whilst the devices represent the interface (Dinh et al., 2011). Finally, since the data is stored on several computers the reliability of the cloud increases. The chance of data loss because of a malfunction on the mobile devices are limited (Dinh et al., (2011).

As previously mentioned, Dhar, (2012) and Grossman (2009) spoke about the band-with problems. Dinh et al., (2011) argues in line with this and speaks about availability and how important

it is in CC and particularly in MCC. Service availability is something important in mobile cloud computing and the authors argue that sometimes traffic congestion might cause network failure which is a potential disadvantage. Also, another challenge that mobile cloud computing is facing are security aspects. Dinh et al., (2011) discusses how mobile devices are exposed to numerous threats, like malicious codes. Installing secure software such as antivirus software does not always help, since the processing power of the mobile devices is so low (Dinh et al., 2011).

However, Power (2013) reflects in line with Rahimi et al., (2013) and argues that mobile devices continue to improve and expand capabilities. The author explains as the general computing environments evolve, more possibilities will become available to create more advanced decision support systems for mobile devices. Power (2013) also emphasizes how tablets are an important platform for delivering mobile BI. The newer generations of tablets all include excellent battery life, touch recognition and high-resolution display. The tablets also represent a new computing factor. Power (2013) argues that innovations in the computing factor have increased the entry for decision support in organizations. Thus, cloud-based mobile BI applications are becoming more and more common. (Power, 2013).

2.1.3 Ubiquitous Computing

Something that is tightly connected to Cloud Computing is Pervasive and Ubiquitous Computing (PUC). Choi, Park, and Jeong (2011) defines PUC as "existing everywhere". Furthermore the authors explain how PUC is growing towards embedding microprocessors in everyday objects so that they can exchange information all the time. The PUC devices rely on a combination of Internet, wireless technologies, and advanced electronics. In other words, PUC devices are fully connected and constantly available. (Choi et al., 2011).

When it comes to Ubiquitous Mobile Computing, Chen and Petrie (2003) say that there are some traditional views that has to be challenged. As, for example, mobility has to be built-in, and not added as some complementary module, to all communication infrastructures and computing devices. Second, it is no longer sufficient to deliver services only to the desktop, but rather create for mobile since users of mobile devices will expect and demand the same service for all connected devices through various forms of interaction. (Chen and Petrie, 2003). Finally, as Power (2013) previously mentioned, the capabilities of mobile devices continues to improve and Chen and Petrie, (2013) say that this will turn mobile devices from client devices to powerful mobile servers with unique local content and services.

However, technologically we are not there yet. Choi et al., (2011) argues that Ubiquitous Computing and Mobile cloud is a key driver. The authors say that data distribution is the key issue of mobility. The computing power of mobile devices are not that strong, this makes task distribution even more important since the existing mobile devices are not powerful enough to be the main computing platform. The Cloud grants a solution to the computational power problem. Consequently, the software modules that need more computation, run on the cloud. Whereas less resource demanding parts associated with user interface run on the mobile device. (Choi et al., 2011). There are additional challenges for ubiquitous mobile computing. Chen and Petrie, (2003) explain how application designers still face many challenges regarding the realization of the potential with ubiquitous mobile computing. First of all the challenges with content transcoding and how content should be converted and adapted for mobile devices. Secondly, authentication of users when they enter through different channels. Security and privacy is another

problem designers are facing according to Chen and Petrie (2003). Finally, performance and where but also when the bottlenecks occur in the architecture. (Chen and Petrie, 2003).

The basic concept of Internet of Things (IoT) revolves around pervasive presence and how devices such as tags, sensors, mobile phones, etc. - Connects to each other, interacts and cooperates to reach common goals (Atzori et al., 2010). Atzori et al. (2010) states that without hesitation, the main benefits of IoT will be the impact on aspects of everyday-life. Also, Atzori et al., (2010) explains how IoT will help with assisted living, e-learning and many other areas in the near future. However, this creates issues that need to be advised. One of the central challenges is making full interoperability of connected devices possible (Atzori et al., 2010). Also, provide these devices with a higher level of smartness be enabling them an autonomous behavior, while guaranteeing trust, privacy, and security. Furthermore, Atzori et al., (2010) explains how the idea of IoT exposes new problems concerning the networking aspects. The authors say the things composing IoT will be characterized by low resources in terms of both computation and energy capacity. Accordingly, the proposed solutions need to be resource efficient besides the obvious scalability (Atzori et al., 2010).

Along with IoT, wearables is one of the main buzzwords today, and are now starting to gain mainstream traction (Starner, 2014). The definition of this broad area of devices is disputed. Starner (2014, p. 10) defines it as "… any body-worn computer that is designed to provide useful services while the user is performing other tasks.". Gartner's IT Glossary defines it as "… designed to be worn on the body... to enable mobility and hands-free/eyes-free activities." (Gartner IT Glossary, 2012E). Examples of wearables available today includes smartwatches, fitness monitors and Heads-up displays such as google glass (Starner, 2014). However, according to Starner (2014) wearable technologies are facing challenges. These are mainly limited to the small footprint of devices, such as power limitations, heat problems and displays etc. The future for wearables look bright in any case. In Accordance to Moore's law (Alba, 2015) the physical challenges and limitations will be addressed in the coming years as technology evolves. Thus, Gartner (2015D) predicts that sales of wearables will experience strong growth, reaching 514 million sold units in 2020. Worth nothing is that these devices will not be a replacement for the smartphone, but rather a complement (Gartner, 2015D).

2.2 Business Intelligence Industry

As previously mentioned, the term Business Intelligence was coined by an analyst at Gartner Group (Watson and Wixom, 2007). Back then, BI was a collective name for a group of techniques to organize the ever-increasing data (Isik et al., 2007). Different sources have defined BI in different ways. Some define it broadly as a holistic and sophisticated approach to cross-organizational decision support whilst others approach it from a technical point of view (Isik et al., 2007). What most of the researchers seem to agree with is the amount of resources BI demands. The cost of hardware, software, and staff to run a distributed decision support platform is significant (Watson and Wixom, 2007). The BI environment also includes technical as well as business aspects, which affect the way BI-systems, are used and perceived.

2.2.1 Business Value

Studies have shown how investments in the IT sector have had an impact on organizational characteristics and outcomes (e.g. Popovic, Turk and Jaklic, 2010). Organizations who lack relevant information has a hard time understanding the external and internal forces who drives the business, together with measuring and improving their performance (Popovic et al., 2010). BI-systems are the preferred investment for these companies, since it returns value to the business (Popovic et al., 2010).

The business value of BI can be defined in different ways. Williams and Williams (2003) explain how the value of BI can be seen as a matter of determining how an organization can use BI to improve management processes and operational processes. The improving of management processes includes planning, controlling, measuring - so that management can increase revenue, reduce costs, or both. BI also improves operational processes in the organization. The affected areas are such as fraud detection and sales campaigns. (Williams and Williams, 2003).

However, applying BI takes resources. Even though the value can be measured, the purpose of the BI-system together with the knowledge about the implementation creates questions that have to be answered. Organizations that implement BI have to ask themselves whether it is worth the investment and if the BI product satisfies the end users (Popovic et al., 2010). The usage of BI also increases the efficiency rate for operational personnel who interact directly with external stakeholders who benefit from better real-time analytical and business intelligence support (Power, 2013). Whilst it seems that the costs of implementing BI-systems are significantly high, there is still incentives for organizations to implement BI since the rewards overcomes the risks and costs in the long run. The term BI encapsulates an industry without any further specific definitions. However the industry consists of different stakeholders, which will be described in the next segment.

2.2.2 Stakeholders

Vendors

According to Gartner's IT Glossary (2012D) a vendor is,

> *... the last entity in the chain that brands a product and sells it directly to end users or through a channel. A vendor may design and manufacture its own products, assemble complete systems from components produced by others, or procure products from an original equipment or contract manufacturer.*

BI vendors are thus the developers or manufacturers of BI software and systems. Many BI vendors sell their products through consultant organizations. Figure 2.1 pictures Gartner's Magic Quadrant, which illustrate the different major vendors in the BI industry and how they compete with each other. There are challengers, leaders, niche players and visionaries (Schlegel, 2014).

Figure 2.1: Gartner Magic Quadrant of BI and analytics competitors (Gartner, 2015B)

Consultants

Bradshaw, Cragg, and Pulakanam (2012) discuss the IS consultants role within organizations. The authors explain how some firms may engage consultants for their expertise and knowledge since it may be missing in their organization. The hiring of external resources can also result in knowledge transfer to the internal employees. Bradshaw et al., (2012) also adds how the IS consultants act as a bridge between IS suppliers and enterprises. Bradshaw et al., (2012) continues to explain how consultants provide services such as advice to assist with software, implementation and customization, training and support as well as integration against existing systems.

Kubr (2002) assists with a different approach upon consultants. The author argues that there are two different views on consultants within organizations. The first perspective accounts consulting services quite broadly. Its definition of consultants is whoever that tries to improve or change a situation without being responsible for the final result. This definition puts the consultant in a helping or enabling role. Per se, anyone can be a consultant, according to Kubr (2002) and this definition. The second approach views consultancy as a professional service and identifies certain characteristics that a service must possess (Kubr, 2002). Steaming from this view, consultants are hired by organizations to identify problems, analyze the problems, recommend solutions to the problems, as well as help and assist when implementing the solutions. These two views complement each other rather than conflict (Kubr, 2002).

2.3 Mobile Business Intelligence

Chen et al. (2012) visions mobile BI as part of what they refer to as Business Intelligence and Analytics (BI&A) 3.0. Preceding BI&A 3.0 is BI&A 2.0, which deals with analyzing and collecting unstructured web content. According to Chen et al. (2012), BI&A 3.0 will extend upon these capabilities by allowing the collection and analyze of mobility and sensor-based data. However, one part of BI&A 3.0 is also to provide access to BI systems on mobile devices, which is what this thesis refers to as mobile BI.

Tona and Carlsson (2013, p.8) conclude that "...mobile BI is a complimentary rather than a substitute to traditional BI.". Additionally, they state that the main purpose of mobile BI is to be used 'on the road' (Tona and Carlsson, 2013). Furthermore, mobile BI enables a mobile workforce to utilize handheld devices and gain access to real time analytics reports whenever and wherever they are (Popovic et al., 2010). Mobile BI adds additional capabilities to the already existing ones on desktops and laptops such as location awareness, tracking of data, and video (Popovic et al., 2010; Power, 2013; Chen et al., 2012). BI applications are becoming more common and there are more and more cloud-based, mobile BI applications (Power, 2013).

The future of BI is the innovative use of mobile devices and their respective techniques such as location-awareness, visualizations, and analytics (Chen et al., 2012). Currently, mobile computing has created means for IT professionals to build applications. Android and Apple have managed to attract a majority of the developers and according to Chen et al., (2012) this creates, an opportunity for mobile analytics to grow. The ability to collect location-specific, context-aware, highly personalized data through the mobile devices has created new possibilities for advanced and innovative BI opportunities (Chen et al., 2012).

We have identified four different areas where the impact of the shift to mobility on BI can be identified. These are the technical infrastructure, design, security and devices. We will now discuss these area one by one and argue for the implications and opportunities within each area.

2.3.1 Technical Infrastructure

A technical Business Intelligence solution consists of different layers with each one having a specific object. The data over which BI tasks are performed often comes from different sources (Chaudhuri et al., 2011). Most often from multiple databases from across different departments within the organization as well as external operators (Chaudhuri et al., 2011).

The fact that the data comes from multiple data sources of varying quality, inconsistent representations, codes, and formats which have to be standardized, represents a challenging task (Chaudhuri et al., 2011). Watson and Wixom (2007) mention how the most challenging part is to integrate data and how it requires 80 percent of the time, effort and generates more than 50 percent of the unexpected project costs. The unexpected costs stems from multiple causes, such as poor quality in the source systems, politics around data ownership, and legacy technology (Watson and Wixom, 2007).

Efficient data loading is important for BI. The different BI tasks usually need to be performed incrementally at the same time as new data arrive. This puts efficiency and scalability as a high priority when it comes to data loading for enterprise BI (Chaudhuri et al., 2011). The back-end technologies for preparing the data for efficient BI usage is called Extract-Transform-Load

(ETL) tools. After the first step, data is loaded into a repository called data warehouse (DW) (Chaudhuri et al., 2011). The DW extracts data from the source systems and transforms it so that is it meaningful for decision support (Watson and Wixom, 2007).

For example, information about a certain customer could be included in several systems. With the help of DW and customer identification number the user could extract all information about that one customer (Watson and Wixom, 2007). Data warehouses servers are complemented with mid-tier servers that provide specialized functionality for all possible BI scenarios (Chaudhuri et al., 2011). These could be online analytic processing (OLAP) servers, which are able to perform common BI operations such as filtering, and drill-down. Data mining engines provide in-depth analysis of data that goes well beyond OLAP and it also helps to build predictive models to help answer questions. This results in front-end applications, which process this information, and presents it to the user. It could be web analytics, which is based on analyzing visitors to a company's website or customer relationship management (CRM) applications with built-in analytics. (Chaudhuri et al., 2011).

As Tona and Carlsson (2013) concluded earlier, mobile BI can be seen as an extension of traditional BI. Thus, it relies on the same technical infrastructure as traditional BI. However, it also extends the infrastructure since it moves BI online in order to become mobile. Turnali (2015) at SAP argues that the introduction of mobile BI affects the organizations general IT infrastructure. Mobile BI is also closely related to Cloud Computing. Power (2013) describes how Cloud Computing makes mobile decision support more powerful and practical. The traditional technical infrastructure for BI relocates to the cloud. Power (2013) discusses how the constraints proposed with hardware and desktop computers when it comes to traditional BI, does not exist with Mobile Cloud Computing.

Mobile BI embraces cloud computing, which means sensitive data leaves the physical surroundings of the building. This requires Mobile Device Management (MDM) systems (Turnali, 2015; Verkooij and Spruit, 2013). An MDM solution consists of a server who can send messages and commands to a mobile device, or to a client running on a handheld device, which implements the command (Braunstein, 2012). In newer versions the server solution for MDM can be hosted through cloud services which can be provided by vendors. As Dhar (2012) mentioned, many CIOs are not comfortable with data being located on servers which the organization does not own. However, using MDM solutions in an enterprise would centralize monitoring and security. Braunstein (2012) explains how lost mobile devices can be remotely wiped from the MDM system, ensuring the security. These systems enable the organization to distribute software as well as manage inventory, security and service of its mobile devices (Gartner, 2015C). The Consumerization of IT and BYOD, (chapter 2.1.1) creates further needs for MDM software (Turnali, 2015).

2.3.2 Design

Chen et al. (2012) identifies "mobile visualization and HCI" as one of the most important parts of what they refer to as BI&A 3.0. Mayer and Weitzel (2012) also emphasize the importance of the design of mobile BI applications. In Verkooij and Spruit's (2013) Mobile Business Intelligence Implementation (MOBII) Framework, the design of application interfaces is referred to as information delivery. They conclude that the absence of a mouse inhibits the user from accurately scrolling and selecting objects. Dashboards also needs to be redesigned for the small screen real estate, which is easier done if the different objects function individually than if they

are interconnected. (Verkooij and Spruit, 2013). The smaller screen real estate does not allow multiple or even two graphs to be looked at simultaneously, hence, Verkooij and Spruit (2013) argue that the main focus of mobile BI applications is to design it in an "...visually attractive manner" (p.26). As devices become ubiquitous and pervasive (chapter 2.1.3) in the form of wearables, the design of mobile BI applications will become even more challenging. However, the area of ubiquitous computing is still an unexplored area for mobile BI but a possible future opportunity.

Trif and Visoiu, (2011) exemplifies on Windows phone and explains how mobile BI applications can take several forms: (1) Standalone applications which run entirely on the mobile device without any connections to an external entity for their own functionality. These applications offer mobility and freedom for the user, and information security since they do not need any network access. A negative aspect of this structure is the lack of processing power a PC could offer. These applications fit for smaller problems, according to the authors. (2) Network applications which have partly distributed components. Some of them maintain themselves on the mobile device whilst some are on external systems. A network connection allows this structure to communicate with servers and therefore solve medium complex problems. This solution requires network access. (3) Web applications which only render a GUI on the mobile device while the processing power is located on an external server. These applications are purely dependent of a network access and they often solve highly complex problems. (Trif and Visoiu, 2011)

Responsive design has been developed as a way to decrease the burden in turning desktop size interfaces into mobile ones, particularly for web applications (Marcotte, 2011). Instead of providing different web site designs for an endless number of devices with different screen real estate, the design can adapt itself to the device. By detecting the screen real estate the objects on the web site can adjust responsively to fit the device screen. (Marcotte, 2011). In the light of IT Consumerization (chapter 2.1.1), responsive design could be an effective way to provide interfaces for the unidentified and unexpected type of devices.

As an example, Muñoz (2014) explains how Qlik has implemented responsive web design in their BI web application Qlik Sense. The web application automatically adjusts the content depending on the device screen real estate. This involves removing certain objects and information that does not fit. However, the actual visualization objects are not changed, only their size and details. (Muñoz, 2014).

Mayer and Weitzel (2012) have developed guidelines for designing mobile interfaces for end-users:

- Executives want the most important messages at a glance with an alternative "read more" function.
- The smaller end-user devices are, the more graphs and portfolios are preferred, instead of tables, text and numbers.
- Bar charts are the most important type of graphs.
- The smaller end-user devices are, the more important high-contrast becomes.
- The smaller the devices, the fewer steps are accepted by the users
- Analysts prefer a more interactive navigation, while consumers prefer the predefined flow of charts.
- Advanced navigation matter more for analysts than it does for consumers.

- The smaller the end-user devices are, the more a predefined display becomes preferred.

According to Tona and Carlsson (2013), mobile BI is mostly targeted at consuming, not creating content. As they explain, "...most of the authoring still happens in the traditional way via the PC, not in the mobile environment" (Tona and Carlsson, 2013, p.7).

2.3.3 Security

Airinei and Homocianu (2010) express their concerns regarding security issues of mobile BI. They argue that it is difficult to maintain, backup and restore a mobile OS. In addition, the wireless networks are easy to intrude from outside. Verkooij and Spruit (2013, p. 27) argue that "… information security is the biggest risk in mobile BI projects.". Chen et al. (2012) follows in the same footsteps, arguing that information security is a major concern for most organizations. Trif and Visoiu (2011) explains that there exists several different mobile platforms such as Android, Apple and Windows phones, on which mobile applications (i.e. mobile BI) run. Each of these platforms possesses their own security characteristics, functionalities and specific APIs, so every platform can have their own secure applications.

With the network dependency organizations must find a way to secure sensitive information. When individuals use mobile BI applications they have access to information within the organization. This results in major privacy concerns, according to Screen at Oracle (2014). Allowing a corporation's critical, analytical data to exit the premises of the organization via mobile devices raises more questions (Screen, 2014; Harris et al., 2012). If that is the case, Trif and Visoiu, (2011) state that security becomes an important aspect that has to be considered.

The incorporation of cloud computing as BI becomes mobile creates further complications. However, concerns regarding physical security, such as lost and stolen mobile devices can be addressed by the use of MDM systems (Verkooij and Spruit, 2013) for tracking, erasing and locking the devices. Furthermore, Verkooij and Spruit (2013) argue that the best way to address security concerns is to cache as little information on the device itself as possible, and instead access the data from secure servers. There must also be security protocols and awareness among the mobile BI users (Verkooij and Spruit, 2013). IT consumerization and BYOD brings even further complications to the area of security. As Voas et al., (2012) stated, BYOD make trust and security issues even greater. The different types of devices and operating systems may possess different levels of security. As the user also utilizes his or her device personally, the likelihood of malware may increase.

2.3.4 Devices

As explained earlier, we regard smartphones and tablets as the mobile devices, enabling mobile BI, with wearables being a future opportunity. Airnei and Homocianu (2010) express concerns regarding the technical features of mobile devices, namely smartphones. They identify the bottlenecks as the small screens, low memory and storage capabilities, as well as restricted processing power. However, in accordance with Moore's Law, the technical capabilities of mobile devices will increase, as costs decrease (Alba, 2015). Despite this, the restricted screen sizes of smartphones will remain a problem. Pitt, Berhton and Robson (2011) argue that the tablets are the perfect middle ground between smartphones and laptops. As they explain, tablets have higher configure, consume and context-abilities when compared to laptops and smartphones.

Furthermore, Pitt et al. (2011) concludes that it is the ability to consume information that separates smartphones and tablets, with the latter being better for the task. The consummation is described as "… the ease with which the user can consume or interact with information" (Pitt et al., 2011, p.137).

Airnei and Homocianu (2010) acknowledge, in accordance with the IT consumerization, how the plethora of devices, operating systems and web browsers add complexity to mobile BI. With the arrival of ubiquitous wearable devices, the number of devices will increase, as well as the complexity of supporting these devices. Mobile devices (i.e. Tablets and smartphones) possess contextual capabilities as their location aware through technologies like GPS (Pitt et al., 2011). These capabilities can then be used in applications, for instance a mobile BI application, to contextualize the information. For example, a map in the BI application could be rendered to only show the city or area in which the user currently resides. This is also emphasized by Verkooij and Spruit (2013), who claims that location awareness can be used to make the content displayed more relevant.

2.4 Summary and Theoretical Framework

To conclude, the mobile workforce in organizations is increasing as the organizations incorporate and leverage mobile devices in their business processes. The idea of office hours anytime/anywhere contributes to the mobile workforce. The IT consumerization and BYOD is a big driver behind organizations shift to mobility. However, it possesses concerns for IT departments to support the devices with software, as well as information security. A main enabler behind the shift to mobility is cloud computing, which itself inherits both strengths and weaknesses. Security remains a big concern, but the potential benefits of mobility are staggering. When it comes to PUC, the mobile devices grow stronger and stronger. At the same time mobile devices are growing in popularity and usage, which affects organizations that has to adapt. Areas of possibility for wearables and IoT still remain wide open with the challenges right behind.

The shift to mobility extends the traditional BI technical infrastructure by adding the need for MDM systems, online access and possibly cloud computing capabilities. BI applications become restricted by the limited screen real estate which increases the burdens in designing the objects for visualizing data. However, responsive (web) design is one solution for designing mobile interfaces more easily. As BI goes mobile, security has been proposed as the main concern. There are risks involved with sensitive data leaving the organization, and the possible theft and loss of mobile devices. The location awareness capabilities of mobile devices create new opportunities for the visualization of data. In accordance with Moore's Law, the technical capabilities of devices will improve and costs will decrease, further accelerating the shift to mobility.

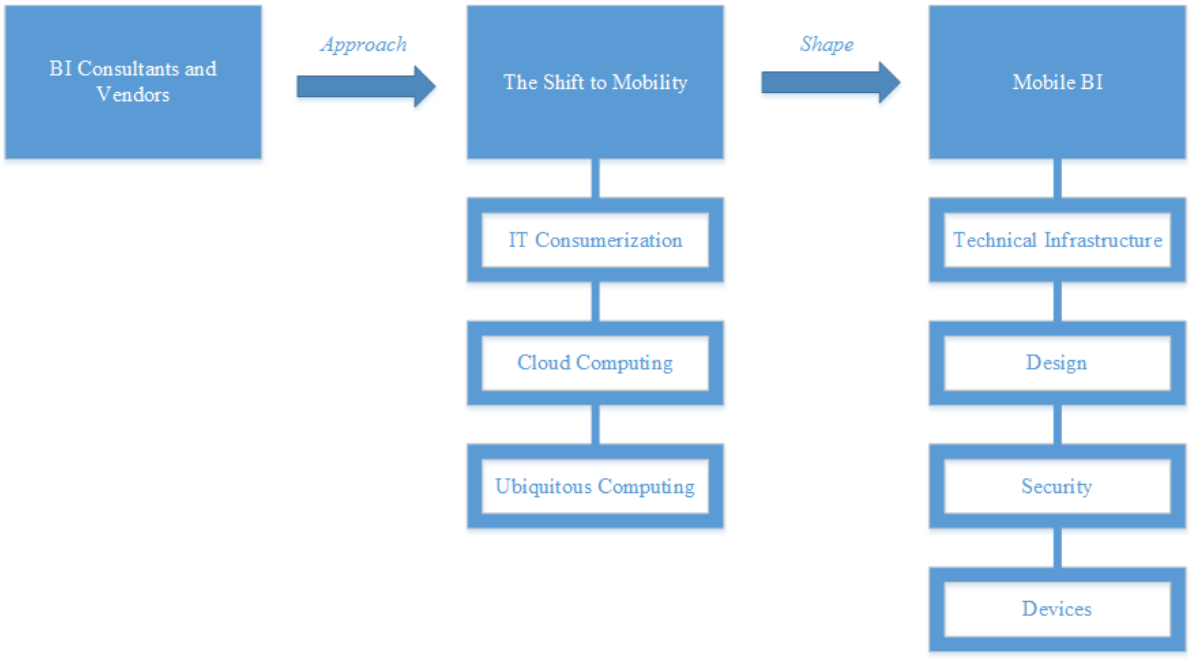

Figure 2.2: Theoretical framework

Figure 2.2 pictures our theoretical framework. This will serve as a basis for the remaining parts of this study. The framework illuminates our overlying themes (the shift to mobility and mobile BI) and their respective sub-themes, as well as indicating how these relate to the two research questions. In short, BI consultant and vendors approach the shift to mobility, which in turn shapes mobile BI. The framework will be utilized both in order to construct questions as well as structure the interview guide. Also, it will be employed as a frame for presenting our empirical findings. Furthermore, it will function as a lens through which we will analyze and discuss our findings.

As explained more profoundly in chapter 3.2.4, we utilized a pilot interview in our construction of the framework. Thus, the framework was a result of iteration between literature studies and field research. However, most of the themes and factors were identified through the literature studies. These were then assured and verified through the input we obtained from the field research (i.e. the pilot interview). Table 2.1 pictures our theoretical framework in detail. It consists of themes and their respective authors.

Table 2.1: Detailed theoretical framework describing the connections between themes and authors.

Theme	**Authors**
The Shift to mobility	Evans (2014). Bower and Christensen (1995). Blodget (2010). Microsoft (2014). Endler (2014). Husson and Ask (2014). Bernoff (2014). Chen et al. (2012). Rivera (2014). Bharadwaj et al., (2013). Sarker et al (2012). Stieglitz et al (2015). Stieglitz and Brockmann (2012). Heck et al. (2012). Gajendran and Harris (2007).
IT Consumerization	Gartner's IT Glossary (2012A). Harris et al. (2012). Niehayes et al. (2013). Andriole (2012). Voas et al. (2012). Wang (2010).

Cloud Computing	Garrison et al. (2012). Dhar (2012). Rahimi et al. (2013). Grossman (2009). Dinh et al (2011). Power (2013).
Ubiquitous Computing	Choi et al. (2011). Chen and Petrie (2003). Power (2013). Atzori et al., (2010). Starner (2014). Gartner's IT Glossary (2012E). Alba (2015). Gartner (2015D)
Mobile Business Intelligence	Chen et al. (2012). Tona and Carlsson (2013). Popovic et al. (2010). Power (2013).
Technical Infrastruc-ture	Chaudhuri et al. (2011), Watson and Wixom (2007). Turnali (2015). Verkooij and Spruit (2013). Gartner (2015C). Braunstein (2012). Dhar (2012).
Design	Chen et al. (2012). Mayer and Weitzel (2012). Verkooij and Spruit (2013). Trif and Visoiu (2011). Marcotte (2011). Muñoz (2014). Tona and Carlsson (2013).
Security	Airinei and Homocianu (2010). Verkooij and Spruit (2013). Trif and Visoiu (2011). Screen (2014). Voas et al. (2012).
Devices	Airnei and Homocianu (2010). Alba (2015). Pitt et al. (2011). Verkooij and Spruit (2013).

3 Methodology

This part of the thesis will explain our methodology, how we carried out our research process. It will provide information on the methods of choice, arguments for them, as well as limitations of the study.

3.1 Qualitative Method

Our thesis aims to explain how BI consultants and vendors approach the shift to mobility currently occurring and how this shift shapes mobile BI. Thus, finding and deciding upon the appropriate research method was based upon our subject of data collection as well as the study's purpose. We aimed at collecting data from BI consultants who had been in contact or involved in projects, which included mobile BI, as well as BI vendors that develops mobile BI. According to Bhattacherjee (2012) exploratory research is often conducted in new areas of inquiry. The purpose of exploratory research is (1) to scope the extent of a certain phenomenon, (2) to generate some initial ideas, or (3) to investigate the applicability of a solution or to generate a more thorough study regarding the phenomenon (Bhattacherjee, 2012). Our research questions are:

(1) How do BI consultants and vendors approach the shift to mobility?

(2) How do the shift to mobility shape mobile BI?

We therefore concluded that our research is exploratory in nature, (1) since it seek to scope how BI consultants and vendors the shift as well as how this shapes mobile BI, and (2) since the research area is fairly unexplored. A research question starting with a "how" statement could indicate the study is explanatory in nature (Recker, 2013; Bhattacherjee, 2012). However, the aim of the study is rather to scope the effects of the shift to mobility. Thus exploring the field of inquiry rather than aiming to fully explain it. Recker (2013, p.88) suggests that qualitative methods "… are well suited for exploratory research where a phenomenon is not yet fully understood, not well researched, or still emerging. ". Hence, we choose a qualitative method as our research strategy.

3.2 Data collection

As we concluded earlier, we choose a qualitative method as a basis for the data collection. Recker (2013, p.90) explains that "The most prominent form is certainly interviewing...". Bhattacherjee (2012) also argues that interviews are the highlighted form of collecting data for qualitative and exploratory research. Consequently, we decided upon interviews as the tool for data gathering. Furthermore, qualitative interviews provide access to the respondents' subjective experience as well as intimate aspects of their life (Kvale and Brinkmann, 2005). As our research is exploratory in nature, we wanted to obtain access to the respondents' thoughts and experiences concerning the field of inquiry. Interviews also have the advantage of being insightful (Recker, 2013), thus we concluded that this collection technique served our purpose well.

3.2.1 Collection Techniques

There are various types of interview techniques. We chose to conduct semi-structured interviews. Ideally, we would have conducted face-to-face interviews with all of the respondents. As Bhattacherjee (2012) argues, interviews unlike mail surveys are more personal, and the interviewer can clarify any issues raised by the respondent as well as observe non-spoken body languages or gestures. However, due to time limitations and different locations of the respondents, we decided to also use Skype video-conference calls, as well as regular telephone interviews. Additionally, we did a thorough investigation of each company so that we would be prepared to suggest a location and time for the respondents since they had busy schedules. The question of busy schedules and geographical differences is something interviewers have to take into consideration (Bhattacherjee, 2012). Also, motivating the respondents so that they feel comfortable and enthusiastic is something important (Bhattacherjee, 2012). We agreed that one of us would always keep eye contact and show interest with the respondents, whereas the other one would act like the interview leader and ask questions. When we conducted telephone interviews we tried to express our interest by asking follow-up questions and confirming the interviewee's answers, thus aiming at motivating them.

Myers and Newman (2007) explain how most of the qualitative research uses semi-structured interviews with an incomplete script. Thus, we wrote the questions beforehand but were not strictly attached to them. This allowed us to leave room for improvisation (Brinkmann and Kvale, 2005). However, semi-structured interviews still require a certain level of processing. We prepared through working on the questions under several days. We started each day with reading through them and asking each other, in compliance with Bhattacherjee (2012), so that we could be prepared for multiple different answers to each question.

We also wrote an introductionary text where we introduced ourselves, just as Myers and Newman (2007) suggests. We continued with briefly explaining our purpose with the interview. Furthermore, we prepared a closing text for the interviews where we informed the respondents that we would reconnect and ask for their permission and approval of the transcribed manuscript. Moreover, our approach was semi-structured which is less intrusive to those being interviewed since it encourages two-way communication (Recker, 2013). The semi-structured interviews also confirm what has already been said (Recker, 2013). This allowed us to ask questions where the starting point was from the literature. A lot of our questions were open-ended and focusing on the respondents' individual opinion. Therefore, choosing semi-structured interviews were beneficial in this case. Individual interviews are also a better forum for discussing sensitive matters since the respondents' feel more relaxed (Recker, 2013. However, in one of the cases we were unintentionally ended up with an interview with two interviewees at the same time.

3.2.2 Thematizing of Study

The theoretical framework (figure 2.2) served as a basis for developing the interview guide. Thus, the themes in the theoretical framework were used to construct questions and structure the interview guide. Table 3.1 pictures the themes in the literature review and how the questions in the pilot interview and the main interview are connected to each theme. As the table shows, the interviews started with investigating the shift to mobility and its sub-themes and thereafter we investigated mobile BI and its sub-themes. Table 3.2 pictures the interview guide with each question and corresponding motivation.

Table 3.1: The questions related to our literature framework's themes.

Theme	**Pilot Interview Question**	**Interview Question**
The Shift to mobility	Q5, Q6	Q4, Q5
IT Consumerization	Q4	Q6
Cloud Computing	-	Q7
Ubiquitous Computing	Q7	Q8
Mobile BI	Q8, Q9, Q10, Q11, Q12 Q15, Q16, Q17, Q18	Q9, Q10, Q11, Q16 Q17, Q18, Q19
Technical Infrastructure	Q15	Q14
Design	Q14	Q13
Security	Q13	Q12
Devices	Q14	Q15

Table 3.2: Interview guide and motivation for each question

Introductionary Questions	
Q1:	Could you explain your professional background and your current role?
Purpose:	*To put the interviewees' answers in context of their background and experience, as this may have affected their answers.*
Q2:	Could you briefly describe your organization?
Purpose:	*To put the interviewees' answers in context to their organizations overall business and goals.*
Q3:	One definition of Business Intelligence is: "*BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal and competitive information to planners and decision makers."* Do you think something is missing from this definition? If so, how would you describe BI?
Purpose:	*To determine if the interviewees' perception and definition of BI was the same as ours.*

Main Questions	
The Shift to mobility	
Q4:	What is your overall organizational strategy surrounding BI? • Could it be proposed as a mobile-first strategy or a more desktop-oriented strategy?
Purpose:	*According to the literature strategies prioritizing mobile has increased in importance. This question refers to the interview object and their subjective view on the issue.*
Q5:	Does your mobile BI solutions steam from customer demand to become mobile, or does your solutions advise the customers to become mobile? Explain.
Purpose:	*To investigate if, and how the mobile workforce and strategy is affecting the vendors and consultants. Furthermore, is it the customers or the vendors/consultants that are drivers for the shift to mobility? This question aimed to understand the main drivers in the BI industry.*
Q6:	How has Bring Your Own Device and the general consumerization of business IT affected the BI solutions you develop?
Purpose:	*Determine how the BI vendors and consultants approach the consumerization of IT while developing BI solutions.*
Q7:	Could you describe the relationship between Cloud Computing and the mobile BI solutions you develop?
Purpose:	*To investigate and understand whether, and how cloud computing is related to BI.*
Q8:	Computers are becoming more ubiquitous and pervasive, for example IoT and wearables. Do you see any opportunities for BI within these areas?
Purpose:	*Ubiquitous computing is part of the shift towards mobility. The aim of this question is to examine whether ubiquitous computing is or could become a part of mobile BI.*
Mobile BI	
Q9:	We have asked about traditional BI and its definition. How would you define mobile BI?
Purpose:	*To determine whether the interviewees' definition of mobile BI was the same as ours. It is important to analyze the interviewees' answers in the context of what they perceive mobile BI to be, and not just our view of it.*
Q10:	What were the main drivers for your organization to enter the mobile BI market?
Purpose:	*To understand the organizations' potential and perceived benefits of entering the mobile BI market.*
Q11:	What is your customers main requests or demands when it comes to mobile BI?
Purpose:	*Investigate customer and demand-side of the business, what is driving customers to adopt mobile BI.*
Q12:	From a security point-of-view, what are the considerations when developing mobile BI solutions?

Purpose:	*To gather insight about what aspects, guidelines and that must be considered from a security point-of-view when developing mobile BI. The question has used the keyword "considerations" so that the respondent can argue for both positive as well as negative aspects.*
Q13:	From a design point-of-view, what are the considerations when developing mobile BI solutions?
Purpose:	*To gather insight about what guidelines and other aspects the interviewee thinks design should follow. The question has used the keyword "considerations" so that the respondent can argue for both positive as well as negative aspects.*
Q14:	From a infrastructure point-of-view, what are the considerations when developing mobile BI solutions?
Purpose:	*To gather insight about what guidelines and other aspects the interviewee thinks that the infrastructure of mobile BI should follow. The question has used the keyword "considerations" so that the respondent can argue for both positive as well as negative aspects.*
Q15:	From a device point-of-view, what are the considerations when developing mobile BI solutions?
Purpose:	*This research paper has defined mobile devices as both smartphones and tablets. The question refers to how the interviewees' define devices and their respective strengths and weaknesses. The question has used the keyword "considerations" so that the respondent can argue for both positive as well as negative aspects.*
Q16:	What do you consider to be the biggest challenges as well as opportunities when developing mobile BI solutions?
Purpose:	*Is to see whether the respondents feel there are challenges, and in which areas. The question is fairly open so that the respondent can think critically and share their opinion.*
Q17:	Could you describe a potential use case for mobile BI?
Purpose:	*Receive insight in where the interviewees' see the usefulness of mobile BI.*
Finishing Questions	
Q18:	How do you look upon the future of mobile BI?
Purpose:	*An open question where the interviewees' can look upon the future and explain either from facts or from their own beliefs on the subject of mobile BI.*
Q19:	Is there anything you would like to add on the subject of mobile BI?
Purpose:	*To give the interviewees' an opportunity to add value on the subject that we may have foreseen when developing the interview guide as well as during the interview.*

3.2.3 Selection of Respondents

In order to properly explore our area of research we conducted interviews with two types of different stakeholders in the mobile BI industry. Two professionals working on the vendor side

and four BI consultants, whereas all of the BI consultants were providing mobile BI solutions for their customers. As for the vendors, we began with examining Gartner's magic quadrant (figure 2.1) and based on that information we emailed nine of those organizations out of these one organization, Tableau, responded and agreed to set up an interview. The interview with Qlik was arranged through one of their employees that had worked as a lab leader for us on an earlier course in Business Intelligence. As for the consultant, we reached out to our professional network in order to secure the respondents. We identified four previous colleagues that were working in the BI industry and out of these, three were able to arrange an interview with someone in their organization for us.

As previously mentioned (see 3.5.1) we conducted a pilot interview with one of the vendors, Tableau. Tableau offers BI solutions for their customers both on the desktop as well as mobile which made the organization and the interviewee an excellent respondent. The informant we came in contact with worked as a Program Manager for Mobile BI solutions. The informant was responsible for features, design and what kind of values Tableau was delivering to the customers. As the interviewee only worked with mobile BI solutions, she could provide a practical view on the shift to mobility as opposed to the theoretical view. However, we concluded that since vendors are providers of software to the industry, we thought that two different vendors can contribute with different perspectives and a broader view. The second vendor was Qlik and the informant was a Product Manager for mobile solutions. We contacted Qlik, partly for the Gartner Magic Quadrant (see Figure 2.1) but mostly for their offices being located in Lund. This way, we could easily set up a face-to-face meeting. Both Qlik and Tableau are one of the leading BI vendors (Gartner, 2015B).

When it comes to the consultants, we desired interviewees with more extensive experience from mobile BI solutions. Our criteria was also that the organization were BI experts in general. The three organizations we arranged interviews with were Optivasys, Company X and Enfo Pointer. At Optivasys we interviewed both a Director of Consulting Services and a Senior BI Solutions Manager and Partner, simultaneously. At Company X we interviewed the Chief Operation Officer. At Enfo Pointer we interviewed a BI sales representative with extensive technical experience.

When we contacted these organizations we inquired employees with specific knowledge and possession of a senior or leading position in the organizations in order to acquire knowledge on the general shift to mobility in the industry. We were able to fulfill this with five out of the six respondents.

3.2.4 Pilot Interview

Bhattacherjee (2012, p.23) concludes that pilot testing of data collection instruments is an "...extremely important part of the research process.". Thus, we decided to conduct a pilot interview to test our research question for our semi-structured interviews. The fact that the area of mobile BI is fairly unexplored also affected this decision. We wanted to utilize the pilot interview as a way to grasp the research area in order to construct and make necessary changes to our research framework. The interview gave us feedback on the structure and phrasing of questions. We also identified a new category for the shift to mobility, *cloud computing*, which we consequently added to our research framework. The structure and phrasing of questions were also changed. The interview guide utilized for the pilot interview can be found in the appendix 1, and the adjusted interview guide in appendix 2.

The pilot interview was conducted with Tableau, as thiswase the first organization that we made contact and scheduled an interview with. The interview was held through Skype, which Bhattacherjee, (2012) describes as a computer-assisted telephone interviewing. As we only changed a few questions an added one category to the research framework we utilized the results from the pilot interview in the completed study.

3.2.5 Ordinary Interviews

The ordinary interviews were all based on the customized interview guide in appendix 2. The interviews were held either face-to-face or through telephone conference (table 4.1). All of the interviews were semi-structured which, according to Recker (2013) creates a conversational form that allows for follow-up questions and related discussions about the interview topic. As Bhattacherjee, (2012) suggests, we introduced ourselves to the respondents', presented the purpose of our study, and assured confidentiality and their voluntary participation. Furthermore, we followed Recker's (2013) advice to start with more general questions since these can work as a basis for more specific questions. Additionally, we asked for permission to record the interviews and ensured that we got consent from the participants.

3.3 Data Analysis

3.3.1 Transcribing

We transcribed the interviews using the online software *OTranscribe.* The transcriptions are a vital part of qualitative research. Hancock et al., (2009) explains how often, a small portion of the interview is communicated through actual words. Tone and inflection are indicators of feelings and meanings. Therefore, we concluded and suggested face-to-face interviews or preferably Skype-interviews with the respondents. Hancock et al., (2009) also describes how the interviewee has to consider the feelings and emotions of the respondents. This can be achieved through punctuation marks. This way, stopping the text and using commas increases the readability and meaning of the text. We also followed Bhattacherjee's (2012) recommendations to transcribe the interviews verbatim into a text document.

Table 3.1: Transcript process

Interviewee	**Transcript**	**Transcribed by**	**Verified by**
R1	Appendix 3	Omar Saka	Victor Svensson
R2	Appendix 4	Victor Svensson	Omar Saka
R3	Appendix 4	Victor Svensson	Omar Saka
R4	Appendix 5	Omar Saka	Victor Svensson
R5	Appendix 6	Victor Svensson	Omar Saka
R6	Appendix 7	Omar Saka	Victor Svensson

3.3.2 Analyzing

According to Bhattacherjee (2012), the purpose of a qualitative analysis is "sense making". In order to make sense out of our extensive qualitative results (in the form of interview transcripts) we opted for a coding process. Recker (2013, p.92) argues that the coding technique is the "… most commonly employed, popular, and vastly useful techniques for reducing qualitative data to meaningful information.". Coding should be done by multiple coders in order to establish reliability of the coding (Recker, 2013). Therefore, we conducted the coding of each interview independently. Thereafter, we compared our results in order to correct mistakes and discuss the parts where we had coded differently. This resulted in the final coding of the interviews, which can be found in respective interview appendix.

The coding were then utilized as a basis for summarizing the interviewees' answers for each theme in the literature review (chapter 4). The analyze itself were conducted by comparing the interviewees' different answers, and then matching this against the literature framework. This process was done process iteratively and ended up in a conclusion.

Table 3.2: Coding structure for the data analysis of interviews conducted.

Theme	**Code**
The Shift to Mobility	STM
IT Consumerization	ITC
Cloud Computing	CC
Ubiquitous Computing	UC
Mobile BI	MBI
Technical Infrastructure	TI
Design	Ds
Security	Sec
Devices	Dv

3.4 Research Quality

3.4.1 Validity and Reliability

The quality of research can be evaluated through its reliability and validity (Bhattacherjee, 2012; Recker, 2013). Validity refers to the extent that the measures used correctly measure what is intended to measure (Bhattacherjee, 2012). Reliability refers to whether the measures used

are consistent and dependable (Bhattacherjee, 2012). Thus, by examining the validity and reliability of our research, we can conclude whether our results are correct and whether a study of the same kind would produce equal results in another setting.

There are two types of validity, *internal validity* and *external validity (*Bhattacherjee, 2012). Internal validity refers to the extent that "...the observed change in a dependent variable is indeed caused by a corresponding change in a hypothesized independent variable" (Bhattacherjee, 2012, p.35). In the context of this thesis, the internal validity is the extent that the approaches undertaken by BI consultants and vendors are indeed caused by the shift to mobility, and not another variable not accounted for. It is hard to identify in other ways, whether the internal validity is legitimate. However to ensure internal validity, we sent the transcribed interviews with the informants, partly for their approval, but also for truthfulness and credibility, in accordance with Recker (2013). This was done so that the informants could change, correct, or disapprove the transcribed text and therefore we could minimize misunderstandings. Triangulation (maintaining a chain of evidence) was also used to increase the internal validity. It refers to improving validity through a multi-perspective view (Recker, 2013) which was used to create the coding of the interviews and also to establish validity of the transcripts. Furthermore, one member of the thesis group transcribed the interviews and the other one verified the quality of the transcript. This way, we always ensured a quality of the transcripts.

External validity refers to whether the findings from a study can be applied elsewhere, generalized to other settings, organizations or cases (Recker, 2013; Bhattacherjee, 2012). Recker (2013) also mentions how the research context should be richly described so that others can assess the context, compared to other fields of research. This is something we achieved by selecting relevant respondents, while additionally provide rich descriptions to accomplish a level of transferability.

As for reliability, Bhattacherjee (2012) describe that the results of a study should not change if the settings remain constant. We tried to establish reliability through using the same phrasing for every interview as well as the same introductory text. We also presented our definitions of mobile devices and BI at the beginning of the interviews to conclude a common view on the field of inquiry. While our interview was semi-structure we tried to phrase the question word for word from our manuscript to the greatest extent possible. We were also very restricted regarding leading questions so that the informant could answer freely, even if it meant that the informant sometimes maybe interpreted the question. In these cases we asked follow-up questions to lead them in the right track.

As for the possible biases Bhattacherjee, (2012) mentions how many respondents tries to avoid answering questions if they possibly can hurt, embarrass themselves, or even demand a negative opinion about someone in their organization. The author says that this so called, "social desirability bias" is almost impossible to overcome except for spotting inconsistent answers and therefore asking follow-up questions. We had the social desirability bias in our minds when we constructed the interview guide with the questions. We tried to avoid it as much as we possibly could, to not end up in biased situations. Moreover, as previously mentioned, we asked all the respondents for consent to record the interviews, transcribe them and send it back to them for approval. This way we also ensured that our verbatim transcription did not interpret anything wrongly. We are also aware that the geographical differences and what that means in terms of culture and organizational environment could affect our results, as Bhattacherjee (2012) notes.

3.4.2 Ethics

The quality of research also includes ethics. Bhattacherjee, (2012) explains ethics as the moral distinction between right and wrong while Recker (2013) adds the difference between good, and bad as well as justice and virtue. Bhattacherjee, (2012) explains how some parts in ethics are widely accepted in the scientific community, such as voluntary participation, anonymity and confidentiality, disclosure, and final analysis and reporting. The participants must be aware that the study is voluntary (Recker, 2013), but also that they are free to choose whether or not to participate in a study (Bhattacherjee, 2012). We informed the participants that they could wish to finish the interview whenever they wanted and the results would be terminated to comply with the voluntary participation. When it comes to anonymity, Bhattacherjee, (2012) and Recker (2013) explains that to protect the subject's interest and future well-being their identity would not be possible to compromise through the research paper. We asked for permission to use their name, position, and company name in our research at the beginning of the interviews as well as a reminder at the end to ensure that they understood.

Disclosure is to provide some kind of information beforehand to debrief the participants so that they can be prepared and decide whether they want to participate or not (Bhattacherjee, 2012). To all of our participants, we sent e-mails with a general explanation of the research area. Since they all were familiar with BI we just informed them that the interview would be in the context of mobile BI. Bhattacherjee, (2012) explains that researchers have to be careful since explaining the research area beforehand could potentially bias subjects' response. We carefully thought about this and we formulated a template e-mail together, which we sent to the participants. Analysis and reporting is about ethical obligations to report honestly and fully (Recker, 2013; Bhattacherjee, 2012) even undesired results since they are a part of the research. Hence, we tried to maintain this state of mind throughout our thesis.

4 Empirical Findings

This chapter will focus upon empirical findings and starts with a presentation of the respondents and their answers. Subsequently, the results of the qualitative research will be presented - categorized after the different themes in the literature framework. The respondents' answers will be summarized in a table for each theme. Quotes and deeper explanations from the respondents will also be presented under each theme.

4.1 Respondent Profiles

We interviewed six different respondents, in a total of five different interviews. All of the interviews, and the interviewees are pictured in table 4.1.

Table 4.1: Interviews conducted

Respondent	Industry Role	Organization	Role	Date	Type	Location	Duration
R1	Vendor	Tableau Software, Inc.	Program Manager, Mobile	2015-04-17, 18:30	Skype	San Francisco, USA	24 min.
R2	Consultant	Optivasys AB	Director of Consulting Services	2015-04-24, 10.00	Telephone	Gothenburg, Sweden	47 min.
R3	Consultant	Optivasys AB	Senior BI Solutions Manager and Partner	2015-04-24, 10.00	Telephone	Gothenburg, Sweden	47 min.
R4	Consultant	Company X	Chief Operation Officer	2015-05-06, 14.00	Telephone	Stockholm, Sweden	30 min.
R5	Vendor	Qlik Technolgies Inc.	Product Manager, Mobile	2015-05-11, 11:00	Face-to-face	Lund, Sweden	28 min.
R6	Consultant	Enfo Pointer	BI Sales Representative	2015-05-13, 13:00	Telephone	Malmö, Sweden	42 min.

Respondent 1

Respondent one works as a Program Manager for Mobile at Tableau and have an undergraduate degree in science. The respondent's role is to define the product,

> *... which features meant to be, in which order you can compute these features. What does it mean by finishing a feature, and what kind of user values would be delivered to users. (3:3)*

According to R1 (3:5) the mission of Tableau is to "… help people see and understand their data better.". The organization has around 1200 employees and is still growing. They were founded 2003 in North America and today, they have offices in North America (HQ), Europe, Asia, Australia, and South America. (Tableau, 2015B). According to Gartner's Magic Quadrant of BI and analytics competitors, Tableau is one of the leading BI vendors (Gartner, 2015B).

Respondent 2

The respondent works as a Director of Consulting Services at Optivasys. R2 has done this for five years and has previous experience of developing. At Optivasys, R2s main focus has been Qlikview and the respondents feels well-oriented in the software. Optivasys focuses purely on Business Intelligence and they have only Qlikview in their portfolio. (4:6). Optivasys was founded 2006 and their clientele consists of over 100 clients and still growing. They have offices in Sweden and Norway (Optivasys, 2015).

Respondent 3

R3 has been at Optivasys for eight years and have had different roles during the years. The respondent started off as a junior developer and has now become a senior developer. R3's current role in the organization is as a Senior BI Solutions Manager and Partner. R3 also mentions how he/she has had different responsibilities and roles during the years, such as team leader, traditional consultant but also responsible for internal training of the consultants. (4:7)

Respondent 4

R4 has 10 years of experience in the BI-industry (5:6), and currently works at a small consulting company with 35 employees (Company X) (5:10). The respondent's current role in the organization is as a Chief Operation Officer, which includes internal planning of the business, but also project management and working as a solution architect. Other experiences include software development, software architect and account management. (5:6) Company X only offers Microsoft-based BI solutions and focuses on budget and forecasting through an in-house developed software (5:10).

Respondent 5

R5 (6:5) has 15 years of experience in the mobile industry. The respondent has worked at Ericsson, Motorola, Samsung and Nokia with both software development and sales. R5's current role is as a product manager for mobile and collaborative analytics at Qlik. Qlik is described by R5 as:

> *... we are in the business of Business Discovery as we call it. Which means that we help people makes sense of their data and analyze it. So it is not just visualization*

of data, which is one part of it, but we provide the platform for analysis of data and for creating your own solutions... (6:7)

Respondent 6

R6 (7:5) has 15 years of experience within the IT industry. The respondent's academic background consists of economy- and technical studies. Furthermore, R6's professional background consists of both technical job assignments as well as sales. The interviewee (7:7) has four years of experience within BI in particular at Enfo Pointer. More specifically R6 describes Enfo Pointer as;

We at Enfo Pointer, are a leading company in Sweden within the BI industry with focus upon Data Warehousing, reporting analysis, budgets and planning as well as BI-counselling. Furthermore, we are partners and retailers for a number of the leading products, globally in BI. In our case, it is Microsoft and Qlikview whom we are working with. (7:9)

4.2 The Shift to mobility

Table 4.1: Summary of empirical data on the shift to mobility

Respondent	Answer
R1	Customers want access everywhere and anytime to their data. The amount of smartphones is a main driver behind mobile BI demand. Tableau is investing very heavily in mobile.
R2	A lot of customers have not rolled out mobile devices in their organizations. An extreme increase of mobile usage and demand to access information anytime and anywhere.
R3	The maturity of the customer in terms of mobility determines if mobile BI will be proposed as a solution.
R4	Main focus of the organization is desktop-oriented. Their customers do not specifically ask for mobile support in their solutions. Mobile is important, but not a deciding factor.
R5	Mobile-first strategy and is becoming a multi-product company. Their mobile BI solutions, steam both from customers as well as themselves.
R6	Prioritizes customers having a BI strategy. Comes down to management to decide about the need for mobile devices. Furthermore, more and more mobile devices are being bought. Additionally, says the gap between mobility and mobile BI is narrower than before.

The different respondents have different views on how the shift to mobility is realized. R4 explains that Microsoft, their platform of choice, does not fully support mobile (5:20). R1 explains how some demands stem from customers, but also how mobility is suggested by Tableau themselves. "I think it is two-ways. It is mutual, but we definitely got a lot of requests from customers." (R1, 3:14). R5 argues in line with R1:

> *We are leading the industry in some cases, but there are of course customers who are ahead of the curve and also sort of helping us transform and develop. (6:17)*

R6's (7:18) organization uses a slightly different approach and tries to define how their customers consume BI. This way, R6 (7:18) says that they can get a good overview whether their customers will gain advantages of a mobile solution or not. At Optivasys, both R2 and R3 argue that it is the mobile maturity in their customers' organizations that determine whether they propose a mobile solution or not.

> *... it is often there in initial discussion with the customer, or in new projects so to speak, and as I said, depending on the type of organization, the answer would be "no that's nothing we could roll out anyway" or it could be "yes that would be great for our field sales representatives that are on the road a lot" (R3, 4:27).*

R4 (5:26) argues that mobility is more often called for within certain industries. R4 also mentions how "...mobile is important... but it is not the most important" (R4, 5:23). The respondent continued to emphasize how mobile devices have become more powerful the last two years. This has led Tableau to encourage their users to start using a mobile version of Tableau server (3:14). R6 (7:36) also says that consumers does not care where they get the information as long as they get it, which makes it harder to distinguish shift to mobility from mobile BI. R4 (5:63) ends by expressing his concerns regarding if organizations decide to go full mobile, then they would spend a lot of money, which of the value they would not get back. R5 (6:58) notes that there has been a change in the last two years, organizations are now moving over to tablets and smartphones completely. When questioned on the main drivers to enter the mobile BI market, R5 answers:

> *... the signals are so clear, it's obvious that users are becoming more and more mobile. If you look at the number of devices last year, a billion smartphones were sold, a billion smartphones. 1.2 actually. And you compare that to the number of laptops, that is one data point, there are so many data points like that, internet users etc., so it's obvious. (6:35)*

R2 makes an important note regarding the usefulness of mobility in organizations,

> *... if the only purpose with getting an tablet to everyone at the company is for them to keep track on their Qlikview app once a day or once a week or once an hour ... then it becomes hard to see the value of or need as clearly as if the organization in its entirety adapts itself to become more mobile ... (R2, 4:76)*

4.2.1 IT Consumerization

Table 4.2: Summary of empirical data on IT consumerization

Respond-ent	Answer
R1	The feature request list for different devices is super long. MDM solutions are an essential part of the BI solution in order to administer devices.
R2	*No answer.*
R3	Qlik Sense is a new product that works across all platforms and devices. When it comes to devices, the business world is always several years behind the consumers' world.
R4	Nowadays, support for both smartphones and tablets as well as iOS, Android and Windows is required.
R5	Qlik Sense is a direct result of the consumerization of business IT. Users expect the software to behave in the same way, regardless of device.
R6	It is a problem but it was more serious earlier. Responsive design (Qlik Sense) is the solution to ITC.

R5 at Qlik argues that there has been a big change in how organizations provide employees with devices:

> *... the IT-department used to provide devices to the user. So you had Blackberry for example which was extremely popular. When you joined a large company, you would get a Blackberry device from them and that device was provisioned for everything that you would need, like your email etc. (6:21)*

However, nowadays R5 argues that:

> *With Bring Your Own Device, there are two things that has happened. One is that the kind of devices that people bring, are extremely varied, it's not default factor, right. You have iPhones, you have Android phones, you have tablets, what not. (6:21)*

R1 (3:36) mentions how the request list of features for the mobile applications from customers is super long. R3 (4:33) and R6 (7:30) mentions how Qlik recently released Qlik Sense, a product that automatically sense the type of device that is being used and scales the interface. According to R3, traditional Qlikview (i.e. not Qlik Sense) is challenging as "… the product does not in a good way recognize the type of device you are on." (R3, 4:58). Thus, R3 (4:33) explains that the developer needs to know which device will be used primarily so that the application can be customized. This is aligned with R5 (6:13), which explains that users should be able to pick and choose any device they want. R6 (7:30) argue that IT first tried to depress the effect of IT consumerization but that it now have been forced to handle the user requests. When Company X develops solutions, R4 explains that some customers ask if the application can be used

on different devices (5:26). R4 (5:28) emphasizes how clients digital environments are changing, incorporating different operating systems. This is a challenge Company X has to solve. When talking about the future of mobile BI, R3 (4:75) argues that it is clear that Qlik is developing its product in a direction for it to become more and more device independent. This is confirmed by R5 (6:21) at Qlik who emphasizes that Qlik Sense "… is directly because of consumerization of IT.". R4 (5:68) relates to how IT Consumerization will be handled in the future and argues that the user do not have to consider it since the system is processing different queries automatically. R5 (7:30) confirms this, adding:

> *Qlik Sense which we work with supports HTML 5 completely, which means that one does not have to conduct any adjustments for different devices since it works automatically for all devices that exists on the market as of today.*

R5 (7:57) emphasizes the security challenges with BYOD, arguing that organizations do not have sufficient security protocols in place to handle lost and stolen devices and employees that quit.

4.2.2 Cloud Computing

Table 4.3: Summary of empirical data on cloud computing

Respondent	**Answer**
R1	"Tableau Online" allows users to collaborate, at the same time with the same data.
R2	Qlik Sense is entirely web-based which can be compared to browsing on a regular page. Data being accessed from outside the organization is still a concern for customers.
R3	Qlikview is client-server, which means non-local data processing. As soon as data leaves the physical organization and being accessible from outside, it becomes a problem.
R4	Notices how customers ask for cloud-based services more and more. However, it is not the company's main focus, but there are always ongoing discussions with customers.
R5	BI industry have traditionally not been in collaboration with the Cloud. Qlik offers Qlik Cloud, a cloud-based system.
R6	More and more customers request cloud solutions.

R1 (3:9) explains how collaboration and sharing is important for Tableau. The respondent informs how Tableaus Server and Tableau Online allows users to see and interact with the same dataset at the same time. R2 (4:34) mentions in line with R1 how the Qlik's new application Qlik Sense is purely web based, and thus based on cloud computing. R5 confirms this and

explains that Qlik has a cloud solution (6:23). R3 (4:62) argues that Qlikview is a client-server solution, with all the calculations being done on the server-side. R4 explains how Company X has noticed that customers' requests cloud solutions more and more (5:28). It is not something that is being done every time, but there are ongoing discussions about how the cloud would work. However, most of the customers still have their own physical servers according to R4 (5:30). Also R5 (6:23) at Qlik acknowledges the cloud computing trend, arguing that BI:

> *... five years ago had not moved in to the cloud. Because it was considered very sort of strategic to the enterprise. But that has changed now for a period of time and more and more enterprises are taking a cloud approach to, not just their CRM data, but actually the analytics as well.*

This is confirmed by R6 at Enfo Pointer, who argues that "... companies more and more accept transcending to cloud solutions." (7:30). However, R5 (7:57) also acknowledge that previous have been a big resistance to placing BI in the cloud, mainly of security reasons.

4.2.3 Ubiquitous Computing

Table 4.4: Summary of empirical data on ubiquitous computing

Respond-ent	**Answer**
R1	Small screens possess big challenges for data visualizations. Wearables could be leveraged for notifications concerning changes in the data.
R2	*No answer.*
R3	Business IT is several years behind consumer IT, thus it will take a couple of years before wearables make their way into enterprises.
R4	Wearables could be utilized for collecting data on employee performance. Voice input (and output) could be the next big thing for mobile BI.
R5	Notifications are a more interesting use case than visualizations. IoT will be the next computing platform for BI.
R6	More and more data from different data sources. The importance of device will not be significant, instead it is how data will be delivered.

To enable mobile BI and start developing it for wearables seems to be a couple of years away for the BI industry. R1 at Tableau explains that, "So yesterday, we were actually joking that we should develop on Apple Watch." (R1, 3:27). Similarly R6 (7:34) mentions a demo where Qlik-view and Apple Watch was integrated to work together. An interesting notion is that it could be more focus on notifications than visualizations in that case, with R1 (3:27) explaining that it,

> *... requires more thinking, because one thing we see users do, that they want to be informed about changes in their data. For example their sales representative just signed a huge deal and entered that entry in the database.*

R5 (6:28) argues in line with R1 concerning notifications,

> *... I have an Apple Watch right, it's not as interesting for me to look at the visualizations that are related to data that i'm interested in, but rather i'm interested in notifications. It's a 'glancing' use case, I use it for a few seconds at a time, so if something changes I want to be notified on the change. But I don't want to look at the trend here, right.*

R4 (5:68) mentions that BI will function as a digital assistant in the future, that the user will interact with the system with their voice. R5 (6:60) states that IoT will be the next computing platform for BI. R6 (7:34) on the other hand, says that users will not are about which device it is, as long as the information is provided. At Optivasys, R3 (4:39) argues that the business world is always several years behind the consumer world, thus,

> *I think there will be a journey first with, well if we call it traditional mobile BI, iPads and smartphone that is, for a couple of years before one enters the current consumer buzzwords.*

4.3 Mobile Business Intelligence

Table 4.5: Summary of empirical data on mobile business intelligence

Respondent	**Answer**
R1	Mobile BI is mostly data consumption, a way for users to stay on top of their data. Users demand to also be able to conduct analysis on mobile devices.
R2	Mobile BI is not a replacement for traditional BI. Not falling behind the competition is an incentive for offering mobile BI
R3	Mobile BI is used in combination with traditional BI. Mobile BI will increase significantly.
R4	Not falling behind the competition is an incentive for offering mobile BI. Not every organization may benefit from mobile BI investments.
R5	Mobile BI is just a use case for BI, not a different system. Users "snack" information frequently. Main demand is consumption and collaboration.
R6	Initiatives for using mobile BI comes often from management. Will be more integrated with different platforms and services in the future. Mobile BI is an

	extension of regular BI. Incentive is making more people use BI whether it is regular BI or mobile BI.

According to R1 (3:11), the user studies conducted by Tableau indicate that,

> *...they want to access the data, anytime at any occasion because data tell stories. So when they are meeting with customers, they want to use data to tell stories and convince their customers why, or support their arguments, things like that.*

Both R3 (4:68) and R4 (5:43) also mentions interacting with customers as a sales representative, is one of the main use cases for mobile BI. All of the respondents agree with mobile BI being more beneficial for consuming data. R2 (4:79) also mentions that, "It is immensely important to understand... that mobile BI is not a replacement for traditional BI but a complement". R6 (7:38) speaks in similar terms and explains how mobile BI is an extension of regular BI. When it comes to defining mobile BI, R4 (5:36) makes a point by arguing that the definitions are unnecessary as customers are not interested in them, they are only interested in how their organizational problems can be solved. R6 (7:49) says that the greatest incentives for their organization is making more customers use BI, regardless of if it is regular BI or mobile BI. R2 (4:47) R4 (5:39) mentions not falling behind rival organizations as one of the reasons to enter the mobile BI market, arguing:

> *There are two incentives, one is that we can earn money by offering solutions and the other is that we definitely in our customer base have a couple of organizations that are interested in these questions, and if we cannot help them they will go to another supplier.*

While discussing mobile BI as a use case for BI, R5 (6:21) notes how mobile devices change the way BI is being used:

> *... people are using them in really interesting ways, you know. People use them, but for frequently, and the use cases, more like, you have a "snacking" use case you "snack" information, consistently and continuously, right.*

Furthermore, the incorporation of smartphones with larger screen sizes affect the way BI is being utilized even more:

> *... you do something on a smartphone but you take the decision somewhere else. But with the larger smartphones more and more these devices are becoming the point of decision making. (R5, 6:63)*

4.3.1 Technical Infrastructure

Table 4.6: Summary of empirical data on technical infrastructure

Respond-ent	**Answer**

R1	Most of the challenges are not in the infrastructure, but in the mobile devices. MDM solutions become a part of BI. Many security challenges need to be handled on the server-side.
R2	No differences in the BI infrastructure regarding adding mobile BI. The general IT infrastructure may be affected.
R3	No differences in the BI infrastructure regarding adding mobile BI. The general IT infrastructure may be affected.
R4	Mentions how their specialty is not infrastructure. However, exemplifies with hiding applications behind firewalls.
R5	IoT will impact the technical infrastructure and change the way data is collected. Mobile use cases impact the infrastructure.
R6	Could be difficult to add mobile BI to old BI-infrastructures. Cloud solutions have greater scalability. The incensement in data sources adds complexity to the infrastructure.

R1 focus on mobile devices when the technical infrastructure is mentioned, signifying that this is the most important challenge when it comes to mobile BI. For example, when asked question 15 (Appendix 1) about the challenges in infrastructure, R1 (3:54) responds:

> *... mobile devices were not that powerful two-three years ago.... now thanks to technology and software technology we have more powerful mobile devices.*

At Optivasys, neither R2 nor R3 considers changes in infrastructure to be a challenge when working with mobile BI. When discussing different security aspects on the server-side, R2 notes that "… that is not part of BI it is more of an IT-infrastructure question." (R2, 4:65). R4 says that they do not specialize in security (5:47) but exemplifies with having an application that is serving the platform This solution is often hidden behind firewalls and is not accessible except for the wireless Internet connection at the office. R4 says that this leads to the solution being unusable (5:57). Furthermore, R5 states that IoT will impact the technical infrastructure. Data will no longer be limited to a data warehouse, it will be constantly generated from different devices and fed into BI systems (R5, 6:28). How the user utilizes a mobile device is also affecting the technical infrastructure, with R5 (6:44) arguing:

> *You need to be able to scale up and down, because it's "snacking" you might have peaks at a certain time, so that you have to think about.*

According to R6 (7:63), new BI-platforms makes it eassy to scale up and down, as well as adding mobile BI to BI solutions. However, this is not the case with older infrastructures:

> *... earlier one had to take the BI investment first... Then one hade to add a seperate mobile BI investment and connect it to, maybe new servers, new licences and so forth. Then it may be hard to get return on investment on that kind of investments...*

4.3.2 Design

Table 4.7: Summary of empirical data on design

Respond-ent	Answer
R1	Data tell stories. Customers to Tableau wants to tell stories with the help of their data. A lot of requests from customers. For instance, opening Tableau format files on mobile devices. The screen real estate of smartphones is challenging for Tableau. Significant differences between smartphones and tablets.
R2	Respondent emphasizes that it revolves around visualizing. There is a mobile version of Qlikview, which is sufficient. Usage of mobile devices pushes Optivasys to develop and perform. One big negative aspect is many of the BI-tools (today) needs to manually adapt to the device.
R3	Qlik Sense, a scalable application adapted for mobile devices. Relieves the developer from thinking about design. Other way around when it comes to Qlikview. It does not sense which device the consumer uses. A challenge to show only the essential information.
R4	The Less screen real estate is a challenge. Responsive design is coming big in BI development
R5	Offers Qlik Sense a product with responsive design and web configurability. Consumption is more important than editing and creating. Compression algorithms make visualizations available on small screens. Minimize the core experience is most important, as well as search.
R6	Mentions Qlik Sense as a tool they work with and how it adapts to devices. Customers want it visually good-looking and attractive. Mentions how design and visualising is very important.

Tableau has gotten a lot of requests from customers. R1 explains how customers ask when they can import their data to the mobile device, and also if there is a native mobile app (3:14). Almost all of the respondents (R1, 3:39; R2, 4:59; R3, 4:60; R4, 5:52; R5, 6:56) acknowledge screen real estate as a design challenge, especially on smartphones. R1 (3:39) mentions how users want to access their data and dashboards when they are offline. R1 (3:56) also concludes that there is a significant difference between smartphones and tablets when it comes to design,

> *I mean they have bigger screens, they have more battery. They usually have more memory, so that allows the users to seize their data better, they have a better experience with interaction, they have a better chance of picking the mark they want to pick, with their fingers.*

According to R2 (4:59), the challenges associated with developing for mobile devices are pushing the involvement of visualizations. R3 (4:60) argues that most of the data is irrelevant and that the developer must find the 3-4 % that is important for the user at the time, and present

these. R5 (6:42) has an equivalent idea and explains that the user treat needs to be minimized to the core experience. R4 (5:68) notes that the use of responsive design for developing BI solutions will increase. This is verified by R5 (6:21) and R6 (7:30) who says that the product, Qlik Sense includes responsive design and is written in HTML5. However, R1 (3:14) describes how earlier, the consumers were allowed to access the Tableau Online through mobile browsers such as Safari, but that it was not convenient and did not provide a good user experience.

4.3.3 Security

Table 4.8: Summary of empirical data on security

Respond-ent	**Answer**
R1	Security is important and is a big part of Tableaus development of mobile BI solutions. Therefore, the security risks are fairly low as long as secure (VPN) connections are used. Investments for MDM solutions.
R2	Security is a big concern among customers, however the risks are exaggerated. Technology is good enough to sustain secure access to mobile BI.
R3	Security is a big concern among customers, however the risks are exaggerated. Technology is good enough to sustain secure access to mobile BI.
R4	Important to have a clear and distinct approach for mobile security. Some customers are very safety-aware while others settle with their current solution. Customers do not want to manoeuvre VPNs.
R5	Cloud hold security concerns. Some industries require more security than others. Three important areas: authorization, authentication, and security of data.
R6	Insufficient security protocols for mobile devices. Customers avoid cloud solutions for security reasons. BI security breaches means getting access to aggregated and understandable data about an organization.

All of the respondents consider security to be a challenge with mobile BI. R1 notes that "… security is really big." (3:50). Furthermore, R1 considers MDM to be part of the security aspects, and notes that this is something that Tableau is investing in. In line with this, both R4 (5:45) and R5 (6:39) note that the information on mobile devices needs to be encrypted as they are easy to lose. R5 (6:39) enlightens the subject with expressing how different industries have different security requirements. R6 (7:30) also discuss security in relation to devices, adding that many organizations have insufficient security protocols for handling lost and stolen devices. R2 (4:50) and R3 (4:51) considers the real security risk to be over exaggerated, but that it is the main consideration among their customers. The notion of having all the data stored on the organization's own servers in the basement, behind firewalls, seems safer for customers (R2, 4:50). According to R4 (5:45) states that security is not necessarily enclosed to BI but there should be a general state of mind with security-thinking. R3 (4:51) notes that,

> *... one allow its employees to carry emails in their mobile devices without consideration. And I would say that they contain at least as many secrets so to speak.*

R2 explain the solutions to secure the data works very well and that over time the security concerns will decrease. Both R1 (3:52) and R3 (4:64) mentions VPN-connections as one way to enable secure access to mobile BI. However, R4 state that no user will be able to cope with connecting to a VPN each time (5:57). To summarize the security aspect, R1 (4:54) argues that,

> *Give it a couple of years and one will get, then it is some new security aspects that one is worried about, and one will sit and laugh at "oh my god, sending out business data on encrypted ways all around the world is of course no big deal at all".*

However, R6 (7:59) argues that if a security breach in an organizations BI were to happen, it would be severe:

> *... if one looks at a business system, it contains an infinite amount of transactions, but it may not be so easy for anyone to understand... But if you get access to a rival's BI data, then it is more aggregated and presentable. So anyone could get a pretty fast insight...*

4.3.4 Devices

Table 4.9: Summary of empirical data on devices

Respondent	**Answer**
R1	Hard to difference between tablets and laptops with touch. Huge demand from smartphone users as there are more of them. Screen space is a big challenge. Hardware constraints of mobile devices are a significant problem.
R2	Tablets more useful than smartphones, problems with screen space.
R3	No performance problems on devices as Qlikview does all the calculations on the server-side. Problems with screen space, sometimes two objects need to be examined at the same time.
R4	The challenges is working with smaller screens. Scaling needs to be done with 22" screens vs mobile screens. It is also important to define mobile devices.
R5	A multitude of devices and computing platforms along with a multi-screen world. Small screen sizes are challenging and Tablets are challenging in their variety. More and more tablets and smartphones.
R6	Modern BI platforms makes the device-question irrelevant.

R4 explains how the smaller screens are a challenge to work with (5:52) and also that mobile devices need to be defined in order to explain what mobile is for users (5:61). According to R3, there is no problems with device performance as the calculations are carried out on the server

side with just the visualizations being sent to the device itself, there is no data stored on the device itself. R5 (6:46) argues in line with this, adding that challenges,

> *... it used to be the processors some time back, but the processors that are available on these kind of devices are of extremely high right not, so that's not a problem.*

However, R1 (3:48) at Tableau paints a different picture, that there is demand from users to be able to access the data offline on their devices. However, hardware constraints make this hard:

> *We have very limited memory, so memory crash still happens very often even though we clean the memory very aggressively. But we got a lot of user requests that they actually want to do deep analysis of their data, when they are on their mobile device, so that requires a lot of memory and it is very challenging.*

Furthermore, R1 (3:56) argues that the benefits of smartphones are that there already exists a lot of them in organizations, butt that the tablets have significant performance advantages as well as screen space. R5 (6:46) mentions that there exists tablets at very different price points and thus these have very different performance, but the user expects the software to function the same on all of these. On the other hand, R6 (7:61) argue that the device-question is irrelevant in modern BI platforms:

> *It is a non-existent question for the customers we are talking with. We do not ask what type of mobile they use or what they are planing to buy in the future. It is just suppose to work.*

4.4 Summary of Findings

Here we will summarize the interviewees' answers, our empirical findings, described in earlier parts of this chapter.

4.4.1 The Shift to mobility

The vendors within the BI industry explains how both customers as well as they themselves have been pushing the shift to mobility. The consultants explain that it is a question about the clients' maturity when it comes to mobile usage. All respondents agree that mobile is becoming more and more important. The general consumerization of IT has changed the way the industry works. Users expect software to behave the same way, independently of which device they are on. However, business is always several years behind the consumers' world when it comes to devices.

Cloud Computing is something that has increased in popularity, however, there are still questions with security, according to all respondents. The vendors feel there is a need for cloud-based solutions and they have therefore developed these solutions such as Qlik Sense and Tableau online. Regarding Ubiquitous Computing, all of the respondents feel there is a potential, but that the BI industry is not there yet. Certain respondents exemplify with data collection and notifications as the main use cases for wearables. A majority of them also sees advantages in the future with one respondent claiming that it will be the next computing platform.

4.4.2 Mobile BI

Some interviewees argue that mobile BI should not be seen as a replacement for traditional BI, but rather a substitute. One respondent even goes one step further, adding that mobile BI is merely one of many use cases for BI. All of the consultants mention not falling behind the competition as the main driver for entering the mobile BI market. All of the respondents acknowledge that mobile BI is mostly suitable for consumption of data. One respondent argues that it is a 'snacking' use case as the mobile devices are used outside that office and regular office hours.

The technical infrastructure does not seem to be of great concern to the respondents. Some notes that MDM solutions area necessary part of BI for administering the mobile devices. However, another respondent argues that this is part of an organizations general IT infrastructure, not BI. The biggest concerns surrounding the technical infrastructure is security. As for security itself, some of the respondents argue that this is a big concern for customer considering mobile BI. Though, this fear is mostly exaggerated as there are secure technologies available. The biggest threat is customer physically losing their mobile device. VPN is embraced as a solution by some, but discarded as being too complicated to use by others.

As for design, screen real estate is the biggest design challenge. Compression algorithms are suggested as one solution, as well as hiding, edit, and create options. Responsive design is coming big. However, one respondent argues that they dropped their web browser solution as it could not deliver the same performance as a native application. There is an important trade-off between customers demand to be able to do 'everything' on their mobile devices, and the actual possibilities for these devices. There is controversy on performance issues on mobile devices, which seems to stem from the application of choice, client-server solution or calculations being made on the device. However, screen size remains the biggest issue.

5 Analysis and Discussion

5.1 The Shift to mobility

We found that both of the vendors have acknowledged the shift to mobility and therefore are investing heavily in this area. According to Gartner's Magic Quadrant (2015B) both Qlik and Tableau are the leading BI vendors. This goes on line with Husson and Ask (2014) who argues that organizations must embrace the mobile mind shift in order to stay on top. Similarly, one of the consultants express concern that their vendor of choice, Microsoft, is not providing good enough mobile support. This is probably the main reason that this consultants organization still have desktop as a main focus, treating mobile as "just another channel" in accordance with Husson and Ask (2014).

All of the respondents except for one (R6) argue that mobile is important and that it is a question of whether the customers are mature enough for transforming and adapting the whole organization to becoming mobile or not. As Stieglitz and Brockmann (2012) explain it, organizations can increase performance if they provide access to their enterprise systems via mobile devices. One of the consultants argues that a customer's organization needs to provide all of its business IT on mobile devices in order to realize the full potential of a mobile BI solution. Bharadwaj et al., (2013) proposes a strategy which is similar to the consultants answer. It emphasizes how the utilization of mobile web, applications and devices creates a digital business strategy to capture and create value. This can be interpreted as how customers must fully commit to a mobile mind shift to be able to capture and create value for their own organization. However, one of the respondents feels concerned about organizations who commit to becoming mobile, also exposes themselves to the risk of wasting resources.

Both consultants and vendors experience the demand from customers for mobile access to their solutions. This is in accordance with the arguments of Husson and Ask (2014) and Bernoff (2014), that there is a mobile mind shift at play among the users. This, and the general increase in smartphones and tablets among business users which one consultant mentions, creates in turn a shift to mobility among the BI industry. One of the vendors even clarifies with mentioning how the signals are clear and how mobile devices increase. However, one other consultant says that the shift to mobility needs to be implemented through the whole company and the purpose of it understood or the value of the investment could be hard to measure. This could signify how organizations needs to be fully aware of what shifting to mobility means for their whole enterprise and not just one department. Conclusively, all the signs are pointing at how mobile devices are increasing and how organizations cannot ignore it anymore, instead they need to adapt to the shift to mobility.

5.1.1 IT Consumerization

The IT consumerization is affecting the industry in various ways. Andriole (2012) argues that employees are pressuring their employer to adapt to new technologies. This has forced one BI vendor to include MDM solutions in their BI systems. Likewise, this affects the design of mobile BI applications and seems to be the main driver behind the use of responsive design in the industry. Consultants express concerns that some of the existing tools do not support different devices particularly well. Harris et al. (2012) argues how it is difficult for IT departments to

keep up with the pace of consumer IT developments. This is supported by our findings, where one respondent argues that the business world is always several years behind the consumer world. Thus, there could be a gap of several years between the employees' wishes to be able to utilize business software on their consumer mobile devices, and the actual support for this from the IT departments. This could be exemplified with wearables beginning to gain traction in the consumer space as of now, and the fact that vendors and consultants only now are starting to consider what can be done on these devices in terms of BI.

In one way it is advancements in consumer technology that is driving innovation in the BI industry, as argued by Andriole (2012). The BI industry always seems to be one step behind consumer demand and innovations in the consumer space. The plethora of new devices and platform makes it impossible for the industry to keep up with demand. This goes on line with Harris et al. (2012) who argues that IT consumerization can foster innovation in organizations. This consumerization has even driven one of the vendors to create a new product, Qlik Sense based upon how organizations provide employees with their devices as well as customer behaviour. Likewise, Bring Your Own Device is something that companies has to take into account, according to one of the respondents. This is supported by Wang (2010) who says that the consumerization of IT could be troublesome for organizations. However, another consultant argues that BYOD is becoming less of a problem as new products such as Qlik Sense is entering the market. In either case, it is imperative that organizations raise awareness about how the consumerization could potentially affect their enterprise and create a healthy approach against this.

5.1.2 Cloud Computing

Some of the respondents mentions how inquires and questions about cloud solutions has increased. The vendors had predicted this and are already offering products such as Tableau Online and Qlik Cloud. Furthermore, we found that the arguments by Power (2013) and Dinh et al. (2011) on the use of cloud computing as a way to diminish the effects of limited hardware capabilities on mobile devices to be true. However, none of the respondents mention hardware limitations of cloud computing, which could indicate that the arguments by Grossman (2009) are no longer valid.

The combination of BI and cloud computing also affects the industry in other ways than mentioned in the reviewed literature. One vendor notes that it brings them in direct contact with the user for the first time, as they are directly connected to the vendors' servers. This enables the vendor to better understand and investigate user behaviour and preferences. Another vendor argues that this could move BI into the consumer space, which could be connected to the IT consumerization. Surprisingly, the respondents do not seem to consider Cloud Computing as a vital part of the shift to mobility. Even though the vendors offer products, they seem to not set aside considerable resources for being able to offer Mobile Cloud Computing. One reason for this could be the greatest security concerns expressed by many of the consultants' customers, which we will discuss later in the security section.

5.1.3 Ubiquitous Computing

As argued earlier, our findings indicate that the BI industry is several years behind the developments in consumer IT. The same applies to wearables and IoT, two of the main buzzwords

when it comes to ubiquitous computing. In accordance with Gartner's (2015D) predictions that wearables will be a complement to smartphones, one of the respondents argues that the smartphone will function as a main control unit, visualizing data streaming from IoT and wearables. Chen and Petrie (2013) express it similarly by explaining how mobile devices turns from client devices to more powerful devices with local services. The same respondent also states that IoT will be the next computing platform for BI. This could be translated as, the more powerful mobile devices get, the merrier IoT and wearables will get. Which Power (2013) previously mentioned where he says that mobile devices are growing stronger and stronger.

Starner (2014) discusses the hardware challenges with wearables, such as screen sizes and processor power. However, the vendors argue that a wearable may only be used for notifications about changes in the data as well as being utilized for collecting data for BI, not visualizing it. All of the respondents agree that wearables and IoT will enter BI solutions at some point. Our findings also indicate that the views of Chen and Petrie (2003) are also being adapted in the BI industry. They argue that mobility cannot be an add-on to existing services. BI must be adaptive and responsive, thus functioning for different use cases whereas wearables and IoT is just one of many.

5.2 Mobile Business Intelligence

Four of the respondents are defining mobile BI as not a replacement, but rather a technology which could be used in combination with traditional BI. One consultant however, does not see the value in defining BI and motivates it with explaining how their customers do not want definitions but just solutions. Another one adds that as BI adds responsive design and becomes device independent, mobile BI will just be a use case among other for BI. This goes in line with the arguments of Tona and Carlsson (2013) BI is a complement and not a substitute.

When it comes to mobile BI, the vendors emphasizes how mobile Business Intelligence is about data consumption and collaboration. It is interesting that they exclude definitions such as 'create', 'produce' or 'build'. These statements of the vendors are supported in the literature, where Popovic et al., (2010) describes how mobile BI enables to real time analytics reports whenever and wherever the users are. The literature does not specify the creating of content, but rather consumption and collaboration which the vendors verify. However, there seems to be a demand from users to be able to create and edit on their mobile devices too. Thus, there is a gap between user demand and the actual possibilities of mobile devices. One respondent argues that whole organizations are now dropping laptops completely and just provide their sales force with tablets. This could provide implications as mobile BI still has a lack of features in regard to traditional BI.

5.2.1 Technical Infrastructure

Only one of the respondents discuss mobile BI as something that could have a significant impact on the technical infrastructure. Two of them argue that the introduction of mobile BI does not affect the infrastructure, however the general IT infrastructure might be affected. This goes in line with what Turnali (2015) mentions about how the introduction of mobile BI has a direct impact on the general IT infrastructure. The reason why the technical infrastructure is not so

prioritized, could be because of mobile devices not being powerful enough. As previously mentioned Power (2013) says that mobile devices are still weak, but they are growing stronger. One of the respondents answer with a statement explaining how IT will impact the technical infrastructure and how data will no longer be limited to a data warehouse but be constantly generated from different sources. This is verified by the literature where Chaudhuri et al., (2011) explains how data often reside from multiple different data sources across different departments within the organization. Another respondent supports this, adding that the growing number of data sources adds complexity to the infrastructure.

5.2.2 Design

The literature argues that design is one of the most important parts of mobile BI applications (Chen et al., 2012; Mayer and Weitzel, 2012). Our findings seem to confirm this. The findings also indicate that mobile users expect a more visually pleasing and easier to use interface on their mobile devices as they are used to this from consumer applications. This could be connected to the mobile mind shift argue by Husson and Ask (2014). All of the respondents agree that screen real estate is the most challenging part of mobile BI design. However, the incorporation of responsive design, described by Marcotte (2011), seems to relieve some of this burden.

The IT consumerization and BYOD is affecting the design and could be the main driver behind responsive design choices. Though some of the respondents argue that dashboard from the desktop simply cannot be replicated on the mobile device, which is supported by Verkooij and Spruit (2013). This could indicate that responsive design may not be such a good solution as proposed by some of the respondents. Likewise, there are oppositions regarding the performance problems with offering responsive design solutions in the web browser with HTML5 instead of a native application. There seems to be an important trade-off between user experience, supporting as many devices as possible, and easy development of applications. Responsive design could be a perfect middle ground, and may be necessary in the light of IT consumerization.

5.2.3 Security

When it comes to security, all of the respondents explain how it is a big concern. Many customers are very security aware and conscious. Verkooij and Spruit (2013) explain that information security is the single biggest risk in mobile BI projects. Two of the respondents argue for, respectively against Virtual Private Networks. This could stem from Trif and Visoiu (2011) which explains that there is multiple different platforms, such as Android, Apple and Windows with their own security characteristics. Therefore, it could be interpreted as the solution to the security issue could be solved easily with VPN, assuming that the users will comply. Additionally, several respondents enlighten how the users worry is exaggerated and that the security focus will shift within a couple of years. One respondent argue that security breaches in BI-system are more severe as these expose aggregated and understandable data, in oppose to getting a hold of just the database.

5.2.4 Devices

The restricting processing power and memory capacities argued by Airnei and Homocianu (2010) is confirmed by one of the respondents as a challenge while developing mobile BI for

smartphones. However, the remainder of our findings indicates that screen size is the only hardware limitation on a mobile device, which is also mentioned by Airnei and Homocianu (2010). One of the respondents report an interesting opinion, about how tablets within different price segments and brands, have different performance. The specific respondent explains how users do not see the difference between tablets, but they expect the same performance independently of the device. This creates challenges for the vendors according to the respondent which goes in line with what Airnei and Homocianu (2010) says about processing power being a bottleneck.

The contextual capabilities vouched for by Pitt et al. (2011) and Verkoij and Spruit (2013) are not supported by our findings. None of the respondents mention these when discussing device capabilities or in terms of mobile BI opportunities. Pitt et al. (2011) notion that tablets are better for consuming information than smartphones is supported by our findings. However, smartphones are far more popular among users, which creates further implications for consultants and vendors. However, one respondent argues that BI grows more and more device independent through the use of responsive design, for instance. Furthermore, this will make the device-question irrelevant in the future.

5.3 Discussion of Theoretical Framework

We will now discuss the connections in our theoretical framework, namely the parts described in figure 3.1. The purpose by doing this is to answer our two research questions. We will commence in the previous analysis and discussions for each theme and try to locate patterns and common themes that exists across the sub-themes of the shift to mobility and mobile BI. Thus, we will be able to provide an answer on how the BI consultants and vendors approach the shift to mobility, as well as how this shift shapes mobile BI,

Figure 5.1: Part of the theoretical framework

5.3.1 Approach

As previously mentioned vendors as well as consultants have acknowledged the shift to mobility, that a change in customer behaviour have affected the BI industry. According to the literature the mobile devices have, and are still increasing. This increase leads to new ways of interacting and using devices. We noticed that the increase affected all the sub-themes to a certain extent. This increase was even reflected in the answers where five out of six respondents mentioned how mobile is important and that it is up to the organization's maturity whether they are ready to adopt mobile devices entirely in their organization or not. Overall it seems like vendors are curious in general about their customers' behaviour and how it expresses itself in the form of devices. The vendors follow the behavioural patterns closely and try to adapt themselves together with some specific, distinguished customers who lay ahead of their curve. The consultants are of course dependent on both vendors but also customers. However, all of them felt that there was an increase in inquiries from customers about mobile and mobility within their

BI-branch. The same pattern revealed itself here, the consultants evaluated the customer's organization and decided thereafter. Depending on whether the customer was mature or not, they proposed a mobile solution, in general.

However, it is not only the behavior but also usage of the devices and where. With trends such as Bring Your Own Device, the BI industry has to take new dimensions into account. Customers do not only want access to data through mobile devices but they also want it anywhere, anytime. In the context of the responses, vendors and consultants mentions this as not a request, but a demand. Consequently, it seems there is no clear strategy when it comes to overcoming the obstacles in relation to BYOD. There is concerns regarding security, the variation of devices, etc. One could argue that the approach the vendors and consultants have against BYOD is cautiousness. BYOD together with Ubiquitous- and Cloud Computing are all connected to BI and mobility. They are also affected by customers and how they are using their devices as well as their variation. Neither vendors nor consultants seems to have any clear approach when it comes to devices. There is no regulation on usage, how, when, or where private devices are permitted to use.

One quote distinguished itself from others and made an impact on our research. It was R3 (4:75) who said "...the business world is a couple of years behind the consumer-world, and I think we are closing in on the real 'boom' for mobile BI.". This could indicate that rather than having a proactive approach, vendors and consultants are forced of having a reactive strategy since they are always behind the consumer world. This seems not to be changing in a near future but instead, the vendors and consultants seems to have reconciled with the thought to follow and adapt.

5.3.2 Shape

The shift to mobility is shaping mobile BI in several ways. It is affecting all of our identified sub-themes. When it comes to technical infrastructure, BYOD brings the need for MDM-software, and new types of mobile devices adds complexity in data sources. Cloud computing is also starting to transform the infrastructure of BI. The shift to mobility are also imposing new design choices, with responsive design gaining foothold in the industry. When it comes to security, the shift to mobility definitely have a great impact, providing further implications for both physical and digital security of mobile BI. However, limitations as well as opportunities of mobile devices does not seem to shape mobile BI in any particular way. The devices seem to be merely an access point for mobile BI rather than a platform for innovation and opportunities.

Mobile BI is being shaped by the BI consultants and vendors choices on how to respond to the shift to mobility. The shift to mobility is mainly consumer driven, in the sense that innovations and user patterns from the consumer space spreads to business IT. Looking at the bigger picture, this implicates that it is in fact the changes in the consumer space and the consumers themselves that are shaping mobile BI. In one way, this signals a democratization of the user, in the sense that they are not forced to adapt themselves to business IT anymore. Rather, business IT is being shaped by the users, as consumers. This also implies to mobile BI.

In one way, the single biggest effect of the shift to mobility's shaping of mobile BI seems to be responsive design. It is presented as the "cure" for almost all implications steaming from the

shift. However, as wearables and IoT gain foothold, mobile BI may need to transform in other ways for meeting these demands too. There is no definite answer on how to handle several hundred of different devices, where visualization possibilities are so utterly different that it cannot be managed by responsive design. One could argue that this answer does not have to exist until the reality is here. However, we would argue that the problem is that this reality is approaching much closer than the BI industry will be able to provide an answer. Thus, again, the industry is merely followers of and adaptors to the shift to mobility. The ways in which it is shaping mobile BI are not proactive. They are reactive by several years and often stem from established innovations in the field of consumer technology. This may be a safe bet for the BI industry, but the question is whether it is enough for the established organizations to stay on top.

6 Conclusion

In order to answer the research question, we first identified two different themes with seven sub-themes by examining the literature. Consequently, these formed our theoretical framework (table 2.2). The two overlying themes were the shift to mobility and mobile BI itself. The theoretical framework, then guided our collection of empirical data. Through interviewing two vendors and four consultants in a total of five different organizations we have been able to establish how they approach the shift to mobility as well as how this shift shapes mobile BI. Their answers differ a lot on some questions and are relatively similar in others. To reconnect to this study's purpose, our first research question was stated as:

(1) How do BI consultants and vendors approach the shift to mobility?

Our results show that the vendors and consultants prioritize some of the sub-themes more than others. Even though Cloud Computing is considered to be a conventional solution, it is not quite supported by vendors and therefore not prioritized by customers. Fear of security issues seems to be another barrier for adopting CC. In contrast, IT consumerization seems to be the most important factor where consumers lead the way, and the industry follows whereas Ubiquitous Computing, unanimously is seen as the future within mobile BI. The second research question we asked were stated as:

(2) How do the shift to mobility shape mobile BI?

The shift to mobility is shaping mobile BI in all of the researched sub-themes. We found that it imposed more implications in the areas of technical infrastructure, design and security, but less when it comes to the actual devices. However, it is clear that the shift to mobility is the main driver behind mobile BI growth. As for the general conclusions for this study, we argue that our results imply the following:

The BI industry is reactive rather than proactive towards the shift to mobility because,

- BI consultants and vendors approaches the shift to mobility by responding and adapting to the developments and trends occurring in the consumers' world. Users and their behavior are the main factor shaping mobile BI, across all sub-themes.

- Developments in the BI industry are several years behind the consumer space. Thus, consultants and vendors are in fact taking the approach of adapting to these changes.

- Vendors and consultants closely follow the developments in the consumer space, leveraging the innovations and user patterns there to shape mobile BI.

Thus, both the approaches undertaken, and shaping of mobile BI is characterized by adapting to, and following the shift to mobility as well as the trends and user patterns in the consumer space. This has consistently occurred across all themes in the theoretical framework. This is closely connected to the IT consumerization, which may be the single most important theme of the nine investigated. In a way, they are taking the safe bet with being followers rather than trying to take the lead in the shift to mobility. However, we cannot determine whether this choice of action will prove to be sustainable in the long run because of delimitations.

6.1 Further Research

The dimension of our study restrict the conclusions from doing anything else than merely implying. Research can show whether the stakeholders have to adopt a new strategy or if the reactive strategy is preferable and solid. Unfortunately the delimitations of our study did not allow further investigations of the found strategies. Another area that would be interesting to conduct research in, is Ubiquitous Computing since our results show that it has not, quite yet been deployed and made an impact on BI.

The generalizability of this research is limited since the sampling was rather small. We only interviewed two vendors and three consulting organizations. To be able to draw more general conclusions from this study, a broader sample of data is required. This is necessary in order to verify or reject the propositions introduced in this conclusion. We also argue that every one of our sub-themes may deserve their own research, in order to strengthen the evidences and explain. The purpose of this study was rather to explore the field of inquiry than to explain it.

6.2 Implications for the BI Industry

Implications for industry stakeholders could be involving dangers with being reactive rather than proactive. The reactive strategy together with the entry barriers for the BI industry in general can be a potential drawback for vendors and consultants who are active within the industry. New organizations and stakeholders could potentially see a lower entry barrier because of the strategies, which in this case would increase the competition.

There could be dangers involved with merely adapting and following these developments. For instance, these organizations could be more sensitive for new disruptive technologies as they are usually several years behind the developments in the consumer space. They could also be more sensitive to new competitors in the BI market that may leverage developments in the consumer space more rapidly, thus providing benefits for the users. However, there are also benefits with the current approach, with it being more of a safe bet. By merely adapting to the consumer user patterns and preferences, the BI industry can take for granted that what they introduce will be enjoyed also by the business users.

Appendix

Appendix 1 - Pilot Interview Guide

Introductionary Questions	
Q1:	Could you explain your professional background and your current role?
Q2:	Could you briefly describe your organization?
Q3:	One definition of Business Intelligence is: "*BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal and competitive information to planners and decision makers."* Do you think something is missing from this definition? If so, how would you describe BI?
Main Questions	
The Shift to mobility	
Q4:	Bring your own device and the general consumerization of business IT is transforming the way employees utilize business' applications. If so, in which way has this affected the BI solutions you develop?
Q5:	One could argue that the mobile workforce is increasing in organizations and that the traditional office space is changing. Regarding this change, does your mobile BI solutions steam from customer demand to be mobile, or does your solutions advise the customers to become mobile? Explain.
Q6:	What is your organizational strategy surrounding BI? • Could it be proposed as a mobile-first strategy or a more desktop-oriented strategy?
Q7:	Computers are becoming more ubiquitous and pervasive, for example IoT and wearables. Do you see any opportunities for mobile BI within these areas?
Mobile Business Intelligence	
Q8:	We have asked about traditional BI and its definition. How would you define mobile BI?
Q9:	What were the main drivers for your organization to enter the mobile BI market?
Q10:	What is your customers' main requests or demands when it comes to mobile BI?
Q11:	Could you describe a potential use case for mobile BI?
Q12:	What do you consider to be the biggest challenges as well as opportunities when developing mobile BI solutions?
Q13:	From a security point-of-view, what are the considerations when developing mobile BI solutions?
Q14:	From a design point-of-view, what are the considerations when developing mobile BI solutions?

Q15:	From an infrastructure point-of-view, what do you consider to be the biggest challenges in developing mobile BI solutions?
Q16:	In terms of mobile BI, what do you think are the main strengths and weaknesses for tablets versus smartphones?
Finishing Questions	
Q17:	How do you look upon the future of mobile BI?
Q18:	Is there anything you would like to add on the subject of mobile BI?

Appendix 2 - Interview Guide

Introductionary Questions	
Q1:	Could you explain your professional background and your current role?
Q2:	Could you briefly describe your organization?
Q3:	One definition of Business Intelligence is: "*BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal and competitive information to planners and decision makers."* Do you think something is missing from this definition? If so, how would you describe BI?
Main Questions	
The Shift to mobility	
Q4:	What is your overall organizational strategy surrounding BI? • Could it be proposed as a mobile-first strategy or a more desktop-oriented strategy?
Q5:	Does your mobile BI solutions steam from customer demand to become mobile, or does your solutions advise the customers to become mobile? Explain.
Q6:	How has Bring Your Own Device and the general consumerization of business IT affected the BI solutions you develop?
Q7:	Could you describe the relationship between Cloud Computing and the mobile BI solutions you develop?
Q8:	Computers are becoming more ubiquitous and pervasive, for example IoT and wearables. Do you see any opportunities for BI within these areas?
Mobile BI	
Q9:	We have asked about traditional BI and its definition. How would you define mobile BI?
Q10:	What were the main drivers for your organization to enter the mobile BI market?
Q11:	What is your customers' main requests or demands when it comes to mobile BI?
Q12:	From a security point-of-view, what are the considerations when developing mobile BI solutions?
Q13:	From a design point-of-view, what are the considerations when developing mobile BI solutions?
Q14:	From a infrastructure point-of-view, what are the considerations when developing mobile BI solutions?

Q15:	From a device point-of-view, what are the considerations when developing mobile BI solutions?
Q16:	What do you consider to be the biggest challenges as well as opportunities when developing mobile BI solutions?
Q17:	Could you describe a potential use case for mobile BI?
Finishing Questions	
Q18:	How do you look upon the future of mobile BI?
Q19:	Is there anything you would like to add on the subject of mobile BI?

Appendix 3 – Interview Transcript Tableau Software, Inc.

Interview with: Tableau Software, Inc.

Interview date: 18:30, 17th of April 2015

Participants: Program Manager for Mobile (R1), Victor Svensson (VS) and Omar Saka (OS)

Interviewee: R1

Interviewers: VS, OS

Interview type: Skype Video call

Interview duration: 24 mins

Transcribed by: OS

Transcription date: 20th April 2015

Line	Speaking	Text	Code
1	*OS*	*Hello! We are two students on the Master Programme in Information Systems at Lund University. Our study is about the general shift to mobility and how it affects the BI industry. We have 18 questions to you. We will start with introductionary questions and then move on to talk about the mobile shift and finally go in depth about mobile BI.*	
2	*VS*	*Could you explain your professional background and your current role at Tableau?*	
3	R1	So, I finished my undergraduate degree in science. Now I work as a Program Manager in Tableau. So its the base plate, defining the product. For example, what features meant to be, in which order you can compute these features. What does it mean by finishing a feature, and what kind of user values would be delivered to users.	
4	*VS*	*Could you briefly describe your organization?*	
5	R1	The mission of the company is to help people see and understand their data better. So, I personally think like, data is one	

		step from information, and information is a step from knowledge, and knowledge is a step from wisdom. So you need a tool to filter out the data or understand their data to reach to another level.	
6	*VS*	*One definition of Business Intelligence is:* *BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal and competitive information to planners and decision makers.* *Do you think something is missing from this definition? If so, how would you describe BI?*	
7	R1	I like that definition.	
8	*VS*	*Yeah, ok. Then we will go on to...*	
9	R1	I want to say more about, like collaboration and sharing. So, that is what Tableau is really good at. We have Tableau server and Tableau online to enable multiple people see and interact with the same dataset at the same time. I think collaboration is a very important part and value of data.	CC
10	*VS*	*Yeah, I think you are pretty unique in that aspect. Ok, so let us go in to the general shift to mobility in the world. So we have 'bring your own device' as a trend, and the general consumerization of business IT. It is transforming the way that employees utilize business applications. If so, in which way has this affected the mobile BI solutions that you develop?*	
11	R1	So, we conducted some user studies and how the use their like, how the user use their mobile devices to stay on top of the data. We found, they want to access the data, anytime at any occasion because data tell stories. So when they are meeting with customers, they want to use data to tell stories and convince their customers why, or support their arguments, things like that. So it is... I would say it is more like data consumption rather than deep data analysis, when they are on their mobile device.	MBI STM Ds MBI
12	*VS, OS*	*Ok*	
13	*VS*	*Thank you, if we talk about the mobile workforce. One could argue that the mobile workforce is increasing in organizations and that traditional office space is changing. Regarding this change, does your mobile BI solutions steam from customer demand to become mobile or does your solutions advice your customers to become mobile, in general? So what comes first, do you understand what I mean?*	
14	R1	I think I understand what you mean. I think it is two-ways. It is mutual, but we definitely got a lot of requests from customers. Like, when can we bring our data to our mobile device, can we have a native mobile app that allows to see and interact with our data. Because in the past we allowed users to access their Tableau server, Tableau online, Tableau public like all	STM Ds Dv

		the products on their mobile browser, like Safari. But it is not a very pleasant or a delightful experience, so we definitely got a lot of customer requests in the past, like two years. Because at that time mobile devices just started becoming very powerful that allowed you to do interesting things on the devices. I think that is how it started. Now we actually encourage users to use their mobile devices, for example on Tableau server interface we would tell users "Hey we also have a mobile version of Tableau server. So you can stay on top of your data anytime, anyplace.".	STM
15	*OS*	*oh, ok.*	
16	*VS*	*Thank you. And Tableaus general organizational strategy for BI. Could it be proposed as a mobile first strategy or a more desktop-oriented strategy?*	
17	R1	What are these two? Mobile first and?	
18	*VS*	*Or is desktop still your main focus as an organization?*	
19	R1	Are you asking if mobile is a demand for customer's organization?	
20	*VS*	*Yea, or is it still desktop, in terms of Business Intelligence?*	
21	R1	Yes, we are definitely investing very heavily on mobile. So we are rewriting the entire Tableau mobile app for iOS and Android and we are also working on other mobile solutions. I do not know if you have heard of "Project Elastic"?	STM
22	*VS, OS*	*Yes, we have.*	
23	R1	It is quite interesting, so I think that it is another step further. Because Tableau has been in the enterprise world for a very long time, for like ten years. I think this is our first time to really develop something that is only in the consumer base. So it is a huge step for Tableau and it is also a huge step for mobile.	
24	*VS*	*Computers are becoming more ubiquitous and pervasive, for example IoT and wearables. Do you see any opportunities for mobile BI within these areas?*	
25	R1	In wearables?	
26	*VS*	*Yes.*	
27	R1	So yesterday, we were actually joking that we should develop on Apple Watch. I think that the next step for us, is to move from Tablet to phone and how to make the phone apps useful. Because it is quite challenging for Tableau that the screens are much smaller with that much screen real estate how can you provide that valuable information to the users? About their data. It is a huge challenge and it is an even bigger challenge when we will move into wearables with smaller screens. But that is requires more thinking, because one thing we see users do, that they want to be informed about any change in their data. For example their sales representative just signed a huge deal and entered that entry in the database. So maybe that want to be informed immediately. Maybe that is something. And they will have their mobile devices all the	UC Ds UC

		time with them, maybe we can use mobile devices to connect them between updates in their database and themselves.	
28	*VS*	*But it is more about notifications in that case. Right? or sort of?*	
29	R1	Yes, we have not thought about it. But it is going to be very very challenging for them to visualize their data, in mobile devices.	Ds
30	*OS*	*Yes, of course.*	
31	*VS*	*Ok, so we have asked about traditional BI and its definition, but how would you define mobile BI?*	
32	R1	That is a good question. I have not thought about it. It is my full-time job and I have not thought about it. I think, it is a delight and fast way for users to stay on top of their data.	MBI
33	*VS*	*Ok. If we look back. What do think were the main drivers for your organization to enter the mobile BI market?*	
34	R1	What is the main driver of the organization or just the main driver in general?	
35	*VS*	*For the organization. Was it customer demand or something else?*	
36	R1	I think it is more customer demand. So, we have been working very hard on the mobile solution and we still got customer requests about new features everyday. And there are a lot of things we cannot fulfill. For example they want to open a Tableau format file on their mobile device and it is something that we do not support now. We might do it in the future and I just want to say, our future request list is super long. So there is a huge customer demand.	Ds/ ITC STM
37	*VS, OS*	*Yes, thank you.*	
38	*VS*	*What is your customers main requests or demands when it comes to mobile BI?*	
39	R1	Um, they definitely want to bring their data offline so when there is no Internet connection they want to carry their data in their pocket on their device. So that they can show the data or the dashboards to their managers, their customers, and just other people, to give them a broad view of some data or story.	Ds/ Dv
40	*OS*	*Ok, thank you.*	
41	*VS*	*Could you describe a potential use case for mobile BI?*	
42	R1	Mobile in general or like the scenario I described?	
43	*VS*	*Just describe a potential use case more in detail for mobile BI.*	
44	R1	For example, when sales representatives where in hotel rooms they know they are going to meet with their customers, in half an hour. So they will pre-download all of the dashboards they are going to use, on their mobile device, just a slide-deck. And what they were presenting, you could just slide, swipe through the dashboards, to present their ideas. So that is a common scenario for mobile BI.	MBI Ds
45	R1	Executive dashboards is another good example. So like if you are an executive of a company and you are in an airport and	Ds

		waiting for your flight, so you use airport wifi to update all your dashboards and you take all the dashboards with you on the plane. So you can actually think deep through your data for the next conference.	
46	*OS*	*Interesting.*	
47	*VS*	*Thank you. What do you consider to be the biggest challenges as well as opportunities when developing mobile BI solutions?*	
48	R1	There are a couple of challenges. First, is that mobile devices are not as powerful as personal computers. We have very limited memory, so memory crash still happens very often even though we clean the memory very aggressively. But we got a lot of user requests that they actually want to do deep analysis on their data, when they are on their mobile device, so that requires a lot of memory and it is very challenging. Second, we are trying to sum now like, how can we still provide users of more information when they have not Internet access, when they are carrying their mobile devices around. The first thing that, if you think about the fact that you do not have a cursor or mouse, it gets really hard to select marks. For example, there is no good way to do multiple select, like a lasso select or other type of selects in an intuitive way with touch gestures. So I think these are the big challenges we are having right now. We are also investing in these areas to make the users experience more delightful so that they can do things they want on a mobile device.	TI/ Dv
49	*VS*	*Ok, from a security point of view, what are the considerations when moving BI in to mobile devices?*	
50	R1	So security is really big. In one way it is like the companies administration of the mobile devices, so we are also investing in MDM solutions like Air Watch to monitor these mobile devices and their usage of the apps. Second, is, we also try to protect against identity theft. For example, we try not to store logging credentials even in the encrypted key chain in the mobile devices. We try to use like, access token since there are more secure solutions for logging and Tableau server has like very strong protection against like, other people's access to your data.	TI/ ITC/ Sec
51	*OS*	*I was just thinking about, when you said, for example the manager is at an airport and he connects to the wifi, an open wifi. Could that be a possible security risk?*	
52	R1	So most of the mobile devices support VPN connection. So I assume if you are an executive, trying to access your internal data, you should connect through your VPN and we can actually support VPN connection. I mean like if your mobile device is connected to VPN, you would go through your VPN for your access to your data.	Sec
53	*VS*	*From a infrastructure point of view, what are the biggest differences between BI and adding mobile BI?*	

54	R1	That is a good question. I think, as I said, like mobile devices were not that powerful two-three years ago so at that point, people had not really thought about reporting BI on their mobile devices and now thanks to technology and software technology we have more powerful mobile devices. So, like, instant access and data anytime, anywhere is something we did not have for traditional BI and I definitively see it as a trend in the future.	TI/ Dv
55	*VS*	*In terms of mobile BI, what do you think are the main strengths and weaknesses for tablets vs smartphones?*	
56	R1	I think I have covered some parts of this question already. Smartphones the biggest advantage, there are many of them like almost everywhere in the business as when it comes to smartphones. But there are not that many tablets. The good thing about tablets is, they are bigger, they have more battery, I mean they have bigger screens, they have more battery. They usually have more memory, so that allows the users to seize their data better, they have better experience with interaction, they have better chance of picking the mark they want to pick, with their fingers. What else, I think, yes, these are the advantages and disadvantages I can think of at this point.	Dv Ds
57	*VS*	*Do you think smartphones has any strengths over tablets?*	
58	R1	Oh, there are more of them. So there is a huge demand, and also we want to, I want to say the line between personal computer and tablet is becoming, like more blur. So there are a lot of tiny windows, like PCs with touchscreen. So like it is really hard to categorize them as PC or tablets.	STM/ Dv
59	*VS*	*That is true. If we go more in-depth with the design of mobile BI applications. What do you think are the main considerations there? We have covered this before but if there is something else you would like to add.*	
60	R1	What is the main?	
61	*VS*	*What are the main considerations when it comes to designing mobile BI?*	
62	R1	Signing? Logging? You mean?	
63	*VS*	*No, design.*	
64	R1	What is the sign?	
65	*OS*	*Design. The design of..*	
66	*VS*	*Of interfaces. Designing the interface.*	
67	R1	Oh, the signing data phase?	
68	*OS*	*No, designing the interface.*	
69	R1	Oh, the interface? Ok, I got it.	
70	*OS*	*Great!*	
71	R1	So like, interface on the surface and behind the scene, are both very important. For logging, for example on the Tableau mobile app, as users should type their server name and then they type their logging credentials and this selects their site. There are a couple of issues that could happen. First, the servers. There is like HTTP, HTPS connection. We want like, always	TI/ Sec

		use the safer one and also keep users informed in the server log on that support HTPS. But we have to do it in an elegant and acceptable way like for the UI and then for typing credentials we want most users to not want to type in their logging credentials again and again. So there have to be a safe way to remember their logging credentials so that they do not have to log in the next time and there are different type of authentications. There are like traditional username, password, there is also *inaudible* and other things. Then you could use a site. There are suspended sites, restricted sites that you do not have access to so we need to handle other cases in the logging interface and also like, outside the app the device might connect to a VPN, so how can we route through things, things like that. Does that answer your question?	
72	*VS, OS*	*Yes, it does. Thank you.*	
73	*VS*	*So, how do you look upon the future of mobile BI?*	
74	R1	The future of mobile BI. So I would like to see more transition between the traditional desktop like Excel BI or other BI solutions to the mobile world. So, we cannot do that now but I would expect people can do more analysis in the drill-down in their data on their mobile devices when the mobile devices are more powerful. That is my hope.	STM Ds/ Dv
75	*VS*	*So you hope that it will move from just consuming to being more productive on mobile devices?*	
76	R1	So today it is mostly consumption, like even editing or like creation, all of these are very difficult to do on a mobile. So maybe it will be possible in the future.	Dv/ Ds
77	*VS*	*Is there anything you would like to add on the subject of mobile BI?*	
78	R1	I think that is all I have. You have asked me a lot of questions.	
79	*VS*	*Ok, then we are done with the questions.*	
80	*OS*	*Thank you very much. I went faster than we thought but your answers was really good. We are going to transcribe this and send it to you next week for your approval.*	
81	R1	Thank you and good luck with your thesis.	
82	*VS, OS*	*Thank you and bye.*	
83	R1	Bye.	

Appendix 4 – Interview Transcript Optivasys AB

Interview with: Optivasys AB

Interview date: 10:00, 24th of April 2015

Participants: Director of Consulting Services (R2), Senior BI Solutions Manager and Partner (R3), Victor Svensson (VS), Omar Saka (OS).

Interviewees: R2, R3

Interviewers: VS, OS

Interview type: Telephone call

Interview duration: 47 mins

Transcribed by: VS

Transcription date: 24th April 2015

Line	Speaking	Text	Code
1	*OS*	*Hej! Vi är två studenter på Masterprogrammet i Information Systems vid Lunds Universitet. Vår undersökning handlar om det generellt mobila skiftet som pågår och hur det påverkar BI-industrin. Vi har 18 frågor till er. Vi kommer börja med introduktionsfrågor, för att sedan prata om det mobila skiftet och slutligen gå in på djupet med mobilt BI.*	
2	R2	Hej! Jag har med en kollega här också, *R3*, som också har varit med ett tag, så vi ska efter bästa förmåga tillsammans försöka svara på era frågor.	
3	R3	Hej!	
4	*OS*	*Okej, vad bra.*	
5	*VS*	*Då kör vi igång med lite introduktionsfrågor här då. Kan ni förklara era respektive professionella bakgrunder och nuvarande roller?*	
6	R2	Absolut, jag kan börja med att säga att jag har jobbat på Optivasys och med BI då i fem års tid och jag jobbar idag som konsultchef på Optivasys i Göteborg. Ja vad ska jag mer säga, jag har som sagt jobbat med Qlikview då och vi på Optivasys använder Qlikview som enda verktyg inom BI idag och från starten 2007. Innan jag kom till Optivasys så satt jag på ett annat bolag där jag var användare av BI som en utvecklare av det så att säga. Det är min korta historia.	
7	R3	Min är väl lite längre på Optivasys i alla fall. Jag har varit här i åtta år ungefär, och har väl varit med på en ganska lång Qlikview-resa. När jag började så var verktyget relativt nytt och inte så välkänt, men det har ju vuxit till ett världsledande verktyg inom BI. Jag har haft ganska olika roller, allt ifrån junior utvecklare i början till en mer senior då. Även varit teamledare och håller väldigt mycket möten, rent verksamhetsmässigt, med mina kunder också. Just nu så har jag en tvådelad roll, dels kundkontakt så att säga, traditionell konsult, men även internt ansvarig för våra utbildningprocesser och fortbildning av konsulter.	
8	*VS*	*Okej, tack så mycket. Skulle ni kunna förklara lite mer detaljerat vad just Optivasys arbetar med inom BI?*	

9	R2	Absolut, jag kan börja, så fyller du i *R3* när du känner att jag är ute på hal is. Som BI-företag så har vi, som jag sa tidigare, sedan starten valt att satsa på Qlikview, enbart, det är det enda BI-verktyget vi har i vår portfölj. Däremot så har marknaden förändrats väldigt mycket, framförallt under de senaste åren, och verktyget som helhet, Qlikview då alltså, har mognat. Framförallt så har även marknaden mognat och tagit till sig BI generellt, och även Qlikview då, på ett annat sätt, vilket gjort att kraven på en konsultbyrå som Optivasys har förändrats väldigt mycket också. Mycket funktionalitet som kanske ligger utanför verktyget har fått plockas in för att komplettera och göra det till en värdefull produkt. Man har även kommit in, det är väldigt mycket verksamhetsdelar i Qlikview om man jämför med andra traditionella IT verktyg och så vidare. Rollen med BI generellt är ju då att det är en verksamhetsstyrd produkt, det är inte en IT-beställare det är snarare en verksamhets. Vilket gör att man är lite tudelad mellan traditionell IT-konsultig programmering till verksamhetskonsult, där vi sitter mycket tillsammans med kund och diskuterar hur man ska driva BI-strategier och BI-lösningar framåt för företaget i sin helhet. Vi, nu har jag nästa glömt bort frågan... men vi jobbar väldigt strukturerat med vår, som vi jobbar med Qlikview rent programmeringsmässigt, vi har tydliga processer för hur vi vill att man ska bygga en Qlikview-lösning. Vi har en väldigt teknisk, ett tekniskt perspektiv på själva strukturen och arkitekturen på det vi bygger, då vi kommer från ett utvecklarperspektiv eller utvecklarbakgrund när bolaget startades från början då. I jämförelse med många konkurrenter så vidare, det som är grejen, nu kan jag ju svara på Qlikview då, är att själva utvecklingen och så vidare är relativt okomplicerad. Man kan sätta sig in i och skapa en hel del BI-nytta utan att ha allt för mycket bakgrundskunskaper. Du går bet väldigt, du går bet när saker och ting börjar växa och miljöerna börjar bli lite mer och mer komplexa och det är mycket det vi ser att de lite mindre företagen som inte har så mycket olika källor och inte speciellt komplex modell i grunden, de klara sig ganska väl själva och är mindre konsultdrivna då. Medans stora bolag som Volvo och IKEA kanske, för att inte dra några exempel som vi har att jobba med kanske, men stora bolag som ändå använder sig av BI och Qlikview att det är det så pass komplext i själva, i deras businessmodel så där är det viktigt att man har en strukturerad tanke när man bygger och arkitekterar. Som sagt, jag vet inte riktigt om det var ett bra svar men det var ett svar.	
10			
11	*VS*	*Ja, jo, men det blir ju jättebra.*	
12	*OS*	*Det lät bra.*	

13	*VS*	*Tack, då går vi vidare till fråga tre. Då ska vi se, en definition av business intelligence är det följande, på engelska då. BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal and competitive information to planners and decision makers. Tycker ni att något saknas från den beskrivningen, eller hur skulle ni beskriva business intelligence?*	
14	R3	För min del tycker jag det lät väldigt träffande. Jag vet inte om du har någon annan känsla *R2*, som, eller om det saknades något?	
15	R2	Nej, den var rätt bra tycker jag, för det är ju liksom egentligen det det är. Det handlar om och ta en rätt stor datamängd och på något sätt försöka och få den förståelig för både personer som tar beslut men även längre ner i kedjan så att säga, eller ja, alla beslutstagare helt enkelt. Det är egentligen allt från en VD till en säljare. Att du på ett snabbt och övergripligt sätt får reda på, liksom, aktuella status för hur du borde ta besluten med tanke på den datan som finns. Någonting som finns är ju väldigt mycket data då, överallt, på många olika ställen, det är väldigt svårt att få det här greppet om. Och, men, nej det är väl ett bra sätt. Sen är det ju även, det kommer ju mer och mer nu, att man inte bara använder BI för att visualisera och ta till sig information, utan att man även använder det som ett operativt verktyg i liksom, kanske, budgetering, etc. etc. Att man även skjuter in data i BI, tidigare har man tittat på redan, på data som redan finns och utefter det ska ta beslut, men nu även använder det mycket just till att själv använda själva BI-verktygen för att mata in data som inte finns tillgänglig någon annanstans, för att få ytterligare en dimension av det. Så det är väl, det kanske ändå ligger inom ramen, men väl något som kanske, som i alla fall håller på att förändras ganska mycket, i förhållande till hur det var tidigare till hur det är nu.	
16	*VS*	*Ja men det ju bra att du säger det.*	
17	R3	Jag kan väl också säga att den första delen av definitionen, alltså just data gathering. Det är kunden ofta väldigt noga med att man ska ha in så himla mycket data överallt. Det man ibland tenderar att glömma är just intelligensen i business intelligence, alltså vad ska vi göra med all den här datan, och hur ska vi göra det så att det blir någon nytta med all data vi har samlat in? Det, det jag som så att säga, det är inte datainsamlingen och validiteten i datan som är det svåra, utan det svåra är göra den förståelig för rätt användare på ett tydligt sätt.	
18	R2	För du vill ju inte, du vill ju inte liksom använda BI för att veta vad som har hänt, utan du vill ju använda det för att veta vad som ska hända. Analys, och det som *R3* säger, just intelligensen, kommer in i spel. Vad som har hänt det har redan hänt, visst du kan givetvis använda mycket av den informationen och liksom förstå hur man kanske kan ändra saker, men just att du vill ju på något sätt kunna använda intelligensen till att förutse vad kommer	

		hända. Och framförallt, vad kommer hända om jag tar det här beslutet kontra det här beslutet. Och det är ju liksom den biten som är det häftiga i business intelligence.	
19	*OS*	*Ja.*	
20	*VS*	*Vad bra, då har vi nog samma bild av vad det är. Då ska vi gå vidare lite till mobile BI nu. Vad är er organisations huvudfokus när det kommer till BI? Skulle man kunna beskriva det som mer mobile-orienterat eller mer desktop-orienterat?*	
21	R3	Till stor del fortfarande desktop-orienterat.	STM
22	*VS*	*Ja.*	
23	R2	Absolut, det ska vi inte säga något annat om, så är det definitivt. Men det är fortfarande ur ett, om man tittar ur ett, vad för typer av BI-rapporter etc. som vi bygger så är det ingenting som är riktat mot en desktop-användare, om man nu får säga det, kontra en mobil användare på något sätt. Det är snarare en visualiseringsbit så att säga. Mycket av det vi bygger är för att kunna använda liksom on the fly, som säljare när du är ute och flänger och far och så vidare. Det är bara det att, liksom om man tittar på den kundbasen, vi har rätt mycket kunder idag och det är rätt många av dem som själva inte riktigt är hela vägen framme till att man har rullat ut iPads till alla i bolaget, tablets generellt till alla i bolaget då. Det är snarare, det är inte så att vi har en strategi i företaget att, "nää vi ska bara bygga majoriteten av våra appar och rapporter för den traditionella desktop-användaren". Det är lite mer hur vi ser på hur marknaden ser ut idag. Majoriteten ligger fortfarande på liksom ett, själva end-usern är en desktop-användare. Men liksom själva strategin och hur vi bygger upp det och hur rapporterna, liksom, vilken data dem ger dig så som användare, de är minst lika riktade till en tablet eller en telefonanvändare som till en desktop-användare.	STM Ds STM STM
24	*VS*	*Men ser ni en ökning inom mobile, eller?*	
25	R2	Det är väldigt mycket, ja det får jag nog säga, det gör vi. Framförallt, det ligger naturligtvis lite i naturen för hur allting är, att man ska ha "easy-access" till allting var man än befinner sig. Det finns fortfarande, och det kommer ni säkert komma till senare i intervjun också, att det finns fortfarande en del, liksom, begränsningar etc. som gör att många företag inte riktigt har kommit hela vägen fram. Men om man tittar på rent, om man tittar i själva, om vi pratar om den faktiska utvecklingen, om man tittar mer på verksamhetsdiskussionerna och den typen så är det ju rätt mycket större buzz kring mobilt BI idag, än vad det var för bara ett eller ett par år sen.	STM STM MBI
26	*VS*	*Okej, då går vi vidare. Skulle du säga, eller ni, rent generellt att de mobila BI-lösningarna ni utvecklar, om det är kunder som efterfrågar det eller om det är ni som uppmuntrar eller föreslår det här för era kunder?*	

27	R3	Jag skulle nog säga att det är en kombination. Beroende lite på vilken typ av kund det är, och det är lite som *R2* var inne på innan, att vissa är av sin natur mer mottagliga för den typen av devices, medans andra är mer traditionella och kanske känner att en utskriven pappersrapport är tryggare att ha med sig. Sen oavsett av kunden skulle jag nog ändå säga att vi, det finns ofta med i diskussionerna initialt hos kunden, eller i nya projekt så att säga. Man har det som en punkt, alltså ska vi tänka mobilt och så vidare, och som sagt, beroende då på organisation så blir svaret att "nej det är inget vi i praktiken kan rulla ut i alla fall" eller så är det att "ja men det hade varit kanon för våra utesäljare som är ute och rör på sig mycket", eller vad det nu kan vara då. Så att, just den som, så att säga initierar det är nog väldigt kombinerat och olika skulle jag säga.	STM
28	*VS*	*Ja.*	
29	R2	Men vi har ju ända med det i, om man tittar nu som sagt, vi har ju väldigt mycket kunder idag om man tittar på business intelligence och Qlik då som verktyg så är det ju väldigt, det är en lång process med BI-verktyg och Qlikview då att, från det att man kommer in på kunden tills att, ja man blir ju aldrig färdig då men, det sprider sig väldigt mycket inom organisationen. Tittar man då på företag som vi jobbar med idag så har man ju, märker man att vissa mognar åt rätt håll, just mot det mobila etc.. Men om man tittar på helt nya kunder för oss, som inte har jobbat med business intelligence tidigare så har vi ju med mobilt BI som en viktig punkt i vår agenda när vi diskuterar och förklarar fördelarna och nackdelarna med att ha mobilt BI. Det finns ju en strategi från vår sida att gå åt det hållet, men just på de här kunderna som vi, som vi redan jobbar med idag där är det ju mycket mer framspel mellan vad som finns idag och hur de jobbar, kontra vad vi kan erbjuda dem.	STM
30	*VS*	*Aha, okej. Tack så mycket. Fråga sex då. Det är ju en del trender som pågår, t.ex. så brukar man säga att det pågår en consumerization av business IT, till exempel bring your own device. Skulle ni säga att det påverkar de mobila BI-lösningarna ni utvecklar?*	
31	R3	Nu har jag ju inte hört de senaste buzzwordsen inser jag....	
32	*VS*	*Jag tänker mer på att man inte riktigt vet vilken typ av device som användaren kommer köra applikationerna på?*	

33	R3	Nej jag skulle säga så här, och det här är ju en liten skiljelinje just i Qlikview då som vi jobbar med. I höstas släppte man, eller i våras kanske det var, en ny version som heter Qlik Sense, som är så att säga en parallell produkt till Qlikview. Den är mer som produkt anpassad för att användas på så att säga okända mobila enheter för att den skalar och ritar om gränssnittet beroende på hur pass du kör en telefon eller en iPad och den skalar även om du kör landskapsläge eller porträttläge. Där har ju så att säga produkten mer tagit höjd själv för vilken device man kommer in med. Vilket gör att vi som utvecklar inte behöver fundera så mycket kring det, i just den aspekten då. Tittar man däremot på traditionella Qlikview som det heter, där är man mer styrd som utvecklare så att säga, hur du placerar dina objekt och hur de ska se ut och hur de ska skalas och så vidare. Där måste man ju nästan veta vilken typ av device som kommer vara den primära. Det enda som vi inte behöver veta är om det är en iPad eller en desktop för dem två kan rent, både utseendemässigt och funktionsmässigt, mer eller mindre skapas oavsett vilken device det kommer vara. Däremot om det är så att någon användare skulle nyttja en smartphone, då skulle jag säga att vi definitivt måste veta det och kanske till och med skapa ett helt eget gränssnitt för just den applikationen som är anpassad då.	Ds/ ITC Ds/ Dv Ds ITC Ds
34	R2	Det finns ju också i, på Qlik Sense då, det är ju helt webbaserat så då blir det ju lite som när man surfar runt som vanligt på en webbsida, jämfört med hur, i alla fall hur den anpassar sig. Men, det jag skulle säga var att i Qlikview då så finns det redan idag, även om den kanske inte är så där superbra, en mobil version av. Om du har en Qlikview app finns det x antal olika objekt, det kan vara tabeller, det kan vara diagram, det kan vara allt möjligt, alla dem objekten, det finns en mobil version av din Qlikview-rapport där du kan välja objekt för objekt, du får en hel lista med de olika objekten som finns i din rapport. Det kräver ju lite mer av användaren, det är ju inte användarvänligt rent visuellt men om du vet vilka objekt det är du brukar titta på så har du möjligheten att göra det, och den är ju helt, med skalning etc. så spelar det ingen roll om du har en telefon eller om du har en iPad eller vilket märke du har, det spelar ingen roll. Det finns en inbyggd funktionalitet kring det, även om den kanske inte är det bästa någonsin.	CC Ds
35	*VS*	*Okej, då ska vi se. Datorer dem blir ju allt mer närvarande och genomträngande, till exempel genom internet of things och wearables. Ser ni några möjligheter för mobilt BI inom dem områdena?*	
36	R2	Kör det en gång till, det var lite kasst där, vi hörde inte riktigt.	
37	*VS*	*Om vi tittar på internet of things och wearables, som är på stor framfart nu, ser ni några möjligheter för mobilt BI inom dem områdena i framtiden?*	
38	R2	Alltså ja... det gör vi kanske i framtiden, men inte just nu skulle jag säga. Eller vad säger du?	UC

39	R3	Nej alltså, och det, det kan man ju egentligen titta tillbaka historiskt. Nu börjar man känna mer och mer tryck efter iPad-lösningar och smartphone-lösningar och så vidare, från ett businessperspektiv. Men tittar man tillbaka hur det såg ut bland konsumenter så var ju iPads och, det var ju hett och nytt för, ja nu kommer jag inte ihåg precis när de kom, men för 5-6 år sedan kanske iPads kom. Så alltså business ligger alltid långt efter i mognad för nyheter, är min erfarenhet är min erfarenhet i alla fall. Jag tror att det kommer bli en första resa med, ja om vi nu kallar det för traditionell mobil BI, det vill säga iPads och smartphones, ett par år innan man kommer in på det som i dagsläget är konsument-buzzwords.	STM /ITC UC
40	*VS*	*Ja men det är bra att du säger det. Bra svar. Okej, då ska vi se. Vi har ju pratat om traditionellt BI och hur det definieras. Hur skulle ni definiera mobilt BI?*	
41	R3	Alltså för mig så är det inte egentligen jättekomplext. Jag brukar alltid förhålla mig till den gamla devisen att rätt information till rätt person i rätt tid. För mig så är mobilt BI egentligen en utveckling av det, att du oavsett om du befinner dig på kontoret eller hemma eller på resa eller var du nu är, att du kan få rätt information i rätt information, när du behöver den.	MBI STM
42	R2	Jag tycker att den definitionen som ni hade på BI tidigare, och bara "where ever you are". Nej men alltså, det är ju nästan det, för det är fortfarande samma, liksom samma, tanke kring det hela tiden, att du ska ha rätt information, du ska framförallt ha samma information som övriga medlemmar i en diskussionsgrupp, etc. Men just att tillgängligheten, det spelar ingen roll om du sitter inne på ditt kontor eller om du sitter på, i Bahamas, utan att du hela tiden har, "where ever you are, at the same time" liksom. Så det är egentligen, annars tycker jag inte att själva BI definitionen förändras för att du har det mobilt.	STM MBI
43	*VS, OS*	*Okej.*	
44	*VS*	*Vad skulle ni säga var de huvudsakliga incitamenten för er organisation att börja med mobilt BI?*	
45	R3	För oss som organisation eller för våra kunder?	
46	*VS*	*För er som organisation, att börja implementera och...?*	

47	R2	Nej men alltså det är ju, om man tittar på Qlikview som verktyg så finns det ju... Det ägs ju av Qlik som utvecklar själva mjukvaran, och vi är en partner då som gör själva implementationen hos dem olika kunderna. Det blir liksom per definition, så är det mycket av produkten som styr vilka nya möjligheter det finns, tillsammans med liksom, hur marknaden och våra kunder ser ut. Qlik då följer den här utvecklingen väldigt väldigt noga självklart så dem anpassar mjukvaran till vad som efterfrågas. Så dem är rätt tidigt ute och låter oss veta vad som komma skall. Samtidigt då som att de kunderna som redan har en BI-produkt, de följer givetvis utvecklingen av den produkten dem har, men även att marknaden och kunderna generellt, det är en extrem ökning av det mobila användandet. Just att du har redan idag, just den här, information när du behöver den var du vill, inte BI då, utan internet, alltså det är självklart idag att om du har en fråga så bara kollar du upp den, oavsett om du sitter på bussen eller om du sitter hemma framför datorn. Det som har drivit oss, att vi hela tiden vill ligga med i framkant till vad som ska komma skall, och att vi är experter och duktiga på de områden som tros bli den stora efterfrågan på framöver. Så incitamentet är ju att vi inte halkar efter någon annan, och alla andra som jobbar som BI-partners dem tänker ju ungefär likadant, att man vill följa med. "Vad är de senaste funktionerna i den produkten vi säljer?" Ja men då är det bland annat mobilt någonting som det har varit mycket snack om de senaste åren, och då måste man läsa in sig på det för att man ska kunna ha med det i sin portfölj. För det är många partners som gör precis samma sak och skulle vi helt plötsligt vara en partner som inte "nej vi kan ingenting om mobilt BI", då finns det en ganska stor risk att vi tappar kund som lägger väldigt mycket fokus på det mobila. Incitamentet är ju att vi måste följa med marknaden, vi måste följa med produkten, och vi måste framförallt försöka ligga minst jämsides med våra konkurrenter och vad dem har att erbjuda.	MBI STM STM/ MBI STM
48	*OS*	*Aha, okej.*	
49	*VS*	*Tack. Vad skulle ni säga är era kunders huvudsakliga efterfrågan och krav när det kommer till mobilt BI?*	

50	R2	Säkerhet. Nej men skämt åsido, kravet är ju naturligtvis att det ska vara så liten förändring i hur dem tar till sig informationen, jämfört med det traditionella sättet på en dator. Bara för att du är en mobil användare så är du antagligen också en desktop användare, du använder dem vid olika tillfällen. Du ska inte behöva känna att du lär dig ett nytt verktyg bara för att du sitter med det på paddan eller på telefonen, jämfört med vad du är van vid i ditt traditionella BI-arbete. Det skulle jag säga är en förutsättning för att kunden ska känna sig trygg och kunna arbeta med den här igenkännlig biten, men sen en fråga som sagt, det som jag nämnde initialt är ju liksom att kraven och förväntningarna, eller det som är oroande, det är just den här säkerhetsbiten. Du sitter på ditt företag, du har din dator, du har en server som står nere i källaren och det känns tryggt. Alla som jobbar med IT vet ju att, det kanske inte riktigt är så för allt, men det är fortfarande att du har det inom brandväggar och det känns väldigt positivt. När du väl ska börja skicka ut det här och kunna accessa det här utifrån, så är det ju fortfarande så att du, det är ju en liten annan typ av säkerhetsuppsättning. Det finns ju naturligtvis större risker när saker och ting lämnar ditt egna nätverk och så vidare, och det är ju någonting som vi jobbat väldigt på så det är ju inte så att det är på något sätt riskfyllt idag, men det är fortfarande en tanke som ofta är liksom en central fråga när man ska rulla ut det hos befintliga kunder.	Sec STM/ MBI Ds Sec CC
51	R3	Jag kan ju egentligen bara flika in, för ni kanske kommer med en fråga om motsättningar till mobilt BI senare, och gör ni inte det så skulle jag bara säga att just den här frågan är den största farhågan, eller vad man ska säga, hos kund. Samtidigt som man, nu glider vi ju ifrån ämnet lite men, samtidigt då som att man låter anställda ha sina mejl i telefonen utan problem. Jag menar att där i finns det förmodligen minst lika mycket hemligheter så att säga. Men ni kanske kommer in på det senare.	Sec STM/ Sec
52	*VS*	*Nästa fråga handlar om säkerheten så ni får gärna fortsätta utveckla kring det, säkerhetsaspekten med mobilt BI.*	
53	R3	Det är ju precis som *R2* sa att man börjar dra öronen åt sig lite när man inser att "oj, oj, oj nu ska all vår information utanför väggarna här". Självklart är ju så att säga, en lösningen är om man har extremt hemlig information, så kanske man ska se till att inte publicera ut just den datan, det finns ju tekniska lösningar för det här. Sen i grund och botten så menar jag i alla fall att den här rädslan är lite, vad ska man säga, den är inte så befogad. För som sagt, e-mail är helt okej att skicka överallt i hela världen, och jag har en känsla av att det är större risk att någon sitter och läser din e-mail än något annat.	CC/ Sec

54	R2	Men så är det, så är det definitivt så att e-mail har funnits här längre. BI och liksom sammanfattning av affärsdata har funnits en kortare tid. Så ge det några år så får man, då är det något nytt säkerhetsaspekt som man är orolig över, och så sitter man och skrattar åt att, "herregud, skicka ut affärsdata på krypterade sätt runtom i världen är naturligtvis inga konstigheter överhuvud taget". Det är mer en, det är definitivt en mognadsbit i det hela.	STM Sec
55	*VS*	*Bra.*	
56	*OS*	*Okej.*	
57	*VS*	*Om vi går vidare till design av mobila BI-applikationer, vad är de största utmaningarna där?*	
58	R3	Om vi då utgår från Qlikview då så att säga, den traditionella basen som vi jobbar mot, så är det ju just det här att den produkten inte på ett bra sätt känner av vilken device du sitter på. Därför måste du veta lite vad du utvecklar för. Självklart är det ju så, och det känner du ju av när man sitter för desktop-utveckling också, att vissa användare har så att säga bara en 1024-skärm. Så det är just att få plats med informationen på en yta, och det blir ju än värre på en smartphone, framförallt, där det är extremt begränsat vad man kan visa upp på en och samma yta så att säga. Och nackdelen, även om Qlikview som produkt är väldigt fantastisk, så är det ju oftast att man kanske behöver titta på två grafer samtidigt, eller ha detaljer i form av en tabell, plus att man ser en graf där man kan se en trend tydligt. Det är klart att ju mer saker du behöver se samtidigt, desto svårare blir det att få plats på en yta, och samtidigt då göra det förståeligt för en användare. Det svåra, den stora utmaningen för att utveckla visuellt och grafiskt, det är ju att få plats på den yta som man har att förhålla sig till.	Ds/ ITC/ Dv Ds R4
59	R2	Och det pushar ju oss som utvecklingsföretag att hitta nya lösningar och nya sätt visualisera data, så det pushar ju utvecklingen framåt absolut. Lite oavsett om du sitter på en smartphone eller på en stor skärm, så är ju yteffektiviteten väldigt viktig. Ju mer du kan effektivisera den, desto bättre upplevelse får du som slutanvändare. Det är ju en bra, vad ska jag säga, det är bra att det pushar oss som utvecklare och hitta nya vägar och möjligheter, och även i funktionalitet kommer ju i Qlikview där man kan kombinera saker betydligt bättre. Som *R3* säger, om man sitter och tittar på två objekt samtidigt, jämfört med hur det var, när Qlikview kom för rätt många år sedan, då fanns det ju inte ens tablets och så vidare, då finns det ingen funktionalitet alls för det här. Produkten följer också att göra det lättare för oss att kunna utveckla just liksom ur den aspekten.	Ds MBI

60	R3	Just när det kommer då till den yteffektiviteten, det blir ju också, egentligen oavsett vilken device du sitter vid men, få in ytterligare då intelligens i verktyget. Oftast om du sitter och tittar på en stor datamängd så är ju 97 procent irrelevant att titta på just där och då. Så liksom att på ett tydligare sätt hitta det som är viktigt att presentera på den ytan man har tillgängligt, utan att behöva göra 11 olika filtreringar för att komma ner till det svaret. Det är en stor utmaning, att så att säga tänka på slutanvändaren, och visa dem rätt saker. Sen om det handlar om att visa vilken produkt det är som har ökat eller minskat mest på lagret sen igår, eller om det är kontobokningar i en huvudbok som sticker ut ur mängden som potentiella felbokningar, eller vad det kan vara, men just hitta ut de här 3-4 procenten som är viktiga att fokusera på, det är en utmaning.	Dv Ds MBI
61	*VS*	*Okej. Om man kollar mer på hårdvaran på de mobila enheterna, ser ni några problem med mängden minne och processorkraft och så?*	
62	R3	Nej. Och det beror på att Qlikview fungerar som en klient-server lösning, så att all data bearbetas på en server, och sen skickad det egentligen visuella, visuell information hur grafer och sånt ska ritas ut. Så ingen data finns på dem, på enheterna så att säga, och det är ju oavsett om det är mobilt eller så att säga en desktop-lösning. Så att, nej är svaret.	CC Dv
63	*VS*	*Okej, vad bra. Om vi kollar på själva infrastrukturen kring BI, med servrar och dylikt, vad är den stora skillnaden mellan traditionellt BI och lägga till mobilt BI?*	
64	R3	För våran del ingen alls, egentligen. Det ändå som det mobila då kan medföra är ju att används på, via någon form av VPN-lösning, för att kunna komma åt nätet. Men det är ju egentligen inte...	Sec
65	R2	Det ligger inte i BI utan det är mer en IT-infrastruktur fråga.	TI
66	R3	Men BI-mässigt så vet jag ju att det är inbyggt för våran del när vi utvecklar.	TI
67	*VS*	*För att runda av lite kring mobilt BI, vad skulle ni säga är de största styrkorna, respektive svagheterna kring det?*	
68	R3	Styrkorna för mig, skulle jag nog säga är att du sätter kundkompetensen hos den, en person som är ute och rör på sig mycket. Alltså en utesäljare som ska träffa kunder, den kan ha med sig ny färsk information i varje möte, och ha så att säga ett övertag mot sin kund. Eller om du är en VD som är ute och rör på dig, du kan alltid veta vad som har hänt fram till, ofta som tills igår när man laddade datan. Just att du har ett kunskapsövertag med dig hela tiden, inte det som fanns på kontoret när du lämnade det igår eller när du var där sist för fem dagar sedan, utan du har alltid med dig den senast uppdaterade datan. Det är den stora, den stora styrkan som jag ser det. Den största svagheten....	MBI

69	R2	Alltså ett fungerande mobilt BI så ser ju inte att det finns några direkta svagheter att ha det över huvud taget. Utan svagheterna ligger ju i, snarare just liksom, att fortfarande idag många av de traditionella verktygen kräver en viss, liksom anpassning till det. Som vi har varit inne på rätt många gånger idag, där är vi ju på väg ifrån också. Det är ju tydligt vad som är positivt med det, just att du har tillgängligheten till data var du än är, det är jättebra naturligtvis. Det är inga direkta nackdelar, folk jobbar för mycket kanske.	Ds STM
70	*VS*	*Okej. Skulle ni kunna beskriva ett användarfall för mobilt BI?*	
71	R3	Jag kan väl egentligen beskriva det som jag fallit tillbaka på i en del av svaren. Jag har en kund som jobbar med distribuerade säljare, helt enkelt. Vissa dagar så är man på ett kontor där man kan förbered sitt mötesunderlag och andra dagar så har man varit ute tre dagar i rad och inte har haft möjlighet, men genom att då kunna använda sin iPad i ett möte, så att säga on the fly hela tiden, så kan man dels få den senaste bilden av hur kunden har köpt under året, jämfört med föregående år. Kunden kanske påstår att "nej men i år har vi köpt så himla mycket så nu måste vi kunna få lite mer i rabatt", men då kan man tillsammans med kunden titta och säga "nej men ni köpte ju faktiskt hälften av vad ni köpte förra året, så just nu kan vi inte erbjuda den här rabatten". Och även, "ni köper ju uppenbarligen den här produkten, ni kanske borde köpa den här istället?", där man då som säljare vet att man har ett bättre TB*(täckningsbidrag)* men ändå en likvärdig produkt för kunden. Så det är väl ett typexempel för min del. Plus att i och med i deras fall har dem så att säga en kundanalys flik som dem sitter och har som diskussionsunderlag, men den är ju en del av den, alltså helhetsapplikationen, så skulle det komma följdfrågor när de sitter i mötet så har dem alltid möjligheten att gå in i andra flikar i Qlikview-lösningen och titta mer detaljerat där och då. Hade dem haft med sig en pappersrapport så, nej då är det ju vad som finns utskrivet som de har att förhålla sig till. Så just det här kunskapsövertaget när man behöver det, det är det dem har känt som en stor nytta av det.	STM Dv MBI

72	R2	För min del så handlar det om ett stort bolag som finns på rätt många olika ställen i världen. Dem har splittrad ledning, dem är inte splittrade på det sättet utan mer geografiskt då alltså, vilket gör att dem reser väldigt mycket i jobbet och tar väldigt mycket möten och diskussioner "on the fly". Någonting som dem har upplevt som en extrem förbättring är just att de sitter och tittar på samma sak. För annars blir det så här att " Pelle skriver ut en rapport på morgonen, sen möter han upp med Lisa på telefon, som skrev ut rapporten fem timmar senare, etc. etc. etc.". Vilket gör att generellt liksom på de stora frågorna och så vidare så är det kanske inte så stor förändring, men ofta hamnar man ändå i en diskussion kanske vad som kan ha hänt lite längre ner, alltså på detaljnivå. När det börjar skilja sig från varandra och man sitter och diskuterar samma sak fast med olika dataunderlag då blir det ofta det fokuset, snarare än själva, vad diskussionen handlar om från första början. Så dem har alltså en extrem nytta av att titta live, så att säga, på exakt samma, exakt samma data. Det finns dessutom i Qlikview, som vi jobbar med, så finns det en funktionalitet idag, som har funnits i ett och ett halvt två år någonting skulle jag säga, en möjlighet att bjuda in varandra i samma session. Inte bara det att man sitter och tittar på samma rapport utan att man sitter i samma rapport, så att när man klickar så görs valen hos alla de här fem personerna i ledningsgruppen, samtidigt på deras iPads eller desktops eller var de nu befinner sig. Det, för dem har det betytt en väldig trygghet i själva underlaget de har för sina diskussioner.	STM MBI MBI
73	*VS*	*Vad bra. Hur ser ni på framtiden för mobilt BI?*	
74	R2	Det lär ju inte minska.	MBI
75	R3	Nej, och det är lite som vi pratade om att businessvärlden är några år efter konsumentvärlden, och jag tror ju ändå att nu börjar vi närma oss den riktiga boomen för mobilt BI. Nu kommer behoven mer och mer och organisationerna blir mer och mer trygga i det mobila, så att säga, för att man har vant sig vid det som konsument, och nu vill man ha det i jobbet också. Jag tror ju på en betydande ökning, vilket också så att säga, det blir ju tydligt i hur Qlik, som då utvecklar produkten, hur dem tänker. För allt går ju åt device, alltså device-oberoende så att säga.	ITC STM ITC
76	R2	Så är det ju definitivt. Tittar man man på företagen idag då, alltså business intelligence, det är ju allt vi lever på då, men det är ju bara en liten del utav deras vardagliga arbete. Så det handlar ju också mycket om att liksom själva mognadsgraden inom bolaget för tablets generellt, om vi bara lyfter det liksom från själva BI-världen till inne hos kunden, om det enda syftet med att skaffa en tablet till alla på företaget är att de ska kunna kolla på sin Qlikview app en gång om dagen eller en gång i timmen eller en gång i veckan, eller vad man har för mål, då är det svårare att se värdet eller behovet lika tydligt som om företaget i sin helhet anpassar sig mer till mobilt, att både affärssystemen men även informationsspridning och så vidare i bolaget sker mer mobilt så	STM STM STM

		kommer det bli en mer naturlig del att man då också kommer använda sig mobilt av sin BI så att säga.	
77	*VS*	*Vad bra, då har jag bara en fråga till och det är om ni vill tillägga något kring det här ämnet?*	
78	R3	Nej alltså, som sagt jag tror ju att mobilt BI kommer explodera framöver. Samtidigt som jag tror att traditionell BI och traditionella rapporter, så att säga, kommer att överleva. Jag tror inte att man ska ha en övertro på varken desktop version av BI eller mobilt användande av BI, utan jag tror att allting kommer vara en kombination.	MBI/ STM
79	R2	Det är ju sjukt viktigt och förstå, jag kan ju i och för sig inte se in i framtiden, men jag har en extrem tro på att mobilt BI är ju ingen ersättning till traditionell BI utan ett komplement.	MBI
80	*OS*	*Supertack för svaret där, det var perfekt. Den frågan avslutade vår intervju. Tack så jättemycket för att ni ställde upp.*	
81	R2	Inga problem. Tack själva.	
82	R3	Tack själva.	
83	*VS, OS*	*Hejdå.*	

Appendix 5 – Interview Transcript Company X

Interview with: Company X

Interview date: 14:00, 7th of May 2015

Participants: Chief Operation Officer (R4), Victor Svensson (VS), Omar Saka (OS).

Interviewees: R4

Interviewers: VS, OS

Interview type: Telephone call

Interview duration: 31 min

Transcribed by: OS

Transcription date: 9th of May 2015

Line	Speaking	Text	Code
1	*VS*	*Hej, det här är Victor.*	
2	*OS*	*Och jag heter Omar.*	
3	R4	Hej!	
4	*VS*	*Omar kör igång med frågorna här direkt då.*	
5	*OS*	*Skulle du kunna förklara din professionella bakgrund och nuvarande roll?*	

6	R4	Jag jobbar inom, i beslutsstödsbranchen då. Det är ungefär 10 år sedan jag tog examen från universitetet. Har haft de flesta roller man kan tänkas ha på ett mindre BI-konsultföretag, så jag har jobbat som utvecklare, arkitekt, projektledare, har jobbat som account manager, har varit konsultchef och, ja men typ dem rollerna jag har haft. För närvarande sitter jag med i [redacted] ledningsgrupp och jobbar väl egentligen med dels intern planeringen av vår verksamhet men också att jag är projektledare och lösningsarkitekt i en del utav våra projekt.	
7	*OS*	*Kan du förklara lite kort vad din organisation arbetar med då?*	
8	R4	Ursäkta?	
9	*OS*	*Kan du förklara lite kort vad [redacted] håller på med? Deras verksamhetsområden?*	
10	R4	Det är ett ganska litet konsultbolag som konstaterat. Vi är väl en 35 personer i dagsläget och vad vi erbjuder marknaden är ju lösningar, alla typer utav lösningar med business intelligence, beslutstödslösningar. Men primärt då fokus på budget och prognosorienterade, alltså planeringsorienterade lösningar. Vi har enbart fokus på Microsoft-teknologi. Så allt vi gör är Microsoftorienterat då. Alla våra konsulter har också tyngdpunkt på Microsoft.	
11	*OS*	*Nu kommer jag säga en definition av BI på engelska, sen får du gärna lägga till eller ta bort och ändra om du vill. BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal and competitive information to planners and decision makers. Tycker du att något saknas för den här beskrivningen?*	
12	R4	Det var lite dåligt ljud så jag vet inte om jag hörde allting...	
13	*OS*	*Jag kan ta om det igen om du vill?*	
14	R4	Ja gör om det en gång till.	
15	*OS*	*BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal and competitive information to planners and decision makers.*	
16	R4	Hade du med external data där eller var det bara internal?	
17	*OS*	*Internal och competitive information to planners and decision makers.*	

18	R4	Ska jag vara helt ärlig så, jag menar det finns typ hundra olika definitioner på vad det är. Jag har inte så mycket synpunkter på det utan det har blivit lite buzzword med att köra "vi levererar business intelligence" och alla leverantörer definierar begreppet utifrån vad som passar deras produkt. Microsoft vill att det dem erbjuder ska vara business intelligence och Oracle vill att deras ska vara business intelligence. Det är väl kul med såna här definitioner men det är inte något som intresserar mig jättemycket liksom, och fundera på om det är totalt korrekt eller inte, om jag ska vara ärlig.	
19	*OS*	*Aha okej, intressent. Yes. Då går vi in på lite huvudfrågor här då. Fråga fyra. Vad är er organisations huvudfokus när det kommer till BI? Skulle man kunna beskriva det som mobile first eller är det mer desktop-orienterat?*	
20	R4	Nej men alltså, vi har ju fokus på Microsoft-teknik, och budget och prognos. Vi har en egen produkt som heter [redacted], som bygger på Microsofts plattform. Den är, den i sig är ganska desktop-orienterad skulle vi kunna säga. Ni har inte jättebra stöd för, mobilt stöd. Visst man kan komma åt enskilda rapporter eller enskilda verktyg från mobila enheter, men en del av lösningen är desktop-orienterad. Sen liksom lever ju vi på Microsofts plattform och det är klart att i den finns det ju delvis mobilt stöd inbyggt. Det är inget som vi liksom, vi skulle gärna vilja att det fanns ett bättre mobilt stöd. Men den typen utav lösningar som vi fokuserar på, kunderna, det är inte det första de frågar, hur bra mobilt stöd, alltså den typen av kunder vi har.	STM
21	*VS*	*Mm, okej.*	
22	*OS*	*Okej.*	
23	R4	Utan jag skulle säga att mobilt är viktigt, det är en essentiell faktor. Om man inte har mobilt stöd så tappar vissa kundkategorier intresset snabbt. Men det är inte det viktigaste.	STM
24	*OS*	*Okej, det var jätteintressant för det kommer in lite grann på nästa fråga. Jag vill bara lägga till här lite snabbt att vissa frågor komma kännas att du redan svarat på, men det är bara för undersökningens karaktär, att vi måste ställa vissa frågor. De här BI-lösningarna, härstammar de från kunders efterfrågan eller uppmuntrar ni kunderna att implementera såna här mobila lösningar som finns tillgängliga?*	
25	*VS*	*Just med fokus på det mobila då.*	

26	R4	Vi jobbar med lite olika typer utav kunder och typer utav lösningar. Det är rätt stor skillnad beroende på vad det är för sorts folk man jobbar med. Om man jobbar med en typisk finansiell organisation, alltså ekonomiavdelning på ett företag som jobbar med budget, prognoser, intäkter, kostnader och så vidare, där tycker inte jag att det är jättestark efterfrågan för mobilt stöd. Jobbar man med en säljorganisation, speciellt en som kanske är ute och besöker kunder, dem vill ju alltid ha tillgång till sin information när dem är i fält. Så det är väldigt stor skillnad. Men i och med att vi då har fokus på budget, prognos och uppföljning så typiskt sätt, som jag sa, våra kunder, ja det är klart att en del kunder är teknikintresserade, de ställer frågan "kan jag få upp det här i min iPad eller telefonen" eller vad det nu är, men det är inte det primära kravet.	STM ITC
27	*OS*	*Okej, väldigt intressant. Tack. Om man går in lite mer på bring your own device och consumerization of business IT, har det påverkat dem här BI-lösningarna ni utvecklar? På det mobila planet återigen.*	
28	R4	Nej, däremot så tycker jag att vi, just det här bring your own, påverkar inte så extremt mycket oss, skulle jag vilja säga. Det kan hända att det påverkar, det som, vi är väldigt microsoft-orienterat och någonting som vi har märkt av är att oftare när man kommer ut så är det organisationer med mixade miljöer, med mac eller vad det nu kan vara. Det är någonting som vi liksom måste tänka på. Hur bemöter vi det, liksom? Man kan ju inte alltid förutsätta att en användare har officepaketet installerat på sina datorer eller internet explorer eller vad det nu kan vara. Jag menar det är ju egentligen samma sak som bring your own, att man kan inte veta så värst mycket om klientverktygen. Sen någonting som hänger ihop med det här lite grann det är ju molnet. Vi tycker att det märks mer och mer liksom att det inte är organisationer som längre vill installera någonting i sin serverhall, utan att dem kanske föredrar att man kan köpa saker som en tjänst i någon molntjänst, och det finns olika varianter där.	ITC CC
29	*VS*	*Ni erbjuder molntjänster då också eller? BI som en molntjänst.*	
30	R4	Ja det gör vi. Jag skulle inte säga att det är vårt kärnfokus, utan de allra flesta utav våra kunder väljer fortfarande att lägga sakerna i den egna serverhallen. Men allt oftare hamnar man i den här diskussionen i olika sammanhang, alltså, "okej men hur funkar det här liksom? Är det en molntjänst eller är det något vi måste installera på en server?". Så att intresset ökar ju väldigt mycket, men de flesta utav våra kunder kör fortfarande programvaran i serverhall då.	CC
31	*OS*	*Men det är jättebra, där svara du på två frågor samtidigt. Så vi kan ju hoppa över direkt till fråga åtta. Datorer blir allt mer närvarande och genomträngande, till exempel internet of things och wearables. Ser du några möjligheter för mobilt BI inom dessa områden?*	
32	R4	Ni sa internet of things och vad sa du mer?	

33	*OS*	*Wearables.*	
34	R4	Ja absolut. De flesta företag som liksom håller på med BI så är det ju på något sätt det här med big data, man ska göra en analys ur liksom, kunna ta hand om det som alla dem här loggarna som kommer från varianter. Vi klurar väl också på det där. Jag skulle inte säga att vi liksom ligger långt framme på något sätt men verkligen så att, vi funderar på "hur kan vi nyttja det här för att skapa affärer?". Typiska såna exempel är ju om man bär en sån här Apple Watch liksom, som spottar ur sig loggar om olika saker och så sätter du det kanske på alla dina personer som jobbar i någon fabrik, eller vad det nu kan vara, så kan man följa hur dem rör sig och kanske köra tidseffektivisering eller bättre planering, det finns ju massa med såna här tillämpningsområden. I våran verksamhet så där vi tjänar våra pengar idag så är det en bit bort egentligen från de här frågeställningarna, men i framtiden så funderar vi alltså på "vad gör vi med det här?".	UC
35	*OS*	*Väldigt intressant. Det var mest frågor om mobilitet och så vidare. Nu tänkte vi dyka in lite mer på mobilt BI genom fråga nio här. Vi har pratat om traditionellt BI och dess definition, hur skulle du vilka definiera mobilt BI? Om du fick möjligheten till det.*	
36	R4	Alltså jag avstår helst. Som jag sa angående traditionellt BI, jag tycker inte de där definitionerna ger så mycket egentligen och jag tycker sällan liksom, när man är ute och pratar med en potentiell köpare utav dem här tjänsterna då är det sällan de vill ha den här skolboksdefinitionen utav vad någonting är. Dem sitter med ett verksamhetsproblem, dem behöver liksom kunna förse sina säljare med, så att de kan veta vad de ska kunna lova till kund och då vill dem bara ha svar på det, de struntar i själva diskussionen av vad mobilt BI är.	MBI
37	*VS*	*Okej.*	
38	*OS*	*Nej men, jättebra. Fråga 10. Nu vet jag inte, men till exempel, finns det några incitament för din organisation att kunna tränga in på den här mobila BI-marknaden?*	
39	R4	Jo men naturligtvis om vi kan tjäna pengar. Det finns väl två incitament, det ena är väl att vi kan tjäna pengar på att erbjuda lösningar och det andra är ju att vi har ju definitivt i våran kundportfölj ett antal företag som intresserar sig för dem här frågeställningarna, och kan inte vi hjälpa dem så kommer de gå till någon annan leverantör. Kommer en annan leverantör in då finns det ju risk att vi förlorar vår nuvarande affär också, även om inte den är mobilt.	MBI
40	*OS*	*Jaha okej, jättebra. Då tar vi fråga 11 här. Vad är era kunders huvudsakliga efterfrågan eller krav när det kommer till mobilt BI, om det finns några?.... Du sa innan att det kanske finns vissa kunder som efterfrågar det, som säljare och så vidare. Har dem några specifika krav när det kommer till det här?*	

41	R4	Nej, ska jag vara helt ärligt så jag har inte varit med i, jag har varit ute och träffat mycket kunder som pratar om dem här sakerna och ställer frågor. Men oftast är det liksom en inledande diskussion som jag har varit med i, jag har inte varit med i så jättemånga sammanhang där det har varit endast kravdiskussioner vad gäller mobila lösningar. Så jag skulle helst vilja avstå från att svara på den frågan.	
42	*OS*	*Absolut.*	
43	R4	Naturligtvis, det där är ju ett väldigt enkelt exempel, att säga att säljare på fältet behöver mobilt BI eller en lastbilschaufför som behöver kanske behöver tillgång till nån statistik när de är ute och åker på sina resor. Konkreta exempel har jag nog inte mer än så.	MBI
44	*OS*	*Fråga 12 här, om vi går in mer på säkerhetsperspektivet inom mobilt BI. Vad behöver tas i beaktande när man utvecklar de här lösningarna?*	
45	R4	Jag är ingen expert på säkerhet. Jag kan ju bara spekulera i det där. Naturligtvis som alltid när man har mobilt så gäller det att se till att ens enheter skyddade och krypterade. Du kan ju ha en liten användning om du har e-post i mobilen. Så om man tappar sin telefon eller surfplatta så är inte den krypterad, om det är företagsdata. Det kan ju vara precis vad som helst som ligger där, som inte får läcka ut. Det har ju ingenting med BI att göra. Spontant skulle jag säga att det viktiga är att man har ett klart tänk för mobilt säkerhet. Det spelar inte så stor roll om BI eller någon annan typ av lösning.	Sec
46	*VS*	*Men är det något som era kunder ofta oroar sig över eller att de ställer krav på att...?*	
47	R4	Nej, inte så. Utan jag tror att de flesta kunder, det finns två läger. Där det ena lägret är säkerhetsmedvetna företag som har...det kan ju vara att de har en känslig verksamhet på ett eller annat sätt. Där kanske man är väldigt restriktiva till den här typen av mobila lösningar överhuvudtaget. Om man tycker att de inte kan riskera att nånting läcker. Eller så finns det andra företag som kanske inte riktigt har samma säkerhetskrav och dessutom tycker att "men vi har en bra och god mobil säkerhet". De kanske har liksom en mobil plattform som de känner sig trygga med. Då tycker man att det här är ok. Vi brukar inte hamna i de här diskussionerna eftersom vi inte är ett infrastrukturföretag som diskuterar mobila lösningar så men vi diskuterar ju just BI-lösningar, inte,säkerhet så mycket.	Sec TI
48	*OS*	*Från ett designperspektiv, vad tycker du bör tas i beaktande när man utvecklar mobila BI-lösningar?*	
49	R4	Ja du…	
50	*OS*	*Nu tänker man ju tablets och smartphones ur ett designperspektiv kanske.*	

51	*VS*	*Vad är de stora utmaningarna där, med just att designa gränssnittet i applikationerna?*	
52	R4	Jag vet inte riktigt vad jag ska säga på den frågan. Det är ju som alltid, när man har en mindre skärm att jobba på, jag menar, BI handlar ju om att presentera information. Och att liksom kunna hitta information och presentera den. Har man en mindre skärm gäller det ju att fokusera ännu mer på "ok, vilken information är det som är viktig" då gäller det att inte ta med för mycket. Det som på en 22 tums skärm ser ok ut, om man har en avancerad grafiskt visualisering eller visar det på tablets, det blir ju bara grötigt och då kanske man måste ta bort lite av den del av informationen som man presenterar. Men jag är inte heller expert på det där området när det gäller gränssnittsdesign. Min analys är inte mycket bättre än någon annans analys. Förenkla måste man väl göra. Det är väl det viktiga.	Dv/ Ds
53	*OS*	*Absolut.*	
54	R4	Sen en annan sak till, det där är ju konstigt egentligen men jag tycker nog att när det gäller mobila enheter är folk bortskämda på ett annat sätt med, det ska vara väldigt lättanvänt. Medan på din desktopenhet så är man nästan van med att systemet ska vara lite, man ska inte riktigt fatta varför man ska klicka på den knappen. Men det gör man ju ändå och då kanske det blir att, man är van att använda appar och så privat så att man tar med sig i arbetet. Det är också en lekmannaanalys.	Ds
55	*OS*	*Tack, väldigt intressant. Fråga 14, vi har pratat om säkerhet, vi har pratat om design. Skulle du kunna säga något om infrastrukturen, vad man bör ta i beaktande när det gäller mobila BI-lösningar då?*	
56	*VS*	*Till skillnad från vanligt BI.*	
57	R4	Ja, det är en sådan fråga som, som det trots allt handlar om ofta, det är ju det här med om man löst det här med brandväggar. Det är ju ingen som orkar hålla på med VPN från sin mobiltelefon. Utan man vill ju att det ska kunna fungera och då gäller det ju att plattformen som man bygger på har bra tänk runt det här. Det vanliga är ju att man har liksom någon applikation som server plattformen och delen av lösningen, den ligger ju utanför brandväggen och sen ska den prata igenom den brandväggen på något sätt. Det gäller ju att fundera på för det kan ju vara så att man köper en lösning som egentligen har schysst mobilt stöd och sen gömmer man den bakom en brandvägg och då får det inte att använda den här lösningen. Såvida inte man är uppkopplad på det trådlösa nätverket på det lokala kontoret. Men det är ju inte så klokt. Det är ju inte särskilt mobilt.	Sec TI
58	*OS*	*Fråga 15. Från ett deviceperspektiv. Vad bör tas i beaktande när mobila BI-lösningar utvecklas? Med device menar vi smartphone vs tablets. Skillnader där. Vad man bör ta i beaktande när man utvecklar för just de här två olika enheterna.*	

59	R4	Jag tror inte att jag förstår frågan. Vad menar du? Vad man ska ta i beaktande om man?	
60	*VS*	*Lite mer, styrka och svagheterna om tablets och smartphones?*	
61	R4	Det är ju vad det är. En smartphone är väldigt liten i skärmen och man har den alltid med sig. Tablets, ja det är ju mittemellan. Jag tror att det är rätt viktigt att man har definierat det här som smartphones och tablets. Att det är de som är mobilt och det måste vara så folk ser på det i allmänhet, mobilt stöd. Det räcker inte med att bara stöjda tablets och det räcker inte med att bara stödja smartphones utan man måste liksom ha bra stöd på båda håll. Det räcker inte med att bara stödja iOS, utan man måste egentligen stödja iOS, Android, och Windows tycker jag då. Men Windows är det ju inte alla som stödjer såklart för att den har inte blivit så stor än. Jag har väl inga styrkor och svagheter, nej det är klart en telefon är en väldigt begränsad plattform men det finns vissa… jag tycker inte man ska klämma in funktioner som inte passar i en telefon. Den typen av lösningar att kunna se information, att kunna se ett exakt lagersaldo. Det är ju en jättebra grej. Eller om man vill titta väntetid på någon produktionslinje eller nånting för att kunna se "ok, hur lång leveranstid har vi på det här?" eller vi som konsultbolag att det ringer nån till mig. Jag sitter på bussen och så frågar de "Har ni en konsult som kan hoppa in på det här uppdraget?" och då har vi en rapport som man kan öppna via telefonen. Sen kan jag se exakt alla konsulters beläggning. Det tillför ju ett väldigt stort värde för oss att kunna besvara direkt, "ja, men det har vi" eller "det har vi inte". Istället för att den potentiella kunden ska behöva vänta en dag tills jag kommer till kontoret nästa gång. Det är ju potentiellt att de hittar en annan leverantör. Så att det är den typen av lösningar jag tycker att man ska hålla sig till lite grand. Det finns inte en människa som skulle orka sitta länge och lägga sin budget på mobiltelefonen. Det är för bökigt liksom. Så det är ingen idé att försöka.	Dv ITC Dv MBI
62	*OS*	*Fråga 17 här. Vad anser du är de största utmaningarna samt möjligheterna för mobilt BI. Om vi tänker ur ett framtidsperspektiv? Vad tror du att det kan utvecklas till? Vilka svagheter? Finn det en framtid?*	

63	R4	Ja, vet ju inte. Utmaningar och möjligheter. Jag skulle inte säga att... smartphones har ju funnits i en fem år. Det är en välkänd mark det här, hur man bygger mobila applikationer. En del leverantörer ligger långt fram och har bra mobilt stöd andra ligger lite efter men det är ju ändå inte jätteavancerade grejer att få till. Så om man ser från ett leverantörsperspektiv alltså, de här stora parterna som erbjuder de här plattformarna. Det är bara för dem att ta till sig och fixa det här, jag tror inte att det är jätteavancerat. Man har ju bra stöd. Sen när det gäller de organisationer som ska implementera det här, där kanske det ligger utmaningen att värdera vilket värde tillför den här typen av lösningar och hur stora investeringar ska de göra. Om det är nån som kommer fram till att vi ska vara helt mobila och alla våra lösningar ska funka i både desktop och mobilt då tror jag att de har mycket pengar att betala som de inte har nåt värde utav.	Ds MBI STM
64	*OS*	*Bara kort om framtiden har du någon prognos där tror du?*	
65	R4	Om vad?	
66	*OS*	*Om, detta mobilt BI?*	
67	*VS*	*Tror du att det kommer öka för er organisation, mobila BI projekt?*	
68	R4	Jag tror att det är två saker som kommer att komma. Lite grand att mer och mer, kanske, det här är ju inget stort på gång. Det pratas en del om design, responsive design. När en lösning… man bygger den ju för att den ska kunna fungera på båda och. Jag tror att de här beslutsstödslösningarna som levereras av Microsoft, IBM och SAP erbjuder, de kommer att bli bättre och bättre på att... det är ingenting man tänker på när man bygger lösningar att plötsligt tänka "det kommer att funka väldigt bra på båda två". Men till exempel att Power BI, jag vet inte om ni har hunnit läsa på om det. Den typen av att bygga ett sånt beslutsstöd-dashboard, där du kan få tillgång till information och det kommer att se snyggt ut på både en PC och en surfplatta och förmodligen på en telefon också. Det blir mer då att man inte behöver tänka så mycket utan systemet i sig, ser till att det här kommer att funka. Jag tror inte att det kommer att funka för alla typer av lösningar men. Sen på frågan, kommer de här att öka? Ja, men naturligtvis kommer det att öka, folk har ju vant sig nu med att man har allt i sin telefon och surfplatta i den mån man har en. Sen tror jag att fler och fler användargrupper kommer att tycka "det här är viktigt för mig, jag vill kunna ha tillgång till informationen". Typ som en ekonomichef som kanske vill kolla av gårdagens försäljning på vägen till bussen. Något som jag tror skulle kunna bli intressant det är ju när det börjar komma BI-system som man kan interagera röstmässigt med. Microsoft har Cortana, Apple kör ju med Siri, alltså att man kan till och med kan börja ställa frågor till beslutstödssystemen, "Hur gick försäljningen igår?" och så får man röst-impact. Så när man sitter i bilen så kan man förhöra sig mot sitt beslutsstödssystem, hur ligger vi till. Man ska inte behöva titta på dashboards, man ska	Ds ITC Ds ITC STM UC

		kunna prata med sin plattform. Det tror jag kommer att komma inom några år mer och mer.	
69	*OS*	*Ok. Tack. Sista frågan här då, R4. Finns det något du vill tilllägga om mobilt BI?*	
70	R4	Nej, jag har ju inte varit förberedd för den intervjun och som jag sa också att, mitt fokus är inte runt mobilt BI. Jag läser ju på men jag är inte jättepåläst på området. Så jag har inget annat att tillägga.	
71	*OS*	*Tack för att du ville ställa upp.*	
72	R4	Ingen fara.	
73	*OS*	*Vi kommer att återkomma till dig för godkännande av transkriptionen.*	
74	R4	Ja, gör det.	
75	*OS*	*Hejdå!*	
76	R4	Hejdå!	

Appendix 6 - Interview Transcript Qlik Technologies Inc.

Interview with: Qlik Technologies Inc.

Interview date: 11:00, 11th of May 2015

Participants: Program Manager, Mobile (R5), Victor Svensson (VS), Omar Saka (OS).

Interviewees: R5

Interviewers: VS, OS

Interview type: Face-to-face

Interview duration: 28 min

Transcribed by: VS

Transcription date: 11th of May 2015

Line	Speaking	Text	Code
1	R5	Hello!	
2	*OS, VS*	*Hello!*	
3	*VS*	*Omar will start with the questions.*	
4	*OS*	*Ok, could you explain your professional background and your current role?*	

5	R5	So right now, I am the Product Manager at Qlik for mobile and collaborative analytics. I have a bachelor in Engineering for Computer Science and I started working as a software engineer and developing software. From my early days, I was developing software for an operating system named EPOC which later became Symbian. So I was Symbian developer like 15 years ago, moved in to different roles, within the mobile industry and ended up in Sweden working as a consultant at Ericsson. So I have a very strong sort of mobile developing background. Worked as Project Manager at one point, even worked in sales for couple of years, and I worked with Motorola, Samsung, I have worked with, a little bit with Nokia, quite a few of the top mobile vendors. Since I have a mix of both technical background as well as sales, I realized that product management was really motivating for me and as an area. I joined Qlik mainly because I was really interested in Qlik's product which I felt was far ahead of the competition and sounded very exciting to me, that I could build a career here and also because of the fact that there was a need for mobility here, and I was interested in Product Management.	
6	*OS*	*How about Qlik as an organization, what do you do?*	
7	R5	So we are in the business of Business Discovery as we call it. Which means that we help people makes sense of their data and analyze it. So it is not just visualization of data, which is one part of it, but we provide the platform for analysis of data and for creating your own solutions if you do not find our solutions helpful. So we have two products, Qlikview and Qlik Sense. Qlikview is a product for what we call guided analytics, which means that if you have a work flow in your analytics, you sort of implement that work flow within our tool and the other is what we call self-service BI. So that is self-service visualization which means that you basically, you know, it is free fall back, how to discover your data.	
8	*OS*	*Yeah, on question number three, we have a definition of Business Intelligence: BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal, and competitive information to planners and decision makers. What do you think about this definition? What is BI for you?*	

9	R5	So BI, when we look at the industry we work in. BI and data discovery or business discovery which is sort of... the segment we play in are slightly different. So Business Intelligence as you describe, is about presenting information for decision making. Whereas business discovery is more about giving people access to data and visualization so that they can make their own discoveries from the data. So instead of... so BI is really about pre-packaged reports, right? That is the traditional BI industry, where you know...the IT industry or IT guys prepare reports and then they give them to business users for analysis. Whereas the industry we work in, is a segment of BI, which is called business discovery or data discovery where it is not just static reports but interactive dashboards. Which you then can interact with, you know drill-down, dig deeper, go around and make your own discoveries so that you can answer questions that you did not know you had, when you started. So you basically... it is like exploring data continuously to answer questions. So that is what I would say. Maybe, expand the definition from BI a little bit to business discovery and more include self-service visualization as well.	
10	*OS*	*Ok, let us go to shift to mobility then. What is your overall organizational strategy surrounding BI?*	
11	R5	It is...we have sort of a mobile-first strategy and it says that we have two strategic products and we are expanding to become a multi-product company. But right now, if you look at it. We have guided analytics, and self-service visualizations and we understand that different kind of customers have different needs. Some customers really want to implement a work flow, whereas others want more, sort of free from business discovery and then business discovery market is more, sort of mobile-first market. So we have a product which is Qlik Sense which is touch first, mobile first, is responsive. So it means that it has been developed using responsive design. I do not know if you know what that means?	STM Ds
12	*VS,OS*	*Yes, we do.*	
13	R5	Yes, which means that it can scale across multiple devices. So we clearly identified a strategy, a need for users to be able to pick and chose any device they want, right. For example you have an iPhone and you have an Android phone, somebody might have a tablet. You should not require these people to have to use different versions of your software or your client to do the same thing. So we never let tools and platforms that allows you to use all of these devices with one platform of ours. That is really our strategy.	Ds ITC
14	*VS*	*In the web browser then?*	
15	R5	Yes.	
16	*OS*	*Alright, question five then. Does your mobile BI solutions steam from customer demand to become mobile or does your solutions advice the customers to become mobile?*	

17	R5	I think it is a bit of both. In some cases...in most cases we are actually leading the market, we were early in defining the need for mobile BI even when our previous... the existing product that we have, Qlikview. We had mobile clients for that product well before any of our competitors did. Because we could see what was happening in the mobile industry, but we also offered big customers who are on the same frequency as us. In the sense like you just described in your question. That there is a customer demand to become more mobile, right. So we can see there are certain customers who are ahead of the curve in their industry. That we meet, were we really have a good frequency because they understand the need for mobility. They understand that everyone who uses a smartphone wants to have access to their enterprise data, right. So I think it is a little bit of both. We are leading the industry in some cases, but there are of course customers who are ahead of the curve and also sort of helping us transform and develop.	STM
18	*OS*	*Question number six. How has Bring Your Own Device and the general consumerization of business IT affected the BI solutions you develop?*	
19	R5	That is a good question. So if you look at a generation back, there was this, desktop and laptop kind of environment. Where people would use enterprise software on their desktops and laptops, right. So when you develop software, when you talk about the BI solutions being developed, or any enterprise software being developed. You had your user, who was primarily static, you are using one device, not moving around that much.	ITC STM
20	*OS*	*Yes.*	

21	R5	With Bring Your Own Device, sorry. Then the next step in the computing world when mobile devices came along, right, and enterprise devices were provisioned. What used to happen then, was that the IT-department used to provide devices to the user. So you had Blackberry for example which was extremely popular. When you joined a large company, you would get a Blackberry device from them and that device was provisioned for everything that you would need, like your email etc. Everything was in that. For software developers or enterprise software developers it meant that you added one more platform. You have the desktop or the laptop and then you added a platform, let us say Blackberry. So you support one more client. With Bring Your Own Device, there are two things that has happened. One is that the kind of devices that people bring, are extremely varied, it's not default factor, right. You have iPhones, you have Android phones, you have tablets, what not. The other thing is that, people are using them in really interesting ways, you know. People use them, but for frequently, and the use cases, more like, you have a "snacking" use case you "snack" information, consistently and continuously, right. So what that means is that we as enterprise software developers have to think about a new paradigm of usage. It is not just about more clients. People use these devices in a different way and there are many kind of different devices. So what we have adopted is, we have done a lot of user research into how people actually use devices and looked and the different form factors then come up with a solution which is HTML5 based, which is responsive design. Which allows us to sort of adapt to any of these devices, and at the same time keep the experience optimized to each device. Which is very key to us. So we are... really ahead of our competition in that sense and that we are the only ones who have a responsive client right now, that uses a responsive design. That is directly because of consumerization of IT. Where we see the need for many different kinds of devices.	STM ITC TI ITC MBI Ds ITC
22	*OS*	*Yes. Question number seven. Could you describe the relationship between the Cloud and the mobile BI solutions you develop?*	

23	R5	There is two kinds of relationships. One is that traditionally Business Intelligence has not been so open to Cloud Computing. If you look at four or five years ago, you know Salesforce has been around for a while, Sierra Data has moved in to the cloud, email has moved in to the cloud with Gmail. You know, 60% of enterprises, small to medium enterprises in the US actually uses Gmail as their corporate email system. But for some reason, analytical and transactional data has not moved in to the cloud yet, or not... five years ago had not moved in to the cloud. Because it was considered very sort of strategic to the enterprise. But that has changed now for a period of time and more and more enterprises are taking a cloud approach to, not just their CRM data, but actually the analytics as well. That has a direct bearing of the mobile BI solutions, because A, we need to be able to consume all of that data, that both created by cloud software, or cloud computing but also the fact that the solution might be deployed on the cloud. So it is good because it gives the user access at all times because it is not hidden behind firewalls. But the same time it brings the full challenges of security. That is one thing. The other thing that is really good about Cloud Computing is that, for example we have Qlik Cloud, which is a cloud-based BI solution or business discovery solution. It gives us a great platform to understand our users a little bit better. Because we have a direct relationship with the user. Traditionally IT has been sort of the buyer. And we did not have direct contact with the user unless we meant via IT. In order to talk to the business user we have to set up a meeting through IT, and so on and so forth.	CC MBI Sec CC
25	*OS*	*Yes.*	
26	R5	But with the cloud it means now that we have a direct relationship. So we get feedback from the users directly and we can use that to improve the product, continuously.	
27	*OS*	*As you well know, computers are becoming more pervasive and ubiquitous for example IoT and wearables. Do you see any opportunities for BI within these areas?*	

28	R5	Huge opportunities. There are so many different aspects of this. It is so big. So, when I look at wearables, I think about smartphones ten years ago, fifteen years ago. When people were questioning if these were early trends or were they going to go mass-market. Same thing with wearables, there are going to be mass-marketed in ten years. Even the smart watches. There are so many ways that it is going to impact BI. First of all, it is as simple as, if you look at connected devices, not just the wearables, but smart devices that you have inside the house, they constantly generate data, all the time. But it is very different from the way data has been looked at traditionally. These devices will generate a lot of data, over a very long period of time. So it is small pieces of data, continously. Whereas the industry currently looks at data as something that's sitting in a data warehouse, you know, our competitors, fortunately at Qlikview we don't have this mentality. But a lot of our competitors look at data and think about data sitting in one place, in a large data warehouse, which is not how it's going to be with wearables and IoT. It's going to be continuously generated. So that is one aspect of it. The whole way of data being generated is going to be different. The second is that it brings some interesting use cases. So on my watch for example, I have an Apple Watch right, it's not as interesting for me to look at the visualizations that are related to data that i'm interested in, but rather i'm interested in notifications. It's a 'glancing' use case, I use it for a few seconds at a time, so if something changes I want to be notified on the change. But I don't want to look at the trend here, right. So that's another, so there are many different aspects of that change, that drive both the way we generate and consume data, but also the visualizations themselves will advance in order to accommodate these.	UC STM UC TI UC
29	*VS*	*Yeah, okay.*	
30	R5	Sorry, one more thing. Also one things is that it also means that the interested for data is moving in to the consumer space. Consumers will have a huge interest in the data itself, not just enterprises.	MBI
31	*VS*	*Cool.*	
32	*OS*	*We have asked about BI and its definition. How about mobile BI, and that's definition? What is mobile BI for you?*	
33	R5	I actually don't like the term mobile BI as such because it sounds like it's BI and mobile BI, you know it sounds different. For me what has happened is that you have a multitude of computing platforms, PC is a computing platform and mobile devices and smartphones are a computing platform, and enterprise software or anything that I'm as an individual is using, any tool or any software, has to accommodate all of these use cases. It's a multi-screen world, right. You have TV as a screen, you have laptop as a screen and you have the smartphone as a screen. So for me mobile BI is not a subset of BI, it's actually the user who's becoming	MBI Dv MBI

		mobile, and the fact that vendors within the BI industry or business discovery space have to adapt to the user being, you know, on a different computing platform. So for me that's the definition, adapting to that, different needs.	
34	*OS*	*Okay, question number 10. What were the main drivers for your organization to enter the mobile BI market?*	
35	R5	Haha, everything around us, pretty much. You know, I mean, the signals are so clear, it's obvious that users are becoming more and more mobile. If you look at the number of devices last year, a billion smartphones were sold, a billion smartphones. 1.2 actually. And you compare that to the number of laptops, that is one data point, there are so many data points like that, internet users etc., so it's obvious.	STM
36	*OS*	*Yeah. Question 11 then. What's your customers' main requests when it comes to mobile BI?*	
37	R5	Everything. They want to be able to do everything that they can on the PC, but we know that it's not like that. Typically, when you look at the platform that we have, there are three steps to get into a BI app. You have the data preparation part, then you have creation of business intelligence app, and then you have consumption. What we see is that the main demand, or the main use case for mobile is actually consumption and collaboration. People want to be able to consume information and collaborate, so I found something that's interesting, I want to collaborate with someone or send someone an email, saying that "Hey, the profit in this market is dropping in the last quarter, what's going on?". So it's a lot of collaborative use cases and consumption of information.	MBI
38	*OS*	*Okay. I know we have touched security, but if we go in deeper, what's the considerations when developing these solutions?*	
39	R5	So it depends a lot on the market. If you look at small to medium businesses, the security requirements are not so high, but when you look at enterprises in certain industries there are, there is a large demand for security. But irrespective of the market, you can from a vendor perspective, what we are providing, will only be the thinks that we think about. So a mobile as a device is easy to lose, I mean I have this iPhone or a tablet that I can just forget somewhere on a train or on a plane. With BI you have critical business data on that device, so there are two points of control. There's authorization and authentication and both need to be secure on a device, so you need to be able to authenticate as a user "who I am" on the server side. So if I'm going to access data there server should know who you are as a user. Once that happen you also need to make sure that the right user have access to the right data, so if you have a large sales department you want to make sure that sales people have access to their individual pieces of data. Instead of having access to everything. And then, when the data is on the device you need to be able to encrypt it, so that if	Sec

		you lose the device nobody can sort of "brake in" to it and get the data out. So it's authorization, authentication and security of data addressed.	
40	*VS*	*Okay.*	
41	*OS*	*If we talk more about design, what are the main considerations there?*	
42	R5	Hehe, there's so many ways to answer that question. But ease of use is the obvious thing with the device and efficiency is very important, in the sense that we need to put a lot of though into how the people will use the device and what they want to do with the data. So giving them a very deep level menu for accessing visualizations is a bad thing. They need to be able to get to the visualizations quickly. Search is very important, so we put a really good search bar right on top when they access our solution, so that they can search quickly. Consumption is more important than editing and creating, so we put that, all of the consumption use cases sort of easy to access, where as any editing is sort of hidden behind . So all of these things, understanding the user, understanding how the use their device is extremely important. You need to make sure that you minimize the core experience to those things that are very very important for the user, and take away everything that you feel is not important. Rather than giving them too many options and too many menus to sort of choose from. So the design is sort of critical when it comes to devices.	Ds
43	*OS*	*From an infrastructure point-of-view, what's the considerations then?*	
44	R5	I would say that security is one consideration, to be able to set up everything properly. Ubiquitous access, giving them access anywhere, because mobile uses per definition are mobile, they are moving around. And the fact that they might be at the office, at home, at an airport, travelling, that's another thing to think about. You have to set up the infrastructure so that they can have access to the data securely from all of these different places. You need to be able to scale up and down, because it's "snacking" you might have peaks at a certain time, so that you have to think about.	Sec TI
45	*OS*	*From a device point-of-view, tablets and smartphones, what do you consider to be the biggest challenges in developing these solutions?*	

46	R5	With smartphones, the biggest challenge is frankly the screen size. It used to be the processors some time back, but the processors that are available on these kind of devices are extremely high right now, so that's not a problem. It's the screen size on a smartphone, were, how do you effectively show a visualization with a million data points? On a smartphone. So we have done some things like, there's some smart compression in algorithms, like really... really high compression algorithms that allow you to see a visualization on a mobile device, even if it has eight million data points. So that's on thing. On tablets it's more about, actually tablets are not that challenging today, the challenge is sort of more in the variation you have in the capabilities of tablets. So at one end you have Android tablets which are, for a 1000 kronors you can by one that's really low end, which have really bad processors and memory. And on the other hand you have an Xperia tablet or you have an iPad Air 2, really high specs. And the user expects both of these to behave in the same way. So we have a challenge in making sure that the software performs on all of these.	Dv Ds Dv ITC
47	*VS*	*But you don't store any data on the device, or?*	
48	R5	In Qlikview we do, we have offline. In Qlik Sense we store data in the browser cache, but that's only temporary storage, only when you are using, we don't have an offline solution in Qlik Sense today.	Ds
49	*VS*	*Aha, okay.*	
50	*OS*	*Question number 16, I know we have touched this, but if we consider the biggest challenges in the whole of mobile BI, developing mobile BI solutions, what are these?*	
51	R5	How is that different from the previous question?	
52	*OS*	*That was more device point-of-view, this is more the overview of whole mobile BI, like everything we have discussed.*	
53	R5	Okay. I think understanding of the user, we need to, as a product manager I need to know the expectations of the user. It's sort of challenging, it's something you have to think about with mobile, and a lot of people fail in that. They just start creating solutions based on the device, or based on what they think is important. It is extremely important before you develop a solution to go out and spend the time and spend the money in finding out more about who your user is, and what is it that they are trying to do? When you build a solution. That's they key thing I would say.	MBI
54	*VS*	*Okay.*	
55	*OS*	*I know we have described already a use case, but could you describe one more?*	

56	R5	Travelling salesman is a really good use case. I mean you have people, this is literally a use case that I deal with like on a daily basis with customers, sales representatives of large enterprise software companies, which are going out and meeting customers. It could be in healthcare for example, they are meeting doctors, or it could be insurance guys who are meeting even individual, you know, customers who have bought large insurance policies. And these industries are driven by data, so you need to have data about performance, about KPI:s, everything on your fingertips. And you don't travel with a laptop anymore, the sales reps are moving over to tablets and smartphones, that's happening across many industries. That's a really good use case for mobile BI. Logistics is another really good use case for mobile BI. So these three I would say, travelling sales people, sales reps in healthcare, or insurance or logistics.	MBI
57	*VS*	*Would you say that these people they only use the mobile BI, or do they use the laptop too?*	
58	R5	I would say that there's a change in the last two years. Two years ago it was a combination, now they are moving over to tablets and smartphones completely. I know customers who have eight to ten thousand sales reps, and they have stopped buying laptops for the sales reps, they are only buying tablets.	STM Dv
59	*OS*	*Okay, interesting. The last two finishing questions. How do you look upon the future of mobile BI?*	
60	R5	It's not so much about the future of mobile BI, but the future of, or the next computing platform for BI. I think that's connected devices actually, IoT that we touched upon earlier. So what's happening now is that you have the smartphone as your main computing device today. But more and more people are deploying smart devices in their houses, there is an industrial IoT, internet of things in the industry, you have wearables. And the smartphone is sort of becoming the control point, or the central, sort of, control unit for these things, were you sit down and look at how the graphs are, or the visualizations, on the data from all of these things. So future of mobile BI is more towards the impact that IoT and wearables will have on BI, and how that will impact the mobile use case.	UC Dv MBI
61	*VS*	*Yeah okay.*	
62	*OS*	*Question number 19, is there anything you would like to add on the subject?*	

63	R5	Yeah absolutely. So if we talk about mobile BI as a way people use smartphones and tablets for decision making, I see one very interesting thing which is, specifically with the appearance of the large smartphones, like 6 Plus, iPhone 6 Plus. Smartphones has always been this consumption device, which I talked about earlier, where you consume data. And typically if you find something interesting you tend to delegate it to someone, or collaborate around it. So it's a part of the journey of a discovery, so you start somewhere, you do something on a smartphone but you take the decision somewhere else. But with the larger smartphones more and more these devices are becoming the point of decision making. So instead of being just a part of the data discovery journey these devices are becoming the end point. So people actually make decisions on these devices, based on what they see. That's something that is very interesting, that's also a part of, like, maybe we should have touched upon future of mobile BI. Mobile devices are moving away from just being a part of that journey, but actually becoming the decision points.	MBI Dv MBI
64	*VS*	*And the screen size is like the biggest factor?*	
65	R5	It's a big factor yes.	Dv
66	*VS*	*Interesting.*	
67	*OS*	*Great! That was really interesting.*	
68	R5	Glad to hear that. Quite a good time.	
69	*VS*	*Thank you!*	
70	R5	Bye!	
71	*VS, OS*	*Bye!*	

Appendix 7 - Interview Transcript Enfo Pointer

Interview with: Enfo Pointer

Interview date: 13:00, 13th of May 2015

Participants: BI Sales Representative (R6), Victor Svensson (VS), Omar Saka (OS).

Interviewee: R6

Interviewers: VS, OS

Interview type: Telephone

Interview duration: 42 min

Transcribed by: OS

Transcription date: 20th of May 2015

Line	Speaking	Text	Code
1	*OS*	*Hej!*	
2	*VS*	*Hej!*	
3	*R6*	*Hej på er.*	
4	*VS*	*Då kör vi igång med frågorna direkt. Kan du förklara din professionella bakgrund och nuvarande roll?*	
5	R6	Ja. Jag jobbar själv då som säljare inom BI. Jag hjälper företag med att hitta lösningar inom BI som ger dem möjlighet att ta bättre beslut för hela sitt företag eller hela sin organisation. Jag har egentligen en teknisk och ekonomisk bakgrund, har jobbat med system och tjänster. Både från ett systemtekniskt perspektiv men också som säljare av de här tjänsterna dem sista 15 åren kan man säga.	
6	*VS*	*Vad bra.*	
7	R6	Så jag har jobbat med BI i fyra år kan man säga, specifikt då.	
8	*VS*	*Bra. Kan du förklara vad Enfo Pointer gör inom BI?*	
9	R6	Vi på Enfo Pointer är ett ledande bolag i Sverige inom BI, med fokus på DW, alltså data warehouse, rapportanalys, budget och planering, och BI-rådgivning. Sen är vi partner och återförsäljare för ett antal av dem ledande produkterna globalt då inom BI. I vårt fall är det Microsoft och Qlikview som vi jobbar med. Så där är vi en av de större partner och återförsäljarna i norden.	
10	*VS*	*Okej, bra. Nu kommer jag säga en definition av BI och sen får du säga om du tycker den stämmer eller om någonting behöver läggas till. BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal, and competitive information to planners and decision makers.*	
11	R6	Det där lät som en rätt bra definition, eller den stämmer ju så klart. Jag vet inte vad du menar med competitive, men det jag skulle vilja lägga till där egentligen är i så fall att, och det är ju också något som är ganska nytt och som kommit nu de sista åren, och det är att man har möjlighet att även inhämtaextern information. Alltså förmågan att inom BI för ett företag då att förhålla sig och börja använda sig av extern information för sin BI-analys. Att inte bara titta på sin egen interna data från sina egna system. Det är väl det man skulle få till i kompletteringen i så fall. Samt möjligtvis också att BI är numera, vilket vi driver hårt, är för alla i en organisation, inte bara som det tidigare varit för vissa beslutsfattare eller nyckelpersoner. Utan BI är för alla, det är en analytisk, BI är en analytisk plattform för alla i ett företag egentligen.	
12	*VS*	*Intressant.*	
13	R6	Nu jobbar jag som säljare som ni förstår så jag kommer, jag ska försöka sälja BI till er.	
14	*VS, OS*	*Haha.*	

15	*VS*	*Det förstår vi, det gör inget. Okej, då går vi vidare. Vad är er organisations huvudfokus när det kommer till BI? Är det desktop, mer desktop-orienterat eller satsar ni stort på mobilt?*	
16	R6	Vad menar du med den frågan? Är det vår, Enfo Pointers då, eller hur vi säljer till våra kunder eller vad?	
17	*VS*	*Ja, hur ni säljer till era kunder.*	
18	R6	Ehm, ja. Egentligen, för att svara lite konstigt på frågan, så är det egentligen inte något av det. Vi vill ju egentligen att först att man ska ha en BI-strategi i sig, vilket inte de flesta har idag, eller väldigt få företag har. När man väl har en BI-strategi så ingår det i den att definiera hur man konsumerar BI. Där ser vi att de flesta företag idag har och kommer ha stor nytta av en mobil konsumtion, om jag får uttrycka mig så. Så vi tänker inte så mycket så egentligen, om det är en fet klient eller mobilt, utan det är ju, i en bra BI-strategi så kommer ju bägge finnas med, kan man säga. Om man inte blandar in begreppet cloud ännu då, men om vi håller oss till, väntar med det så.	MBI STM
19	*VS*	*Jaha okej, men då svarade du nästan lite på nästa fråga då också. Men då, det handlar mycket om vilken typ av kund det är, om dem, om ni föreslår mobilt BI eller inte då? Det är den här strategin det hänger på?*	
20	R6	Ja faktiskt alltså. För, vad ska man säga, det finns ju något som man, en drivande faktor på marknaden är ju trots allt mobilt BI, det är något som ökar ganska kraftigt. Även då inom olika skäl när det kommer nya enheter och folk använder sina paddor och sina telefoner mer utbrett affärsmässigt. Så någonstans så känner vi i alla fall att ett mobilt BI-behov kommer oftast ifrån ledningsperspektivet, sällan från andra delar av bolaget. Det är där ifrån intresset kommer för där är man att få det mer serverat till sig, i form av en rapportorienterad setup. När man vill gå från den rapportorienterade setupen till en mer analysorienterad och kunna konsumera sin BI från den vägen, och då blir det ett annat behov hos det bolaget egentligen där efter. För då blir det ganska naturligt att övriga delar av bolaget också kommer ha nytta av och vilja ha en mobil access till sin BI-lösning. När vi pratar med våra kunder så är det också ledningen som är drivande när det gäller den mobila behovet om man säger.	MBI STM MBI STM
21	*VS*	*Okej.*	
22	R6	Jag vet inte om det var svar på frågan eller...	
23	*VS*	*Nej men det var väl ett bra svar på frågan. Hänger det samman med att dem kanske reser mycket då eller?*	
24	R6	Nej jag tror det, det är flera saker. Dels så kan det ju vara att man vill ha det tillgängligt var man än är, om man säger, det är det ena. Men det andra är att man, man vill ha det mer krispigt, alltså man från ledningshållet är van att få mindre information, färre KPI:er och styra och agera på. Det tror jag är en, ska inte säga felaktig bild, men bara för att det är en lite mindre	STM MBI

		device eller enhet så behöver inte det betyda att du får mindre information eller mindre underlag för beslut, men det är det man tror ofta. Men däremot så ser ju vi en, tvärtom då, att med modern teknologi så ska ju en modern BI-plattform, en mobil BI-plattform, förse användaren med samma typ av information och ge svar på den här frågan vad som har hänt eller varför det har hänt. Även för en ledningsperson, en person i ledningen. Men oftast är de ju vana vid att få en mindre information men när vi har gett dem en mobil lösning så kommer oftast behovet av att se mer än vad de är vana vid och intresset av att se mer. Där kommer det in då att det är ganska viktigt att man väljer en modern plattform som kan ge dem den möjligheten. För det är en väsentlig skillnad på om du ska trycka ut information till en ledningsperson i en begränsad informationsmängd eller om du ska ge dem, egentligen access till hela den mobila BI-lösningen, men bara just nu kan jag visa en del av den men att de själva kan bestämma att se mer eller gå vidare. Där tror vi det finns en vattendelare i teknologi, kan man säga, på marknaden just nu.	TI
25	*VS*	*Okej. Yes.*	
26	R6	Ni får ursäkta om jag svävar ut lite ibland men vissa frågor hänger ju ihop så får väl hjälpas åt att få ihop svaren här sen kanske.	
27	*VS*	*Precis, det gör inget om dem, om det går ihop i lite och vi kan hoppa över en eller så, det gör inget för vår del.*	
28	R6	Ja.	
29	*VS*	*Men om vi tittar lite på det här med bring your own device och IT consumerization, känner ni att det påverkar BI-lösningarna?*	
30	R6	Både och. Tidigare har det varit ett problem, delvis fortfarande kanske, att teknologin inte har stöttat olika enheter, olika storlekar på skärmar på ett bra sätt. Kombinerat då med ett säkerhetstänk som man vill så att säga upprätthålla på den nivå man nu vill ha på ett bolag. Samtidigt håller det på att svänga lite grann för vi ser ju till exempel då att, ta till exempel Qlik. Qlik Sense som vi jobbar med stöder ju fullt ut HTML5 vilket innebär att man inte behöver göra någon anpassning för olika enheter utan det funkar per automatik för alla enheter som finns på marknaden just nu. Tillsammans med att företag mer och mer accepterar att gå över till molnlösningar. Kanske inte på hela men delar av sitt systembehov inom en verksamhet och därmed våga inom citationstecken "släppa ut sitt data utanför sitt intranät", på ett annat sätt än innan då. Då är ju steget till ett mobilt BI kanske mindre nu än vad det var för bara något år sedan egentligen. Och användarna då, man kan ju bara se till sig själv som konsument, man är ju van att lösa mycket av sina dagliga uppgifter med hjälp av en mobil eller padda. Folk rör på sig mer och mer, jag tror det driver en hel del men, men kanske inte att det påverkar BI jättemycket ännu. Men det	ITC Sec Ds ITC CC MBI STM ITC

		har nog varit lite grann att jag tror IT, om man får måla upp, IT har nog bromsat det lite grann. Man har kanske blivit tvingad att hantera den frågan, kan man säga. Och där tror jag återigen då att när ledningen kommer till IT-avdelningen och säger "vi vill ha våra BI-lösningar mobilt" då väger det mer och påverkar mer än när man från andra delar i en verksamhet ställer samma fråga. Svaret är väl ja då.	
31	*VS*	*Nej men vi förstår. Bra. Om vi tittar på nyare teknologier som IoT wearables, ser ni några möjligheter för mobilt BI inom dem områdena?*	
32	R6	Kan du utveckla lite vad du menar med IoT och wearables?	
33	*VS*	*Ja, till exempel om man skulle inkorporera den här nya Apple Watchen till exempel, med sitt BI-system. Visualiseringar eller notifikationer där. Är det något ni har funderat på?*	
34	R6	Jag har faktiskt sett en demo från när man integrerar faktiskt Qlikview med Apple Watch, så det finns möjlighet att göra det. Men vi har inte funderat så jättemycket på det egentligen, mer än att, vad ska man säga... den, det kommer ju fler datakällor hela tiden på olika sätt och vis, det beror på vilken bransch man som företag är i, om man är i livsmedel eller man kanske är i hälsobranschen på ett eller annat sätt. Så vill man ju hjälpa sina kunder med bättre beslut kring de produkterna man själv säljer och därmed tror jag BI kommer bli mer integrerat in i andra produkter och andra portaler och tjänster, mer sömlöst framöver än vad det är idag. Så du har kanske inte en separat BI-lösning på det sättet utan den finns som en del utav en tjänst eller en portal. Men den som levererar, avdelningen eller företaget eller den som levererar den här BI-tjänsten, den är ju inte intresserad av att utveckla en särskild lösning bara för varje mottagare. Det ska ju fortfarande vara samma BI-plattform i botten, men sen hur den konsumeras eller hur den integreras det är ju ganska ointressant. Så där kommer det ställa krav på själva teknologin igen, att den kan tillgängliggöras på olika sätt och vis. Sen om man konsumerar det genom en Apple Watch eller Google Glass eller någonting det spelar, det har egentligen ingen betydelse. Faktiskt. Jag tror det här kommer förändra sig också framöver men det är lite tidigt ännu.	UC MBI ITC UC
35	*VS*	*Men om man kopplar det här tillbaks till bring your own device och IT consumerization, kan det kanske påverka mer där när det blir allt fler olika enheter som ska stödjas?*	
36	R6	Ja det tror jag nog. Det kommer komma tillbaka till den BI-strategin som jag pratade inledningsvis om, som vi tycker ett företag ska ha. Att man talar om och bestämmer vad är viktigt för respektive målgrupp för att dem ska kunna ta bättre beslut. Sen hur dem konsumerar det, vilken device eller vilket format, det är ganska ointressant men det vill man säkerställa ur ett företagsperspektiv är att dem får den informationen som driver affären i rätt riktning just nu. Och på samma sätt ur ett	MBI ITC STM

		konsumtionsperspektiv så bryr ju inte jag mig om heller, jag vill ju bara ha informationen. Sen om jag råkar ha den informationen i min padda eller klocka det spelar ju inte så stor roll heller för mig, som konsumerar den. Så den här sömlösa gränsförflyttningen har ju varit en utmaning när det blir mindre och mindre. Så det gör ju att BI kommer, finns ju på fler plattformar, mer tillgängligt. Men det kommer också ställa större krav på företagsledningen att definiera och IT, att IT, eller BI, att BI är en föränd... alltså en sak som förändras med företaget hela tiden egentligen.	MBI
37	*VS*	*Okej. Yes. Vi har ju pratat om traditionellt BI och dess definition. Hur skulle du definiera mobilt BI?*	
38	R6	Eh... ja det är ju inte lätt kanske. För oss så är det egentligen en, mobilt BI är ju, det är ju någonting som ger dig full visualisering, full analys, möjlighet att skapa, administrerar och samarbeta med andra på vilken device eller enhet som helst. Mobilt BI är liksom, det är inget annat än det vanliga BI:et, om man säger omobilt BI, utan det är egentligen en förlängning av BI. Så vi känner väl att mobilt BI för något år sedan, då var det mer statiskt och reaktivt, men mobilt BI måste vara visuellt, det måste ge användaren möjlighet att förändra och gå från frågan "vad" till "hur". Vad som har hänt det kan man ta reda på ganska lätt men hur det har hänt, hur kunde det ske, vad ska vi göra annorlunda, vad kan jag förändra nästa gång. Den frågan måste vi kunna ställa via ett mobilt BI. Det kan du inte göra om det är ett statiskt BI, så det menar vi med ett modernt mobilt BI.	MBI ITC MBI
39	*VS*	*Ja, så det är inte bara en rapport liksom utan man ska kunna gräva djupare?*	
40	R6	Exakt. Och det är där som det ställer krav på när du får, låt oss säga att du får upp din mobila BI-lösning i din padda och så ser du något intressant som du vill dyka djupare i, då måste du få den möjligheten att dyka djupare i, ta reda på mer och ställa nya frågor för att kunna agera. Annars tvingar du ändå gå tillbaka till din traditionella BI-lösning eller gå tillbaka till ditt källsystem och så vidare. Det gäller att kunna hjälpa användaren hela vägen i mål så att säga. Och sen att ett modernt mobilt BI det gör ju ingen skillnad på enheter egentligen då, vilken enhet är ointressant.	MBI ITC
41	*OS*	*Japp.*	
42	R6	Ni kan säkert det här bättre än jag kan, ni har ju pluggat i ett antal år.	
43	*OS, VS*	*Hahahaha.*	
44	*VS*	*Ja vi har ju läst lite litteratur om det men...*	
45	*OS*	*Det är intressant att se vad dem som är ute i fältet tycker.*	
46	*VS*	*Ja, det brukar ju vara lite olika.*	

47	R6	Ja det är ju ganska nytt fortfarande för många, så det är liksom, många pratar om mobilt BI men det är ganska få som verkligen aktivt jobbar med det på sättet det borde göras, tycker vi då.	
48	*VS*	*Okej. Om vi går vidare då. Vad skulle ni säga var de huvudsakliga incitamenten för att börja erbjuda mobilt BI till era kunder?*	
49	R6	Ja det är nog egentligen att vi ser ju hos de företagen eller kunderna till oss som har fått ut störst effekt av sin investering, det är nästan alltid också dem som har spridit användandet mest i sin organisation. Alltså mycket folk som använder BI, stor effekt, fåtal användare liten effekt, det är nästan alltid lika. Största incitamentet där är ju egentligen att nå flera användare med hjälp av en BI, en mobil BI-lösning. Och hjälpa dem att få fokus på "varför" istället för "vad", helt enkelt. Och det finns ju också undersökningar som påvisar att företag som har snabbare tillgänglighet, enklare tillgänglighet till sin information, sin BI-information, går bättre, mår bättre, tar snabbare beslut, är mer lönsamma och så vidare. Så det finns ju ekonomiska incitament också att investera i mobilt BI.	STM MBI
50	*VS*	*Spännande. Vad skulle du säga är kundernas huvudsakliga efterfrågan och krav när det kommer till mobilt BI?*	
51	R6	Kraven, framförallt det är ju... det här blir lite konstigt men alla vill ju att det ska vara visuellt snyggt och attraktivt. Det är det första som kommer upp på agendan och det kan man tycka är självklart på ett eller annat sätt men, det är det ena. Det andra är att det ska vara enkelt, och man ska se samma information som man då ser i sin vanliga BI-lösning, i sin tjocka klient. Det är kraven som brukar finnas men... och det ska vara nåbart vart som helst såklart. Sen ska det kunna stödja stora och små devices. Men där har man ju, nu råkar vi jobba med Qlik Sense som är marknadsledande när det gäller visualisering och gör komplex data enkelt. Det är inte alla verktyg som har den fördelen men bortsett från verktyget så är det just det som är utmaningen egentligen. Att hjälpa användare via modern teknologi, att på liten device se rätt saker och på ett snyggt och attraktivt sätt. Så kunden har rätt i sin kravställning. Utan att det är visuellt snyggt så tappar man attraktionskraften och man tycker att det är inte kul att använda längre. Det gäller att bestämma sig också, vad är viktigt att visa då och tänka målgrupp. Oftast så är det så här när man pratar med befintliga kunder, så har man oftast en befintlig BI-lösning, ja och så säger man "nu vill vi ha detta på en padda eller en telefon också". Då måste man tänka sig igenom den strategin ett varv till egentligen samtidigt så vill man att teknologin, den investeringen du har gjort, en gång. Du ska inte behöva göra om den eller investera ytterligare utan du ska kunna återanvända den investeringen så klart ju. Men det är väl ungefär.	Ds MBI Dv MBI Ds Dv TI

52	*VS*	*Ja, jag förstod vad du menade. Just det här med visualiseringen är det viktigare att det är snyggt på mobila enheter än om man kör det på desktop BI?*	
53	R6	Alltså det är ju, vi lever ju i en värld där alla har telefon på något sätt. Man är ju ganska kräsen och tappar intresset för produkter eller applikationer som inte är snygga eller som inte fungerar som man förväntar sig. Kraven man har är att det ska vara självlärande, du ska direkt förstå, du ska inte behöva lära om, bara för att du har kört en BI plattform på jobbet, på kontoret, på din dator eller tjocka klient så ska du inte behöva lära om. När du kommer till samma lösning på din andra, lilla device. Det kommer nya rön hela tiden när det gäller design och visualisering. Hur människan fungerar, hur man ska designa för att du ska förstå sambanden lättare när det gäller såna konkreta saker som olika typer av diagram. Vilken typ av diagram passar, vilken typ av data, vilken typ av färger fungerar bäst osv. Det där är en hel vetenskap men med de verktygen som vi jobbar med så är det inget som användaren utvecklar utan det är best-practice. Systemen som är uppbyggda idag, för att konsumenten ska kunna, den som konsumerar ska kunna ta till sig data på bästa sätt helt enkelt. Den är helt avgörande, för att förstår du inte det du ser, eller inte ser sambanden, eller till och med att det är oaptitligt att titta på, då blir det inte bra. Då riskerar du, då kan du inte ta de besluten som förväntas tas och kan inte se sambanden som man försöker hitta. Så design och visualisering är superviktigt. Det är något som vi har jobbat jättemycket med. Så det ska man absolut inte underskatta, tricket är att användaren slipper uppfinna det här själv, för mycket. Kan ta ett exempel, återigen Qlik Sense. Om du har ett diagram med traditionellt X och Y, ett plotterdiagram eller skattediagram så tittar du på det, så förstår man ju själv, det går inte att se värdet av varje punkt. Utan först får du en minidiagram där du ser de grova dragen, sen kan du zooma in på ett traditionellt sätt med fingrarna och ju lägre zoom-nivå du kommer till desto mer detaljerad data visas i grafen. Så man får en preview och sen kan du hjälpa användaren att guida rätt. Det här området eller den här sektionen verkar mest intressant så borrar du dig vidare i den. Därmed får du ut mer och mer detaljerad data efterhand. Ni har säkert sett det men det är typ såna grejer som hjälper användaren till bättre insyn helt enkelt.	STM Ds
54	*VS*	*Vad skulle du säga är de största utmaningarna när det gäller design, är det något mer än det du just nämnde?*	
55	R6	Ja, något som vi alltid tjatar om egentligen, är ju att våga visa lite. Faktiskt, att våga välj ut, tre av fem KPI:er eller diagram, eller vad det nu är. Att nämna de en, två tre viktigaste. Det är de du måste ha koll på först. Det kan ibland vara en utmaning, att kunderna och användarna tror att man behöver se mer. Man ska inte underskatta att, det är lätt att när man tittar på något	Ds

		att man agerar på något man känner igen. Man agerar på det som är lättast att förstå men du kanske missar, av fem KPI:er så kanske du missar den tredje som egentligen är den viktigaste men du nöjer dig med att förstå fyra av fem men det kanske är trean som är det viktigaste. Det har man ju som utvecklare ett stort ansvar och att företagets strategi, att ta reda på "vad är det viktigaste för oss nu?". Så det går tillbaka till den här BI strategin som jag har tjatat om ett par gånger att den måste hänga ihop hela vägen, ut till användaren.	MBI
56	*VS*	*Ja, det låter vettigt. Om vi tittar på säkerhetsbiten då. Vad är de största utmaningarna där? Vad bör man tänka på?*	
57	R6	Ja, det är väl inte min hemmaplan egentligen men det har ju rent generellt, tidigare varit utmaningar ur ett tekniskt perspektiv att få samma lösning ur ett användarperspektiv, mobilt som på en PC eller tjock klient. Det har varit ett fullständigt motstånd till cloud-lösningar på ett eller annat sätt. Det har ju förändrats och håller på att förändras. Så i och med de lösningar vi använder, som HTML5 så är det bara en webbklient du behöver. Tidigare använda man kanske mycket appar, BI-appar vilket man håller på att lämna. Så därmed är ju säkerheten samma som när du kör på en dator, ingen skillnad och VPN osv. Det är alltid en diskussion, det är alltid en utmaning men tekniken finns ju att uppnå samma säkerhet som, oavsett device egentligen. Men det är alltid en IT-fråga, lite på avdelningen att titta på det. Däremot så kanske många av företagen slarvar med att koppla in det här "Bring Your Own Device" i och med det är så många som har sina egna enheter, folk flyttar eller byter enheter, folk slutar, att man har policys som tar hand om såna förändringar också. Så inte folk har tillgång till någon annan data än vad de ska ha, när man byter roll eller slutar. Där kan det finnas lite att göra, hos många företag fortfarande.	Sec CC TI Sec ITC Sec
58	*VS*	*Intressant, om vi tittar på infrastrukturen, med servrar och så. Vad är den stora förändringen om man lägger till mobilt BI, på vanligt BI? Om man ska utöka?*	
59	R6	Ja, det kan jag ha svarat på lite grann innan. Men tidigare hade man ju appar som sagt, lite push and pull. Man kan säga så här, komplexiteten har ju ökat såklart, i och med att en komplett, om jag får uttrycka mig så, mobil BI-lösning, ja den hämtar ju inte bara data från det interna ERP- eller ekonomisystemet eller vad det nu är. Utan hämtar även data från andra datakällor utanför företaget. Det gör ju nästan att det är en fördel att lägga en mobil BI-lösning i molnet eller liknande. Företagen numera är ju ganska ointresserade vart det ligger, på vilket sätt, vilka servrar eller så där. Utan man vill ha en lösning, en tjänst men det har vart lite så här, mobilt BI i sig är ju ganska modernt. Den här frågan när det gäller servrar och så ligger man lite i efterkant i mognadsgrad. Jag hade nog förväntat mig att mer av BI-lösningar skulle ligga i molnet	TI CC TI

		kanske, än vad de gör med tanke på att de tekniska förutsättningarna finns oftast för det. Det finns väl åt andra sidan en rädsla också för att tittar man på ett affärssystem så ligger där ju oändligt antal affärstransaktioner och det är kanske inte helt lätt för vem som helst att förstå, om du kommer över en konkurrents data. Men om du kommer över en konkurrents BI-data så är den ju mer aggregerad och presenterbar. Så vem som helst kan få en ganska snabb insyn och det betyder ju mer risk att presentera den datan. Så det finns ett inbyggt säkerhetstänk där så man har väl till viss del fog för det.	Sec,
60	*VS*	*Om vi tittar lite på de själva mobila enheterna då. Vad är de största utmaningarna, smartphones versus tablets?*	
61	R6	Nu har vi ju turen att jobba med moderna produkter för de har det ingen betydelse egentligen, vad det är för enheter. De klarar ju alla devices som finns på marknaden idag, utan anpassning. Men det är viktigt ur ett kund- eller köpperspektiv att man väljer att titta på den typ av teknologier som klarar det. Det ska ju vara en ickefråga egentligen. Vilken typ av device man använder. Det är ju en ickefråga för de kunder som vi har pratat med. Vi frågar ju inte vilken typ av mobiler de har eller vad de tänker köpa för mobiler i framtiden. Utan det ska bara fungera.	Dv
62	*VS*	*Bra, om vi tar det på ett högre plan. Vad tycker du är de största utmaningarna och möjligheterna för mobilt BI?*	
63	R6	Oj, ja. Jag tror ett par saker. Dels är det här att det har inte slagit igenom så mycket ännu. Utan oftast möter vi ett motstånd, ett intresse lägre ner i bolagen, men oftast motstånd. Oftast så kom det behovet via ledningen och därmed så får större delen av bolaget nyttja det också. Så detta är väl en utmaning då att få en acceptans i andra delar i företaget när ledningsnivån säger att mobilt BI är ok. Det ska man investera i. Annars, vet jag inte riktigt. Alla kunder befinner sig på olika mognadsgrad när det gäller sin BI-plattform eller sin BI-lösning. Tittar man ur ett säljperspektiv då som jag oftast gör, för ett helt nytt företag som står inför att investera i en ny BI-lösning. Då kanske mobilt BI är helt rätt att börja med. Klockrent. Det kanske är en hyfsad liten investering för att få en stor effekt. Det är en målgrupp som är intressant. Tittar man på ett större företag eller ett företag som har kört BI under många år men inte kör mobilt, då är det oftast ledningen som måste visa framfötterna där. Detta kan ju vara en utmaning, faktiskt. Vi har väl ibland svårt att få företagen motiverade i en investering. Det har ibland varit så att det har varit en kostnadsfråga. Det kanske är den största utmaningen när jag tänker efter, att man tidigare egentligen behövt ta sin BI-investering först, när det gäller traditionell BI. Sedan har man behövt göra en separat mobil BI-satsning och kopplat till den, kanske nya servrar, nya licenser osv. Då är det kanske svårt att räkna hem en sådan	MBI TI

		investering tidigare. Att du får samma information som tidigare på mobil eller platta, och vad ger det då? Men nu, med modern teknologi så behöver man inte göra om det här. Man behöver inte ha dubbla investeringar. Utan du har din redan befintliga BI-plattform som du har investerat i men du öppnar upp kanalen BI. Utan extra licens och utan extra servrar så det har varit en stor barriär innan men det håller på att försvinna med den nya teknologin som kommer och de nya BI-verktygen som kommer. Jag tror att det kommer att hjälpa till lite grand.	
64	VS	*Det var ett bra svar. Skulle du kunna beskriva ett användarfall för mobilt BI?*	
65	R6	Ja, jag har funderat på det lite grand. Vi har inte jättemånga men vi har ett. Jag kan inte nämna vilket företag men det är i alla fall ett flygbolag. Lite kort kan man säga att de har ett antal piloter som använder BI för att optimera sin... som pilot får du göra vissa moment själv. Typ taxa ut, starta, landa osv. Olika moment du gör som pilot påverkar såklart till exempel bränslekostnaden som är ett flygbolags största enskilda kostnad. Då finns det en lösning att man ger piloterna en padda med tillgång till en applikation en BI-lösning där då kan se och förstå hur deras agerande påverkar just den här kostnadsbilden. De kan också benchmarka sig med liknande situationer som andra piloter har haft och se vad gjorde de som gick bra och kan jag göra likadant för att förbättra min egen siffra. Som ni vet själva, att flyga och mobil är inte så populärt. De har ju inte plats för stora datorer i flygplan heller så det är ganska intressant bruksvis, och tekniskt genomförbart och kan vara ekonomiskt försvarbart också. Ger de ett affärsvärde.	MBI
66	*VS*	*Jätteintressant.*	
67	R6	Det är väl så mycket jag har lov att säga om den lösningen.	
68	*OS*	*Ja, men det fungerar bra. Vi förstår.*	
69	*VS*	*Ja, lite avslutande frågor. Hur ser du på framtiden för mobilt BI?*	
70	R6	Ja, tittar man ur ett makroperspektiv så såklart så ökar ju antalet mobila enheter dramatiskt fortfarande både telefoner och paddor. Antalet datorer minskar ju faktiskt som företag köper. Alltså stationära och bärbara datorer minskar ju. Det är ingen tvekan om det. Vi som också kallas konsumenter. Vi konsumerar ju data på ett annat sätt idag än vad vi gjorde förr. Ett Google Search-liknande beteende när vi ska leta reda på någonting. Då måste ju ett modernt BI svara upp på det. Det finns tillgängligt överallt, det är lätt att konsumera. Det är tydligt att titta på. Det måste vara anpassat för dig som, din roll eller din uppgift. Så jag tror det kommer att växa snabbt, det går ganska sakta eller det kommer att gå fortare framöver. Kraven från företagen kommer att öka, på sina medarbetare egentligen. Att de ska vara mer tillgängliga och ta sina beslut snabbare. Det kommer också bli så att redan på ett sätt, att man	STM MBI STM MBI

		interagerar mer online eller vad man ska säga, inom affärsfrågor. Mobilt BI kommer att bli ett medel för att hjälpa till i de affärsbesluten. Man har inte tid, under möte eller pågående diskussioner att liksom ta actions och återkoppla med svar, en vecka efter. Man väljer att lösa uppgiften vid sittande bord helt enkelt. Då har man med sig en mobil eller padda helt enkelt och går in i sitt mobila BI och tar reda på svaret på den här frågan. Så det är ett förändrat beteende. Sedan får man inte glömma att såna som ni, som kommer ut på arbetsmarknaden snart ni har ju ett annat beteende än vi som har jobbat här ett tag nu. Ni kommer att ställa helt andra krav på tillgänglighet, hastighet, design osv. Annars så kommer ni inte att använda de lösningar som finns, så enkelt är det. Det kommer ut en helt annan målgrupp på marknaden snart som inte kan så mycket om BI kanske men har ett behov av att hitta information på ett modernt sätt, som vi måste svara upp mot.	STM
71	*VS*	*Jätteintressant. Är det något du vill tillägga på ämnet?*	
72	R6	Det är en farlig fråga. Nej, jag vet faktiskt inte det är ju ett stort ämne och ett intressant ämne. Jag har inget spontant just nu. Jag hade önskat att fler ledningsgrupper hade tittat på mobilt BI. Det är väl det vi är ute och missionerar hela veckorna. Jag stannar där så länge.	
73	*OS*	*Ja, tack så mycket då R6. Vi vill tacka dig för att du ställde upp.*	
74	R6	Tack själva och lycka till.	

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