Purchase of an electronic visitor management system – the planning phase

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Saara Soikkeli
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Laurea University of Applied Sciences **Abstract**

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This thesis describes a development project conducted in a case organisation. The organisation had an initial plan to purchase a visitor management system. The development task of the project was to execute the planning phase for procuring an electronic visitor management system. The aim was to enable the success of the rest of the procurement process. Successful procurement will in turn result in improved visitor management process, by increasing the organisation's ability to manage information concerning visits.

Theoretical framework was based on visitor management and procurement. Visitor management was considered as a part of access control; the focus was on safety and security. Access control is in turn a physical security measure. Risk management process is used to identify the need for establishing physical security measures. Procurement set the guidelines for the project and security was the objective.

The methods used in data collection were observation, semi-structured interviews and desk research.

The current visitor management process in the organisation was paper-based. The issue with paper archives had been acknowledged. As the organisation operates in facilities around Finland, accessing these physical archives had not been seen functional. The organisation would also benefit from the possibility to print out statistics of visits in its facilities. Any statistics would have to be combined manually in the current process.

It could be said that by purchasing an electronic visitor management system the case organisation would be able to better manage the information regarding visits. The main purpose of electronic visitor management systems is collecting information into a digital database which can be accessed remotely.

The importance of thorough planning in a procurement process should be noted in organisations.

Keywords: visitor management, public procurements, physical security, access control

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1 Introduction

As a significant proportion of 18 % of Finnish gross domestic product (GDP) is spent on public procurements, it is evident they are a regular topic of discussion in media. Especially unsuccessful procurements may face critique. A recent example is the case about the new information system which was purchased by the government for the ministries. Planning of the procurement lasted for about four years. After the new system was launched the users made claims that the information security is not on the required level. It appeared as in the planning phase the procurement unit missed some vital specifications that should have been set mandatory for suppliers. The purchase had to be cancelled and a new round of procurement process was initiated. (Parviala 2018; Korhonen 2018.)

Public procurements are purchases paid with public funds. Public procurement units include government and municipal authorities, and any organisation that has been granted the support for more than half of the value of the procurement from other public procurement units (Finland 2016). Ultimately the procurement process can be separated into three phases: planning, tendering and contract period. Especially the planning phase may be oversighted if public procurement units fixate on compliance regarding the competitive tendering.

This thesis was carried out as a research-based development project. The development task was to execute the planning phase of a procurement process. The aim was to enable the success of the procurement process. Successful procurement will in turn result in improved visitor management process by increasing the organisation's ability to manage information concerning visits. The case organisation's corporate security department had an initial plan to purchase an electronic visitor management system. They had set the requirements for the system. The organisation's secondary aim was to reduce costs of the visitor management process. As a public procurement unit, the organisation is required to organise a competitive tendering if the value of procurement exceeds the threshold value as stipulated in the Act on Public Procurement and Concession Contracts 1397/2016. The project was conducted in the case organisation in summer 2018.

In general, an electronic visitor management system is a software designed for managing information about visits. Often the systems have additional functions like customised messages sent automatically for hosts when their guest is registered or a possibility to print out a badge for visitors upon arrival. Systems may include accessory devices such as printers and monitors. Some visitor management systems can be operated only by the receptionists or other personnel while some can also operate as stand-alone self-service kiosks. The purpose of a visitor management system is to support the work of employees who manage visitors' information and consider the visitors' experience during the whole process of visiting the organisation.

The case project consisted of three major phases. It began by analysing the current state of the visitor management process and identifying possible deficiencies compared to the criteria set by the case organisation. Secondly, conducting market research to understand the current market for electronic visitor management systems. Final phase was to provide the case organisation with a report including the findings of earlier steps, calculations of cost estimates for different procurement options to support decision making, and an implementation plan for the rest of the phases of the procurement process. Some limitations were set for the project to fit in the scope of a bachelor's thesis. The most significant part ruled out was a task to study, if an electronic visitor management system could replace a receptionist and would the replacement cause a need for changes in security measures. As the changes might become expensive, this should be considered when comparing the costs of receptionists and electronic systems.

The case organisation is a limited company based in Finland. Due to the nature of its operations the focus of visitor management is safety and security. The central elements of the theoretical framework of this thesis are visitor management and procurement. During the case project three research methods were applied: observation, semi-structured interviews and desk research.

2 Theoretical framework

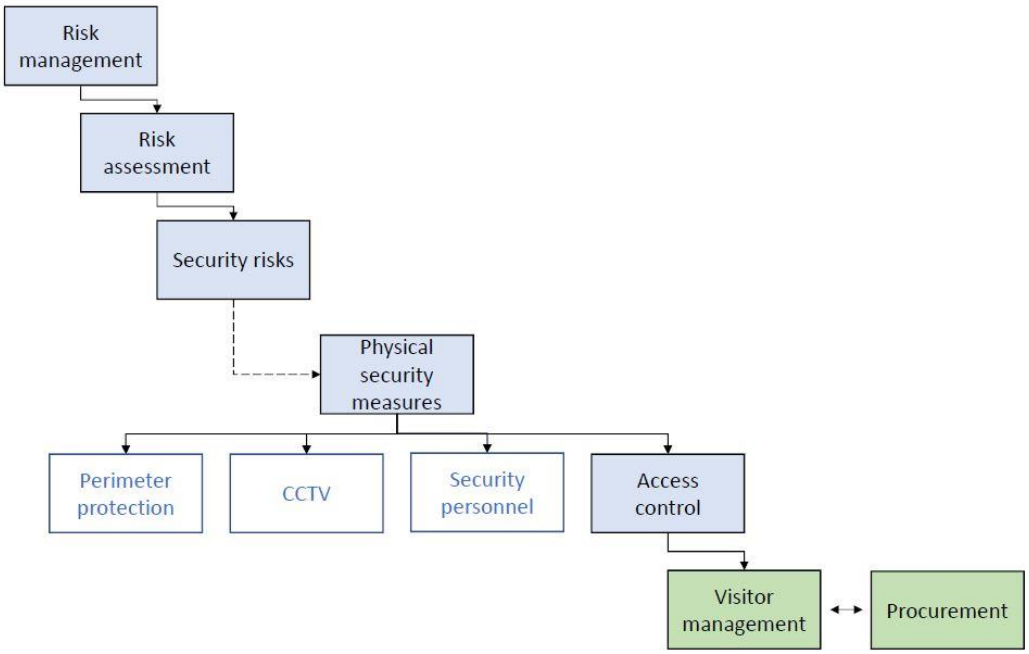

Figure 1: Theoretical framework

The theoretical framework of this thesis is based on public procurements and visitor management. In this theoretical framework visitor management is presented as a part of access control, corresponding with case organisation's current visitor management process. In addition to security, visitor management includes elements of marketing, customer service and hospitality.

In this thesis the term access control is used to describe physical access in an organisation's premises, not on movement of data via information networks. Thus in this framework access control is considered as a physical security measure. Fundamentals of physical security are therefore explained as they determine access control. Risk management is presented to explain how the need for establishing physical security measures, such as access control, is identified.

2.1 Case organisation

The case organisation is a limited company that produces knowledge-intensive services for public sector and private companies. In 2018, the organisation had a turnover of more than 170 million euros and employed over 2000 people. (Case organisation website.) The organisation's operations require different type of premises for diverse purposes. The organisation operates in about twenty locations around Finland. The facilities have different types of users whose needs regarding access to the premises are diverse. Main users include employees of the case organisation, maintenance personnel, personnel of subtenant organisations, and visitors. The need for access permit is considered individually on each case. Annually the organisation hosts a total of 40 000-50 000 visitors.

Some aspects of visitor management are regulated on national and international levels (Ministry of Defence 2015). However these regulations are not presented in this thesis. The case organisation has arranged its visitor management process competently and fulfilling the organisation's requirements will result in fulfilling regulations concerning visitor management. Also, quite similar suggestions regarding visitor management as in regulations are given to any companies, as the literature review presents. In this way, the thesis can be seen as a suitable guide for any type of organisation.

2.2 Risk management

The scope of access control and other physical security measures must be implemented based on the risk assessment of the facility (Fennelly 2017, 255; Kovacich & Halibozek 2003, 185). The fundamentals of risk management and risk assessment are important in understanding how the need for physical security measures are identified. This chapter will present them both in their essence.

Risk management is a comprehensive process which aims to manage identified risks. The process is based on reducing the likelihood of risks occurring and minimising the effect of an occurred risk. Not all risks can be identified but an organisation should know the most significant ones and have implemented adequate risk management measures. (Leppänen 2006, 119.) As stated by Hopkin (2013, 31) and Finnish Standards Association (2018) risk management process is iterative and should be integrated into other processes of an organisation. Risk management supports the organisation in its aspiration for achieving its objectives (Georgeta & Alexandru 2017).

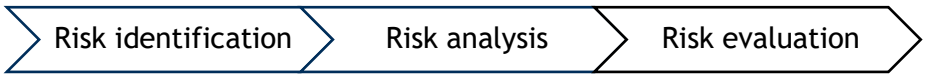

Figure 2: Risk assessment (Finnish Standards Association 2018)

Risk assessment is a key element of risk management. It is a systematic process in which risks are identified, analysed and evaluated. Principle for initiating risk assessment is to study the present level of risk and whether the existing controls are competent (Hopkin 2013, 55). The first phase of risk assessment process aims to find and identify risks that might stop an organisation from achieving its objectives. The scope of subject to be assessed is set before studying the risks. Risks should be identified whether the sources are manageable by the organisation or not, e.g. theft or natural disasters. After a risk is identified, it is analysed to understand its nature and characteristics. Analysis should consider likelihood of events, magnitude of consequences, existing controls and their effectiveness. Risk analysis contributes to the next phase, risk evaluation. An organisation should determine its risk criteria, the extent and type of risk it's willing to take. Risk evaluation means comparing the results of risk analysis to the risk criteria. Risk evaluation might lead to a decision to do nothing further, analyse the risk further, continue with current controls or acknowledge risk treatment options. (Finnish Standards Association 2018.)

According to Clarke, an organisation can choose from five ways of treating risk. By **accepting** the risk an organisation decides to take no action and manage the consequences if the risk occurs. An organisation can choose to **avoid** the risk by completely abandoning the operation that causes the risk or to **mitigate** the risk by implementing control measures to reduce or eliminate the risk. By insuring for the possible consequences of an occurred risk an organisation **transfers** the risk. A risk can have a positive effect, an opportunity, and an organisation

can **exploit** the risk to increase the likelihood of the risk occurring. (Clarke 2017.) Usually security measures are established to mitigate the risk (Fennelly 2012, 4).

2.3 Physical security

Physical security concentrates on the "protection of people, property and facilities" by applying security systems, procedures and personnel (The American Society for Industrial Security 2005, cited in Fennelly & Perry 2017, 1). Physical security measures are established to mitigate risks that have been assessed in the risk management process. A key principle of physical security is layering different measures to complement each other. An organisation must have implemented some level of physical security management before establishing an access control system: access control should be based on pre-defined restricted areas. According to Dercksen (n.d.), the type of business affects the focus of visitor management. Although visitor management refers to the overall process of caring for visitors and managing information about visits, in this framework the objective is safety and security: managing visitors' access to the organisation's premises. That is why the fundamentals of physical security and access control are presented before visitor management.

According to Kovacich and Halibozek (2003, 185-187) physical security is the cornerstone of asset protection. A single physical security control cannot however cover all the security needs, which is why different measures are layered. Defence-in-depth is an essential concept of physical security. It "means implementing a number of security measures which complement each other". Physical security measures aim to deny, deter, delay and detect unauthorised access or actions. Implementing any security measures must be in accordance to the risk management process of an organisation. (Ministry of Defence 2015.)

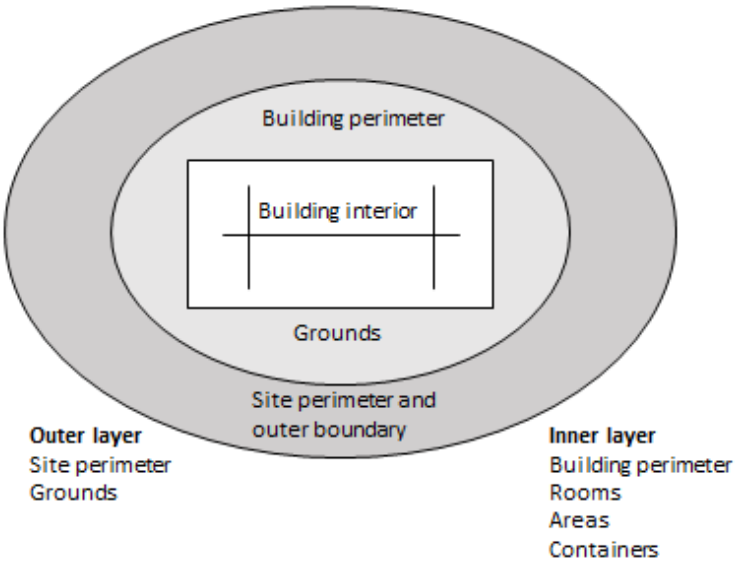

Figure 3: Layers of security (Kovacich & Halibozek 2003, 188)

Kovacich and Halibozek divide physical security into outer and inner layers. The type of perimeter and grounds often depend on the location. Buildings located in a city area may have the building's walls as the first layer of protection, whereas facilities located in a more rural or industrial districts can have larger grounds. In the latter, the outmost layer might be a man-made fence or a natural barrier, such as a river or a cliff. Perimeter barriers do not necessarily completely prevent unauthorised access but aim to delay or make it more difficult. If the outermost layer of physical protection is the building itself, special emphasis should be appointed on the types of inner physical security measures. (Kovacich & Halibozek 2003, 187-189, 197.)

Inner layers of physical protection include building perimeter, rooms, areas and containers. A typical building has multiple openings which should all be addressed. This includes not only windows and doors but also entry points for ventilation, power and communication system, to name a few. Any unused openings should be permanently blocked. Protection of areas, rooms and containers should base on the value of assets in them. The facility needs to be functional, so employees, other users and visitors should be able to move more freely within the space once they have been granted access to the area. Additional security controls are required for areas and rooms where sensitive materials and information are stored or where sensitive work is performed. Usually the simplest way of implementing additional controls is to add an access control system on entryways. Containers, or safes, are used to store the most sensitive information or material. (Kovacich & Halibozek 2003, 196-199.)

Often established physical security measures within the layers are lightning, surveillance, different types of alarm systems and access control. Lightning can serve as a deterrent for intruders and reduce accidents and injuries. The purpose of surveillance is to deter and observe. Surveillance can be accomplished by security guards or surveillance cameras. Usually a combination of the two is applied. Alarm systems act as a deterrent and reinforce physical barriers by detecting unauthorised activity. Unlike many other physical security measures, alarm systems are not an obstacle to delay or deny intruders. Their purpose is to alert of a problem. (Kovacich & Halibozek 2003, 192-195.) Access control as a physical security measure is presented in the next chapter.

2.3.1 Access control

As Fennelly (2012, 38) defines, access control is "a method of providing security by restricting the movement of persons into or within a protected area." Controlling the access to and from the organisation's premises is a key part of layered security. Ensuring that only persons with proper authorisation are able to enter the premises reduces the risk to assets. (Kovacich & Halibozek 2003, 200.) According to Fennelly and Perry (2017, 11) access control is a physical security method to control the flow of traffic. Access control protocols should be built to

complement other physical security methods, such as perimeter barriers and intrusion detection devices (Fennelly 2017, 255). Effective access control measures minimise misuse, theft and compromise of material and information. They control the flow of people, material and other property. (Fennelly 2012, 185.)

Generally, locks, keys, PIN codes, card readers and biometric systems can be used as tools for controlling access (Kovacich & Halibozek 2003, 200). Establishing restricted areas is the baseline for setting up an access control system. In general, restricted areas are any spaces that require special controls for enhanced security. Fennelly suggests classifying restricted areas into three categories based on the level of required security. The three categories he recommends are controlled, limited and excluded. Access to exclusion area is granted under the most restrictive controls. Controlled area should be established as a buffer zone for limited and exclusion areas regarding the defence-in-depth principle. Reasons for restricting an area may include protection of critical assets or classified information. (Fennelly 2017, 256-257.) The purpose of access control should be facilitating access for authorised users while denying access for unauthorised persons. Access within a more complex facility can have layers by the principle of layered physical security. (Norman 2010, 250.)

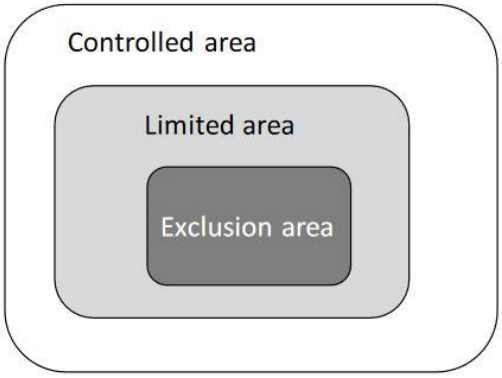

Figure 4: Restricted areas (Fennelly 2017, 256-257)

Identification badges make it possible to separate personnel and visitors (Leppänen 2006, 368). Identification badge system should be established for any organisation where 30 or more employees are working a shift, suggests Fennelly (2012, 186). In smaller organisation only personal recognition without specific badges can be sufficient. In general, when an employee is granted an access, they receive an access card that contains the authorisation. The employee can access the areas by reading the card with a card reader placed in entryways. (Norman 2010, 269.) Access control system can be integrated into other systems, for example working hours monitoring system. Access control system could also be utilised as an electronic visitor log and visitors would be granted a temporary access to certain areas. (Leppänen 2006, 366)

2.3.2 Visitor management

As Dercksen (n.d.) states, the type of business affects the focus of visitor management. In this case the focus is on safety and security. An organisation should compose safety and security guidelines regarding visitor management. Security measures should be designed based on risk assessment, where the nature of the operations and facilities are considered. Areas where visitors can and cannot access must be determined before organising visits. Safety and security measures of visits should be integrated with other physical security operations. Common visitor management principles include registration of arriving persons, assigning them with badges stating their visitor status, and training personnel about their responsibilities of hosting visits. (Leppänen 2006, 204-206; Fennelly 2017, 255-257.)

Visitors are registered before the visit begins. In general, registration contains visitors' personal details, purpose of the visit, and the date and time of the visit. The organisation's security policy may require assigning a responsible contact person (a host) for the visit for the duration of the visit. In these cases the details of the contact person are recorded. Ending of the visit should also be registered. (Dercksen n.d.) Visitors should be appointed a personal escort especially while visiting restricted areas. While properly identified, the visitor could acquire information that they are not authorised for. Special guidelines may be established regarding foreign national visitors. (Fennelly 2012, 187-188.)

Visitors' personal information is handled in the visitor management process, for example when the visitor is registered upon arrival. Maleficent use of the archived data could have harmful effects as it includes information of the times of visits, visitors and persons who hosted the visit (Leppänen 2006, 206). As stated in the General Data Protection Regulation (GDPR) only relevant data should be collected. The data must be collected for a specified purpose, processed with transparency and archived only for an appropriate period. Collected data must be processed and archived so it remains confidential. (European Union 2016.)

The most prominent part of safety and security operations in the organisation are the ones that visitors encounter. These measures might be the first interactions with the visitor and are likely to affect their perception of the whole culture of the organisation. Excessive security measures portray a bureaucratic organisation whereas understated measures warn about inattentive processes. Properly conducted security procedures also inform about positive attitude towards customers. An organisation must invest in optimising their security measures based on the risk assessment. (Leppänen 2006, 205.)

Peppers defines customer experience as "the totality of a customer's individual interactions with a brand, over time." Albeit he acknowledges the importance of marketing campaigns and brand messages, by Peppers' definition they do not contribute to customer experience because they are not interactions. (Peppers 2016, 8-9.) According to Jain, Aagja and Bagdare

(2017), customer experience is a comprehensive concept forming “of feelings, perceptions and attitudes”. Positive customer experiences play a significant role in an organisation’s aspiration of competitive advantage. All types of marketers should attend to customer experience due to the rise of experience economy and consumers’ increased expectations for holistic experiences. (Jain et al. 2017.) As Löytänä and Kortesuo (2011, 11) write, customers’ experience is affected by their subconscious interpretations as well as rational thinking. That is why an organisation cannot fully decide the outcome of the customer experience. Pennington (2016, 49) suggests that an organisation should however decide what type of experience they attempt to create and compare it to their current situation.

2.3.3 Process improvement

Knowledge of the current state is required to improve a visitor management process. Target process should also be specified. Comparing these two will illustrate the practical areas for improvement. One commonly used method to describe a process is a flowchart. Mapping a visitor management process with a flowchart helps to conduct more systematic work. Current state flowchart can be used to identify areas for improvement. (Martinsuo & Blomqvist 2010.)

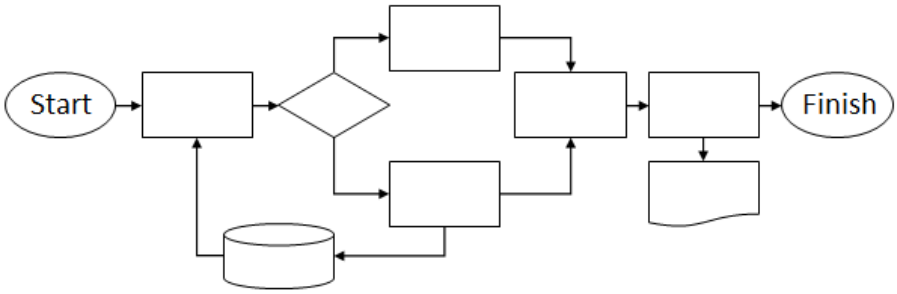

Figure 5: A flowchart (Martinsuo & Blomqvist 2010, 16)

According to Sharp and McDermott (2001), it is vital to understand the current state of a process before making changes to it. They state that processes are always somehow interconnected and dependent on other processes. Furthermore, knowing the actors who would be affected by the changes in the process and collecting their input is important. (Sharp & McDermott 2001, 187.)

2.4 Public procurements

Procurement is in a key role in the theoretical framework of this thesis since the case organisation had decided to improve their visitor management process by purchasing an electronic visitor management system. Regulations and practises of public procurements will give the guidelines to follow while visitor management remains as the main objective. While this thesis focuses on the planning of the procurement it is vital to note the other stages as well, and the regulations concerning the whole process.

Nieminen writes that in practice everything an organisation receives an invoice for is procurement. Procurement, also referred to as purchasing or sourcing, is an organisations' support function. It aims to ensure the core functions to operate free of disturbance. Procurement function refers to organised procurement operations. Its job is to improve organisation's performance and competitiveness. (Nieminen 2016, 10-11.) Iloranta and Pajunen-Muhonen (2015, 33) agree that procurements have a considerable impact in maintaining and improving the competitiveness of an organisation.

Määttä and Voutilainen (2017) state that procurements are a significant expenditure on public funds. About 18% of Finnish gross domestic product, 34 billion euros, is spent on public procurements (The Public Procurement Advisory Unit 2016). Public procurements are purchases conducted by, for example, government and municipal authorities and any party that has secured the support for over half of the value of the procurements from the mentioned authorities. Public procurements are regulated in the Act on Public Procurement and Concession Contracts 1397/2016. The purpose of the Act is to regulate the duty of arranging competitive tendering. It aims to enhance efficiency in the use of public funds, promote innovative, sustainable and high quality procurement and ensure equal opportunities for corporations and other organisations to offer goods and services in competitive tendering for public procurement. The Act is applied when the estimated value of the procurement exceeds national or European Union threshold values. (Finland 2016.) The key principles of public procurements, in addition to equal treatment, are non-discrimination and transparency (European Commission 2018).

2.4.1 Procurement process

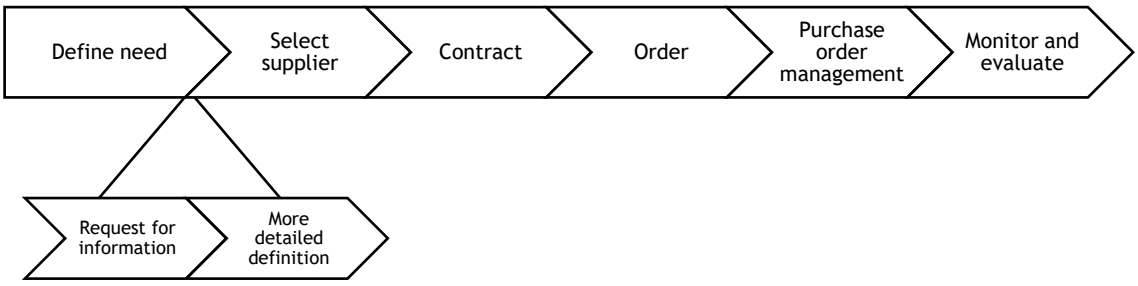

Figure 6: Procurement process (Nieminen 2016, 193)

The phases of a procurement process are presented in Figure 6. In the case of public procurements, the process is sometimes divided into just three phases which are referred as planning, competitive tendering and contract period (Nieminen 2016, 205). This more detailed figure was chosen to highlight the similarities in private and public procurements. As seen in Figure 6, procurement process consists of 6 or 8 phases. In the first phase the need for pro-

curement must be defined properly. The procurement unit may send out a request for information or conduct its own market research which will help it sharpen the definition. Selecting the supplier in public procurements is regulated in the Act on Public Procurement and Concession Contracts 1397/2016. The procurement unit publishes invitation to tender as regulated or in line with the company policy. After the tendering period has closed, the procurement unit will compare the bids and state the winner. The rest of the phases form the contract period. At the beginning of the contract period the guidelines of cooperation between the procurement unit and the supplier are agreed upon. The contents of the contract are implemented at this stage while both parties monitor how the guidelines are followed. Monitoring and evaluating should be systematic and base on open discussion between the parties. The experiences of the end users should be collected and referred to when developing the cooperation and the product or service. (Nieminen 2016, 206-214.)

This thesis focuses solely on the first phase of the procurement process, defining the need or planning. According to Iloranta and Pajunen-Muhonen (2015) managing public procurements is too often focused on compliance and the tendering process. It is vital to realise that the procurement process in more extensive than the tendering phase alone. They also state that the success of a procurement process is set prior the competitive tendering phase. The planning phase is for identifying the requirements and the impacts for the whole period and involving the end user's point of view. At the end of the planning phase the guidelines and goals for the implementation and contract phase should be outlined. (Iloranta & Pajunen-Muhonen 2015, 379-387.)

As Nieminen (2016) writes, defining the need is prerequisite for a successful procurement process. The product or service that is needed will determine how it should be defined. For example, when procuring a technical product an organisation might simply define the requirements for functions and capacity, or in some cases even name the brand and model of the product they are looking to purchase. Defining the need must also include notes on quality, logistics and maintenance of products. Defining criteria for services is challenging. An organisation shall, at minimum, define what the result of service must be. This allows the suppliers to utilise their expertise and develop the service with the customer. Defining of the need should be done with the end user. Trying to guess the requirements might lead to not including a vital feature or defining too many unnecessary ones, which will increase the price. In practise it might turn out to be challenging to involve the end user or even properly identify the actual end user. (Nieminen 2016, 54-58.)

2.4.2 Market research

Planning of the procurement includes not only thorough mapping of the need and aim for procurement but also market research and the calculation of the total estimated cost. Public procurement units should not be apprehensive of contacting the suppliers in the preparation

phase. Combining the invitation to tender will be challenging without the knowledge about current market and competition. Suppliers may be asked for information or even preliminary propositions to solve the problem. When conducting the market research, as well as any other phase of a public procurement, the procurement unit should consider all suppliers equal. (Iloranta & Pajunen-Muhonen 2015, 379-387.)

In market research the scope can be set to fit into researcher's needs. Research may cover subjects as product specification compared to customers' requirements, pricing, branding, and distribution methods. One research should not try to cover too many areas as focused research is likely to be more efficient. (Hague, Hague, Morgan 2013, 6.) Nieminen (2016) states that market research is an important part of preparing for procurement. By researching the market, the procurement unit will have a better understanding of what kind of options exist. This helps them in defining the product or service that they are looking to acquire and to define more clearly the principles that they will compare in the tendering phase. The procurement should have a clear goal. (Nieminen 2016, 207-208.)

A procurement unit can research the market to prepare for the procurement and at the same time inform the suppliers about their plans and requirements (The Public Procurement Advisory Unit 2016). Suppliers know what is possible and reasonable to implement with current technology (Nieminen 2016, 59). This allows the procurement unit and suppliers to discuss and find the best possible solutions in an openly manner.

3 Methodology

As Clough and Nutbrown (2007, 23) write, methodology provides justifications for applying specific methods on a research. Therefore this chapter presents the methods used in this thesis for data collection and the reasons for applying these particular methods. The research was conducted as a qualitative case study. The goal of a qualitative research is to gain comprehensive understanding of a phenomenon, in this case the visitor management process of the case organisation and the current state of the market for electronic visitor management systems. Qualitative research methods are process oriented and explorative, they seek for descriptive answers and questions are formed using words what, how and why. (Ghauri & Grønhaug 2010, 105; Vilkka & Airaksinen 2003, 63.)

This thesis was carried out as a research-based development project. According to Ojasalo, Moilanen & Ritalahti (2014), the purpose for a research-based development is to renew practices or to find solutions to practical problems. It also often creates new information about working life processes. Data is collected systematically from theory and practice to support the development. Documenting the tacit knowledge of an organisation also aids them in further projects. Research-based development can be established from the need or desire for change and development. Functionality, aiming for improved processes and supporting the

feasibility of implementations with research are emphasised in research-based development. (Ojasalo et al. 2014, 18-20.)

According to Farquar (2012, 12) and Bloor & Wood (2006, 27), a case study is applicable when the aim is to gain a comprehensive and detailed understanding of a phenomena in a specific context. Ojasalo et al. agree that a case study is often a useful approach when the goal is to gain comprehensive understanding of an organisation's situation or provide development suggestions based on research. A case study is conducted to create ideas for development or suggestions for solving a problem. Usually multiple data collection methods are used to achieve broad understanding of the object. (Ojasalo et al. 2014, 37.) Case study research is empirical, meaning it aims to systematically apply gathered information into practise (Farquar 2012, 6; Heinonen, Keinänen & Paasonen 2013, 15).

The number of respondents, sample size, is usually small in a qualitative study because more resources are allocated per person to gain more in-depth answers. Aim is to collect descriptive and detailed data. (Sharp 2013, 143-144.) Generally, the data for qualitative research is collected in natural situations and from people. Appropriate respondents are chosen knowingly rather than by a random selection. Commonly recommended methods for collecting qualitative data are semi-structured interviews, participant observation and analysing secondary data. (Hirsjärvi, Remes & Sajavaara 2013, 164.)

Applied data collection methods in this thesis were participant observation, semi-structured interviews and desk research. They are explained in the next chapters.

3.1 Participant observation

In participant observation the researcher is a part of the organisation that is studied (Ghauri & Grønhaug 2010, 115-116). Participant observation is a qualitative research method to collect primary data. Its priority is uncovering the reasons for actions people take. It can provide valuable information for management and business researchers. (Saunders, Lewis & Thornhill 2009, 288-290.) Observing can be used in situations where there is no prior or only little knowledge about a phenomenon. Advantage of observation as a research method is the authenticity of situations because observation is usually conducted in the natural environment. (Kananen 2008, 69.)

Observations were conducted in multiple locations within the case organisation to examine the current state of visitor management process. Objects observed were the settings and procedures. The organisation had written instructions for service providers and personnel about visitor management, but it was important to understand the actual state of the process in order to improve it. The locations were observed to learn if the entrance areas and receptions had any restrictions for installing new devices.

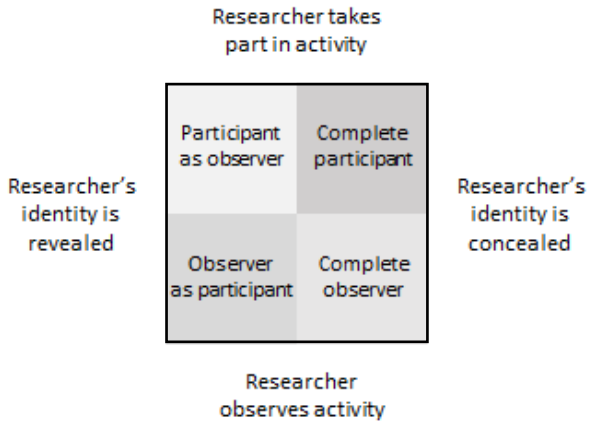

Figure 7: Researcher roles in participant observation (Saunders et al. 2009, 293)

Observer as participant role was applied to gather data for this thesis. The role allows the researcher to focus on the research and write notes of insights as they occur. Since the participants are aware of the researcher observing it is difficult to estimate whether the researcher's presence affects the situation. However this role does not raise similar concerns about ethics as in situations where the researcher's identity and purpose are concealed. (Saunders et al. 2009, 294.)

3.2 Desk research

"Desk research is the study of secondary sources of data – information that is already available either in public domain or within the private confines of an organization itself" (Hague, Hague & Morgan 2013, 41). According to Hague et al. desk research, or secondary research, can be quite beneficial - however it should not be used as a sole method for conducting a research project. One way of conducting a market research is to start with desk research and reinforce the findings with primary research, such as conducting interviews. Secondary research is also rather inexpensive compared to primary research. Thus it is recommended to carry out desk research before going into the field, so the researcher will only use more expensive field research where it is necessary to fill the gaps. (Hague et al. 2013, 54.) Also Armstrong defines desk research as compiling and analysing "information which is already published or in existence". Desk research is a reasonable method of obtaining data about the market. It is generally used to complement a field research to gain a broad understanding of the market that is studied. (Armstrong 2006.)

Researcher's task is to assess is the secondary data suitable for the current research (Farquar 2012, 78). In this thesis, the secondary internal data utilised were visitor statistics and documented feedback from employees. External sources of secondary data were the materials prepared by the companies providing visitor management systems. The data was found to suit

the current research as the statistics were recent and the feedback was collected from the employees who partook in the earlier piloting of a visitor management system.

3.3 Semi-structured interviews

Qualitative interviews can almost resemble normal conversations rather than have a clear distinction between the interviewee and the interviewer. Usually interviews are conducted in person but might also be carried out by phone or e-mail. (Eriksson & Kovalainen 2010, 78.) Semi-structured interviews begin with issues or themes, but the questions and their order can vary, unlike in structured interviews. The tone of the interview is kept conversational and less formal. More detailed and in-depth responses are sought for. The challenge is to cover all the required topics and compare the responses due to the possibility of respondents' different interpretations of same questions. (Eriksson & Kovalainen 2010, 82; Bloor & Wood 2006, 104.)

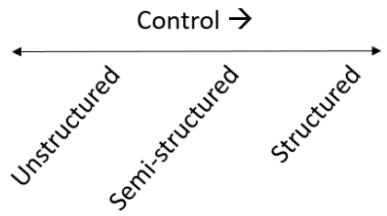

Figure 8: Types of interviews (Harrel, M. & Bradley, M. 2009, 29)

Interviewing is amongst the most common market research methods. Depth interview allows interviewer and interviewee to explore additional points and move to another direction if needed. Depth interviews increase the validity of a research by incorporating plenty of respondent's perspective into the findings. (Hague et al. 2013, 69-70.) Depth interviews are beneficial when complex decisions, such as purchasing a visitor management system, are researched (Sharp 2013, 146). Interviews are usually conducted as semi-structured in qualitative research. Semi-structured interviews are flexible but follow the guidelines and objectives which are set. Selecting the correct interviewees is important for getting the information that is required. Participants should be selected on the base of the perspective they will provide. (Farquar 2012, 73-74.)

Semi-structured interviews were conducted in the current state analysis and market research phases. The current state of visitor management process was studied by gathering and analysing organisation's internal data, observing and finally interviewing to fill in the remaining gaps. Interviewees included reception desk workers from multiple locations, assistant team leader and a corporate security representative. In market research, the service providers' insights were valuable addition in studying different pricing models and the products and services they offer.

4 Research for improved visitor management process

This section describes the relevant characteristics of the case organisation and the background and phases of this thesis project. The project consisted of three phases. First two phases were analysing the current state of visitor management process and conducting market research for electronic visitor management systems. The final phase was to combine the findings of the research, cost estimates for different procurement options and implementation plan for the rest of the procurement process. The final phase is described in chapter 5 Results. The project was conducted during summer and autumn of 2018, when the author was employed in the case organisation.

The case organisation is a limited company that produces knowledge-intensive services. It operates in about 20 locations in Finland. The organisation's operations require different type of premises for diverse purposes. The premises have a variety of users with diverse needs of access to the areas. The organisation employs over 2000 people and hosts around 40 000-50 000 visitors annually. Visitors' access to the premises was the core element of this thesis.

The commissioning party for this thesis project was the corporate security department of the case organisation. They had an initial plan of procuring a visitor management system to optimise and support the work of receptions. Their goal was to purchase a system which would allow them to better manage the process of visitor management. They needed a system which could be operated by a receptionist but also function as a self-service kiosk in locations without receptionists. The case organisation wanted to find a supplier who offers the software and accessory devices, as well as maintenance service for the products. Accessory devices that were sought for were self-service kiosks, cameras and visitor badge printers for receptions, and possibly a separate device for the visitor to return the visitor badge and sign out when exiting the premises. The self-service kiosks were expected to have cameras and badge printers included.

The case organisation's support functions include departments for corporate security and assistant services. Both have their own role within visitor management process, which are described in the current state analysis phase. In addition, there is a team of procurement professionals. As Nieminen (2016, 54) wrote, a successful procurement process demands for multidiscipline cooperation and clear division of responsibilities within an organisation. Including representatives from procurement, corporate security and assistant departments was thought important during the project. As a public procurement unit, the case organisation is required to organise a competitive tendering to select the supplier, if the estimated value of the procurement exceeds the threshold value stated in the Act on Public Procurement and Concession Contracts 1397/2016. The support from the procurement team was valuable due to their expertise on regulations concerning public procurements. The regulations and the case organ-

isation's practices of procurements gave out the guidelines which to follow during the planning phase. Corporate security's task remained the research of visitor management process and systems.

4.1 Analysing the current state of visitor management process

The reason for conducting a current state analysis was to gain a comprehensive understanding of the current visitor management process and to identify possible deficiencies and other areas for improvement. Documenting the current state of the process is important in process improvement because the changed process should be compared to the starting point to see whether an improvement has been made. As the author was employed in the case organisation's corporate security team, it was already known that the visitor management process was managed by the same team. The visitor management process was considered as a subprocess of access control. Gathering data and analysing the current state of visitor management process started at the same time as planning of the project.

Information about current state of the process was collected from multiple sources by observing, interviewing and analysing secondary data. The first step was to identify the actors in the visitor management process. Their input should be involved in the current state analysis. The main actors were identified by analysing the organisation's written instructions and discussing with a corporate security employee. The data was found to be dispersed between facility specific documents. As new data was found its location was documented so the document became a summary of all the instructions. The actors in the visitor management process were identified to be corporate security, assistant team, employees, receptionists, facility managers and different types of visitors.

In practise, anyone who does not have an access permit to a specific area, is a visitor. Visitor types include individuals and groups visiting the organisation, people attending events held by the organisation in its facilities, contractors who do not have personal access permit and some number of visitors for other companies that use the same facilities. Individuals or small groups who wish to visit the case organisation and the visit is expected to last less than two weeks are usually registered as visitors. The need for access rights is agreed upon with the person from the case organisation hosting the visit. The case organisation may host an event where people from outside of the organisation are expected as guests and will be registered as visitors. The events often take place in auditoriums or other areas where visitors do not have a need for extended access rights. Some contractors who might not have regular need for access permit but need to access an area to perform a task, are also registered as visitors. This includes on-call contractors if the regular person with access permit is not readily available. Personnel of the case organisation can also be visitors in facilities or areas where they do not have personal access permit.

Persons must fulfil certain requirements to gain access to restricted areas. Persons accessing an area might be required to pass a safety training or go through a security clearance process. The required safety and security measures for gaining an access permit are specified for each area. Specifications are in line with the organisation's risk management process. In general, visitors can access the areas once they have been registered and are with a host. The host is obligated to remain with the visitor for the duration of the visit. Normally visitors are not granted a personal access permit.

Day-to-day visitor management process is largely managed by service provider's reception desk workers. The overall responsibility of the process is on a corporate security employee. It was implied that confusion about responsibilities between corporate security and facility services could cause problems during the procurement process. Facility services are the main contracting party with the service provider while corporate security adds to their tasks. However, since researching the possibility of replacing a service provider's employee with a self-service kiosk was limited from this thesis, these difficulties did not occur.

Involving the assistant team was necessary since their tasks include hosting events and management meetings. They are somewhat a unique user group as they act as hosts on behalf of the actual host. Visitor management process must therefore allow this type of users. The most common user type however is the employees of the case organisation. They can organise and host visits in areas they have been granted access and visits are allowed. Employees' input was not gathered in as much detail as for example receptionists'.

Receptionists from multiple and different types of facilities were interviewed. Their job includes daily visitor management procedures, the most prominent being registering visitors upon arrival. The objectives were to gain a broad understanding of their work regarding visitor management and to document their experiences of the current process. The interviewed receptionists were able to give valuable points of practical issues that had arisen when the case organisation had piloted and discontinued an electronic visitor management system a few years back.

In total, observations were conducted in eight facilities. The aim was to observe different types of locations to gain as comprehensive knowledge of the current state of visitor management process as reasonable. Observations were conducted to study if the current process is managed according the guidelines and facility specific instructions. Field notes were made also about the possible spaces to install a self-service kiosks and other devices.

The main issue in the current state of visitor management process appeared to be managing the data about visits. The data is stored in the paper forms that visitors fill upon arrival. Interviewed receptionists' and corporate security employee had acknowledged the problems of paper archives. The papers are archived in different ways depending on the facility. Based on

observations, the most common method of storing the forms is in a locked drawer at the reception. However, not all facilities have a reception and the forms are stored in varying places. As the information is stored in paper archives, it cannot be accessed without travelling to the location. This creates challenges in the organisation as it has facilities around Finland.

Service provider's receptionists keep count of the number of visitors in their respective facilities. Since some facilities do not have a reception, the organisation cannot fully rely on the known number of visitors. Registering visitors and archiving the forms in facilities without a reception is up to the employees. Also, the organisation does not have real time information about the visits. The service provider combines statistics manually four times a year. Not all the service provider's employees were aware of the instructions specific for their facility. The reason appeared as when the old employees left the new ones were not briefed about the facility specific issues. Some other problems were also found. It was discovered in the interviews that registering large groups is time consuming, especially if the host has not informed the reception beforehand. Also, a few single visitors arriving at the same time can jam the reception.

4.2 Conducting market research

This chapter will present the purpose, actions and findings of market research as a part of planning of visitor management system procurement. The reason for conducting market research was to gain understanding of the current situation of the supply of electronic visitor management systems. Aim was to learn if the features of different systems corresponded with the requirements the case organisation had set and what kind of pricing models supplier use. The findings of the research should then be applied when combining the invitation to tender. Setting realistic expectations is vital for a successful procurement process. Additionally, the organisation must be able to combine the invitation to tender in a way that enables them to differentiate the bids to select the supplier.

Market research was conducted throughout the project. Some amount of studying was done prior the actual start of the thesis project, but the main contribution was made after the analysis of current state. At first, secondary data was collected about the visitor management systems that are on the market. Systems that had all or most of the features the organisation was looking for were prioritised.

Market research was conducted by searching information on companies' websites and interviewing suppliers from four different companies. To purpose of interviewing was to fill in the gaps that were left after other research. As a public procurement unit, the organisation must

consider all suppliers equal. Fair treatment was ensured by giving the suppliers same information about organisation's plans. The interviewees were able to provide valuable information and suggestions for optimal use of the different systems.

	A	B	C	D
Can include self-service kiosks	X	X	-	-
Visitor badge with visitor's picture	X	X	X	-
Cloud-based	-	X	X	X
Possibility to print out statistics	X	X	X	-
Sends automated messages to hosts	X	X	X	X

Table 1: Example of differences in some visitor management system features

Four fictional systems and some of their features are illustrated in table 1. The table was created to demonstrate the different types of electronic visitor management systems which were identified in market research. The most common type of system is presented in the column D. An electronic visitor management system can be in its simplest form a webpage where visitors' information is logged by the receptionist and stored into a digital database. The research found multiple companies producing software that offered visitor management systems as a secondary product. More advanced systems include accessory devices which can be visitor badge printers and cameras for photographing the visitor for the badge, as in column C. The most limiting feature was found to be the self-service kiosks. Columns A and B present quite similar systems but product B is a cloud-based whereas A is installed into client's server. All the researched systems send the host an automated message once their visitor has registered.

Findings of the research indicated that the central purpose of every electronical visitor management system is the same: to collect information of visits into a digital database. In most cases the data would be stored into a cloud server and only few companies offered a software that would be installed into client's own server. Whether the software is in cloud or a local server does not significantly affect day-to-day operations but updates and maintenance work

for a locally installed software would require the supplier to access the server room. The organisation should define whether they wish for a cloud-based system or a local one.

An electronic visitor management system, especially with a self-service kiosk, would support the work of receptionists. They would be able to see upcoming visits and arrange their other tasks accordingly. Visitors could self-register if the reception is temporarily busy or unavailable. Receptionists would be able to see the current number of registered visitors in their respective facility. Self-service kiosks in facilities without a receptionist would assist the host by guiding through the registration and removing the need to archive paper documents.

Although the market research was limited to companies based in Finland, it became known that there are multiple international companies operating on the electronic visitor management system market. The supply however appeared to be highly similar on domestic and international markets.

5 Results

The outcome and the final phase of the project was a report for internal use of the case organisation. It was compiled of the findings of the research, calculations for different procurement options and recommendations for the rest of the phases in the procurement process. Strengths, weaknesses, opportunities and threats of the procurement were compiled onto a SWOT-analysis.

The current state of visitor management was documented in detail. The document may be used for other purposes as well, for it contained details of each facility. Visitor management process was presented as a detailed flowchart which the organisation preferred and used also for the purposes of documenting the collection and use of visitors' personal information. Appendix 1 presents a simplified version of the flowchart. Based on the conducted interviews and observations, a central issue of the current state is the paper-based system. To regain the management of information, the data should be in digital form. The corporate security employee could then access the data when necessary and without too much effort. It is recommended to purchase self-service kiosks to locations without a reception. Otherwise the paper-based system would still need to be used and the data would not be part of the digital database.

Visitors' point of view was considered when figuring out solutions with receptionists, corporate security and assistant team employees, and system providers. It was recognised that the experience at the reception desk is often the first time the visitor or customer has face to face interactions with the organisation. Interviewed visitor management system suppliers explained that replacing paper forms and badges with digital ones can speed up the registration

process significantly. At this point of the procurement process the target was to purchase a system which would allow for a smooth registration.

The main conclusion of the project was that an electronic visitor management system would aid solving the current challenges in the visitor management process. The process would improve significantly, if the data would be stored in a digital database. To ensure the success of the procurement, the organisation must allocate enough resources for the entire procurement process.

5.1 Cost evaluation

Suppliers of visitor management systems were inquired preliminary prices for their products, as a part of market research. Calculating the estimated cost of a public procurement is important. The evaluation is applied to determine whether the national or European Union threshold value would exceed, and competitive tendering must be organised to select the supplier. The case organisation also needed the cost evaluation for budgeting purposes.

	unit price	1st year	2nd year	3rd year	4th year	5th year
Software	*	**	**	**	**	**
Self-service kiosk	*	**	**	**	**	**
Badge printer	*	**	**	**	**	**
Empty badges	*	**	**	**	**	**
Total		***	***	***	***	***

Figure 9: Illustration of a cost evaluation

Cost evaluations were calculated for different procurement options. A new table was drafted for different options. Costs would change if the organisation would rent or purchase any of the devices. In a five-year contract period the cost of renting would become larger than purchasing the devices. However the expenses would be higher during the start of the contract if the devices are purchased. In addition, interviewed suppliers were not able to inform about the expenses of maintenance service if the devices would be purchased. If rented, maintenance service would be included. The number of self-service kiosks had the most significant effect on the cost. Additionally, the duration of the contract period affects the price. Expenses in the first year were higher due to the installation costs for example. Otherwise the costs would remain same for the duration of the contract.

5.2 Implementation plan

A successful implementation of the new visitor management system demands for engagement of the case organisation in planning and executing the launch. Competitive tendering might

be the phase which public procurement units focus on even though the success of the procurement is highly dependent on the planning and contract phases. At least the outlines and clear goal for implementation phase must be outlined already in the planning phase.

The main part of implementation plan was a timetable for the rest of the steps in procurement process. Literature review and discussions with a corporate security employee were required to be able to compile the timetable with all the necessary phases. The phases include tendering, contract matters, training sessions, testing and pilot periods, and launch. Every phase is divided into tasks and the responsible party marked. The detailed timetable is in appendix 2.

The possibility of replacing a receptionist with a self-service kiosk must be reviewed once the kiosks are deployed. Users will need receptionists' assistance in using the new system and devices after the launch. The possible spots to install self-service kiosks were observed in the current state analysis phase and marked in blueprints for later use.

5.3 SWOT analysis

A SWOT analysis was formed to visualise the strengths, weaknesses, opportunities and threats of an electronic visitor management system procurement. A SWOT analysis is commonly used tool to create comprehensive awareness to support decision making and strategic planning in organisations (Renault 2018). The table applies to all the researched systems rather than specific one. It was not seemed reasonable to focus on any particular system because the supplier would be selected by competitive tendering. At this stage of planning of the procurement it was important to be able to present rationale for the procurement for management.

Strengths	Weaknesses
• Visitors' personal data is managed by GDPR requirements • Data is stored digitally: management and compiling statistics more effortless • No messy paper archives • Automated messages of arrival instructions for visitors • Different companies in same buildings can get unique visitor badges	• The system will not work during power and/or communications network outages
Opportunities	**Threats**
• Improved customer experience • Supports case organisation's image as a pioneer in technology • Utilising visitor statistics in other departments, i.e. marketing • Integrating the system into existing access control system • Re-allocating receptions' resources	• Users' unwillingness/insecurity about using the new system • Co-operation with the chosen supplier does not function as expected • The system chosen by competitive tendering does not fit case organisation's goals • Critical observation of internal visitor management process

Table 2: SWOT-analysis of an electronic visitor management system

General Data Protection Regulation enables persons to inquire about their personal information held by an organisation (European Union 2016). The current paper archives of the case organisation may prove challenging to go through if a person requests a copy of their personal data. A digital database would pose a notable strength in the matter. In addition to smoother registration, the possibility to include other departments and existing systems into a visitor management system could help improve visitors' experience. The organisation could seek for savings of visitor management by re-allocating receptions' resources to other tasks, if self-service kiosks are installed.

An evident weakness of an electronical system is power outages. The organisation must prepare for outages by holding onto some amount of paper forms for continuous process even without electricity. The organisation should define the invitation to tender in as much detail

as possible. That way the selected system will meet their need. Visitor management system should be observed again after the launch of the purchased system. Being able to neutrally observe one's own process can be challenging.

6 Conclusions

Planning is a critical phase of a procurement process. It is important for an organisation to know what they want and need to purchase. That is why the need is defined in the first phase of a procurement process. Public procurements are governed in the Act on Public Procurement and Concession Contracts 1397/2016. As the purpose of the Act is to enhance the use of public funds, the importance of the planning phase is again emphasised. Procurement units should not waste funds on unsuccessful procurements due to lack of planning.

Visitor management was considered a part of access control in the framework of this thesis. Access control is in turn a common physical security measure. Security measures are established based on risk management and assessment process. Literature review, observation, desk research and semi-structured interviews were used to gather information necessary for this thesis. These methods are amongst the most commonly used in qualitative case studies and proved to be useful in this project as well. A combination of multiple methods was needed because a single method would not have enabled as comprehensive results.

A visitor management process may appear messy in complex organisations. It is impossible to study the whole organisation with detail. The goal should therefore be to understand the main characteristics, differences and problems that occur most often, and aim to fix them. The most prominent issues in the current state of the visitor management process appeared to be due to paper-based system, as was expected. The main goal for procurement should then be to transfer the data of visitor management process into a digital database.

Including employees' input in the current state analysis was considered but then decided against it. It was thought that the process would not change significantly from the hosts' perspective. Considering that the goal of the development project was to improve the organisation's ability to manage information, the decision was justified. Involving the hosts' input would have been necessary if the primary goal would have been, for example, to make the process more user friendly.

In conclusion, the procurement process is more extensive than the tendering period. The procurement unit must allocate resources for the whole procurement process. Visitor management software providers rarely offer a finished product that can be launched immediately after tendering. Usually suppliers are prepared and willing to adjust the product with the help of the client.

A suggestion for further research is to study the effects of a visitor management system and whether it could replace a receptionist. The impact of removing a guard might cause the need for changes in security measures, which should be analysed and the possible costs of the changes compared to savings.

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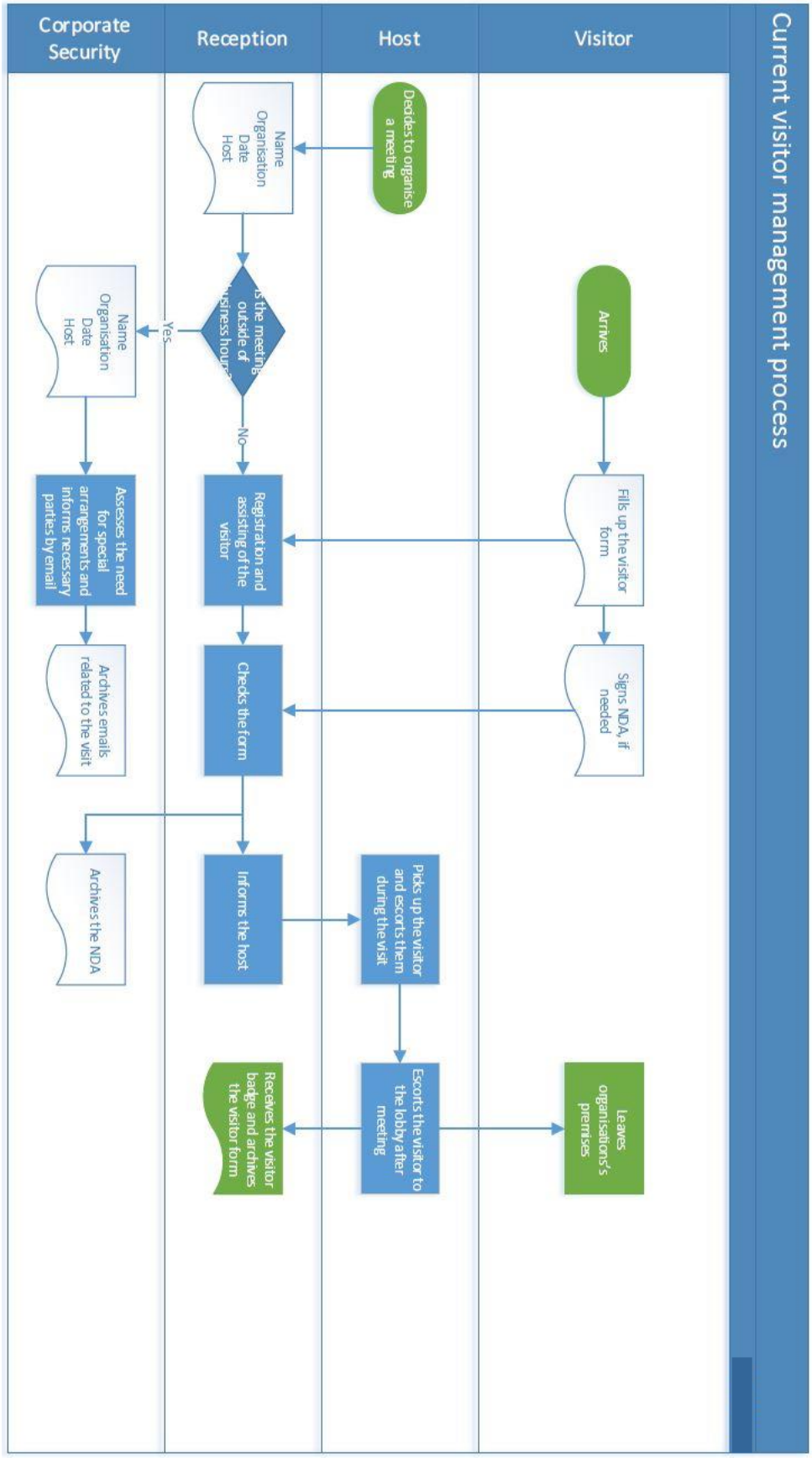
Figures

Tables

Appendices

Appendix 1: Current visitor management process flowchart



Appendix 2: Timetable for the rest of the procurement process