Digitalisation of payroll processes at Aalto University

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Abstract

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The purpose of this thesis is to support Aalto University payroll department in incorporation of digital payroll solutions. The transition towards paperless payroll management has long been discussed in the university, but a comprehensive research on the advantages and weaknesses, expenses and savings and the necessity of the project has been called upon before undertaking the project.

The aim of the thesis is to map out the current payroll processes and to analyse the problem areas, which could potentially be solved by digital solutions, within these processes. It intends to provide a critical analysis on the threats and advantages related to digitalisation and to discover what the general perception towards digital solutions is within payroll professionals and whether they are prepared to adopt digital solutions.

The theoretical part of the thesis studies payroll management. It elucidates what salary consists of and what legal factors are associated with payroll management. It also analyses the evolution of digitalisation so far and what threats and advantages it has brought about in payroll management. Digitalisation allows payroll management to handle payroll data with modern tools and automated processes. Different payroll processes are performed with as little manual work and consumption of paper as possible.

The study uses a mixed methods research design to analyse the research findings. Qualitative method is used to document the perceptions of payroll professionals towards digitalisation and a quantitative method to identify the variance. Qualitative data was gathered by interviewing Aalto University staff. Quantitative data was research through a survey, which was sent to Aalto payroll professionals and analysed with SPSS Statistics software. Mixed methods design resulted in a more complete and in-depth understanding of the research question.

The research revealed that the problem areas in payroll processes centre around the erroneous data on the arriving payment material as well as two particularly time-consuming payroll processes: non-digital archive and checking the payment material before the final payment. Payroll professionals are open to new digital innovations, which could bring improvement to these problem areas but concerns towards information security risks, decreased need for human workforce and incapability of electronic data to deal with exceptional circumstances remain.

Aalto University is an international organisation of 5000 staff and 20 000 students located in the Helsinki Metropolitan area. University's foundation in 2010 stemmed from an idea of a new innovative university combining art, technology and economics.

Keywords
payroll management, digitalisation, digital financial management

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1   Introduction

Constant evolution is taking place in payroll management in the fast changing world of technology. New technologies continually create new ways to operate in payroll management and are expected to drastically shift the field of financial management in the future.

Traditional payroll management includes receiving the material in paper form and dealing with it manually. Digital payroll solutions allow the payment material to be received in electronic form and the payroll processes to be automated. Digital solutions have emerged as an option for traditional financial management based on manual processes and are becoming an essential part of effective financial management. Digital solutions optimise financial management and decrease the amount of routine tasks, which enables the staff to focus on specialised tasks.

This thesis represents a study on digitalisation of payroll processes. The thesis has been commissioned by Aalto University, which payroll department has determined a demand for digital solutions but a thorough research on possibilities and weaknesses related to digital payroll management has been called upon before undertaking the project.

The thesis will map out the main payroll processes and aims to determine the problem areas, which could be solved by digitalisation, within these processes based on qualitative interviews and a quantitative survey. It intends to critically analyse the possibilities and weaknesses associated with digitalisation and to study payroll professionals' perception towards digital solutions and their preparedness to adopt a digital payroll system.

Chapter 1 introduces the background of the thesis topic and the commissioning organisation as well as provides the reader with the main concepts related digitalisation worth knowing before proceeding with the study. An organisation-wide digitalisation project is taking place at Aalto University, which requires different departments to determine their process phrases and study how digital solutions could improve their services. The commission for the thesis is also based on previously conducted study, which revealed that the staff is not satisfied with the impracticabilities related to current processes and suggested a follow-up research on how digitalisation could improve the quality of service.

Chapters 2 and 3 review the theory behind payroll management and digitalisation. The theory is based on literature and electronic sources. Chapter 2 elucidates what salary consists of and what legal factors are associated with payroll management. Salary can be considered both an intimate matter to a person as well as a politically and economically

important factor in a society. Chapter 3 analyses the evolution of digitalisation and studies the threats and advantages it has brought about in payroll management. Digitalisation allows payroll management to handle payroll data with modern tools and automated processes. Different payroll processes are performed with as little manual work and consumption of paper as possible.

Chapter 4 familiarises the reader with the research methodology used in the thesis. The research is based on a mixed methods research design, utilising both qualitative and quantitative data. Qualitative data was gathered by interviewing Aalto University payroll and IT staff. Quantitative data was acquired through a survey sent to payroll professionals and analysed with SPSS Statistics software. A clear description of the research methods used in the study improves the transparency and thus, reliability of the study.

Chapter 5 introduces the empirical findings of the research and finally chapter 6 analyses, discusses and draws a conclusion based on the research results.

1.1   Background

The study has been commissioned by Aalto University, which is currently reflecting upon moving towards digital payroll solutions and interested in mapping out the current processes that the transition could have an impact on as well as determining possibilities and challenges related to digitalising payroll.

In 2014, a study examining the total quality of the service process at Aalto payroll department was conducted by Paula Kokkola (2014). The study reveals that the staff is not satisfied with the impracticabilities related to payment invoices and manually conducted tasks. According to the research human error is a major factor negatively affecting the quality of service. Therefore the study recommends a follow-up research on how service quality could be improved by digitalisation of payroll services creating a high demand for this research in the organisation.

Traditionally, payroll management at Aalto University has been a labour-intense and manual process with payment material, employment contracts, tax cards and other documents to be sent across different campuses and departments to the payroll. Payroll staff would then re-enter the data into the system in order to process the payments. This process relies on the accuracy of individual employees who manually rewrite the information from the payment invoice to the system.

Aalto payroll department has identified that manual processes can make the organisation vulnerable to payroll errors and scheduling inefficiencies and has therefore requested a research that would determine what the possibilities and challenges related to paperless payroll services are.

The current issues related to manual payroll services revolve around the substantial amount of incoherent or missing information in the arriving payment material. The payroll department receives the payment documents from six different schools and three different campus areas, which are spread out across Helsinki Metropolitan area. Sending payment material back to the HR to fill in the missing information or requesting more information via e-mail can cause postponements in the payment process.

1.2   Thesis topic

The research question of the thesis is whether it would be beneficial for Aalto University to adopt digital payroll solution. Different standpoints of the topic are researched through investigative questions. Firstly, the payroll processes need to be determined in order to clarify what are the problem areas that the university strives to enhance through digital solutions. Secondly, the possibilities and threats associated with digitalisation are studied objectively in order to gain accurate and neutral information. The third investigative question focuses on financial aspects related to digitalisation. Acquiring a new digital system is undeniably expensive but the study also aims to find out how digitalisation can reduce certain costs in an organisation. Finally, the thesis studies payroll professionals' perceptions and acquiescence towards digitalisation through qualitative interviews and a quantitative survey.

Table 1. Research question and investigative questions

Research question	Is it beneficial for Aalto University to digitalise its payroll services?

IQ1	What are the main payroll processes at the payroll department and which of them are the problem areas, which could be solved by utilising digital payroll solutions?
IQ2	What are the advantages and weaknesses related to digitalisation?
IQ3	Is digitalisation of payroll financially beneficial?
IQ4	What is the attitude of the payroll staff toward digitalisation?
IQ5	Discussion

1.3 Demarcation

The nature of the thesis is very specific. The thesis studies specifically university payroll system, which is based on the General Collective Agreement for Universities, and therefore differs from corporate payroll system in many ways. Hence, the theory related to payroll management highlights the legal factors and other areas specifically associated with education sector.

The payroll professionals' perceptions on digitalisation are Aalto University staff's perceptions, which can differ from other universities depending on the level of digitalisation in the university as well as other working conditions.

The thesis does not study different software qualities, being written as part of Financial Management for Global Business specialisation studies, but recommends a follow-up research on choosing the best software for Aalto University payroll department for ICT students.

1.4 Case company introduction

Aalto is a university of 20 000 students and 5000 staff located mainly in the Helsinki Metropolitan area. It is the third largest university in Finland after the University of Helsinki and the University of Turku. Its history stems from the Finnish university renewal and an innovative idea of a university merging art, science, technology and economics. Aalto started officially operating on 1 January 2010. (Aalto University 2015.)

The origin of the name of the university leads to a name competition held in 2008. The winner of the competition, Aalto University, honours the life and work of the world-renowned Finnish architect and designer Alvar Aalto. When the Helsinki University of Technology moved from Hietalahti to Otaniemi after the Second World War, Aalto created the general plan for the campus. Hence, Aalto's architecture still plays a major role in the campus area. Particularly noticeable is the main building, known as Otakaari 1, a striking amphitheatre-like auditorium, which Aalto located in a very visible area on one of the seven hills of the area. (Aalto University 2015.)

Aalto comprises six schools: School of Arts, Design and Architecture, School of Science, School of Chemical Technology, School of Electrical Engineering, School of Business and School of Engineering. Aalto is mainly located in three campus areas; the four Schools of Technology in Otaniemi, The School of Arts, Design and Architecture in Arabia and the

School of Business in Töölö. However, according to a goal set by the Board of the university, all operations will be concentrated in the Otaniemi campus and by 2017 all students from Töölö and Arabia will have moved to Otaniemi. This enables Aalto to improve its creative and multidisciplinary goals. Therefore the Otaniemi area is expected to develop considerably within the next years. (Aalto University 2015.)

Aalto is a foundation-based university. When the university was founded in 2010, its capital composed of donations of 700 million euros of which 500 million euros was a Government donation and the rest, 200 million euros, was donated by Finnish industries and financers. The profit that the university generates is spent on achieving the university's strategic goals. (Aalto University 2015.)

Professor Tuula Teeri was elected the first president of the university and started her second 5-year term in 2014. Under Teeri's presidency the university incorporated a tenure track system, encouraged interdisciplinary activities and established factories in media, service science and product design. Before her presidency at Aalto University Teeri was working in the field of forest industrial biotechnology and the development of biomimetic materials. (Aalto University 2015.)

In recent years Aalto students have received recognition for success in fashion and nanotechnology as well as founding Europe's leading start-up event Slush. In spring 2015, four students from The School of Arts, Design and Architecture were amongst the top-ten finalists in one of the most important fashion designer competitions in the world, Festival International de Mode & de Photographie Hyères in Hyères, France (Aalto University 2015). Aalto students also won the competition in 2012 and 2013 and the remarkable success in the competition has even created a Finland –phenomenon in the fashion industry (Helsingin Sanomat 2015). In spring 2015 the researchers at Aalto University became known of achieving a record-breaking efficiency of 22.1% on nanostructured silicon solar cells, which indicated an almost 4% increase to the previous record (Aalto University 2015). Started as a student project, Aalto students also created the Aalto-1 satellite, the first satellite that was completely planned and constructed in Finland (Aalto University 2014).

Aalto has faced significant financing difficulties in recent years and has gone through statutory employer-employee negotations in 2014 and 2015. In 2015 Finland's economy had contracted for three years in a row. This resulted in Prime Minister Juha Sipilä government deciding on significant cuts on education to promote economic growth. The cuts for universities were 330 million euros by 2018 out of which Aalto's portion was 66 million euros. The cuts consisted of cuts to the funding of the Ministry of Education and Culture as well

as cuts to Tekes funding. Some of the cost savings at Aalto were realised by increasing funding from other sources (29M€), improving the effectiveness of operations and reducing facility and procurement costs (20M€) but the university was also forced to start statutory employer-employee negotiations concerning its personnel in November 2015, a year after the previous employer-employee negotiations in 2014. Approximately 17M€ was estimated to be covered by savings in personnel costs. (Aalto University 2015.)

1.5 International aspect

Aalto's mission statement expresses that it "works towards a better world through international top-quality research, interdisciplinary collaboration, pioneering education, surpassing traditional boundaries, and enabling renewal. The national mission of the university is to support Finland's success and contribute to Finnish society, its internationalisation and competitiveness, and to promote the welfare of its people." (Aalto University 2015).

At Aalto, internationality is considered as a strategic enabler and an important factor in targeting towards global competence of students and staff. Internationality is embedded into all activities at Aalto: supporting international mobility of students and teachers, international research and integration. The share of international teaching and research staff has increased by 65% since 2010 (Figure 1), which indicates a strong international focus of the university (Aalto Annual Report 2014).
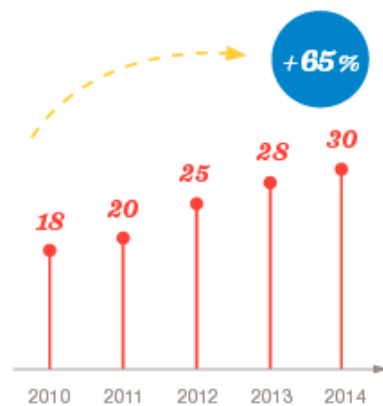

Figure 1. Share of international faculty (%). Aalto 2015

Of all Aalto degree students 12% were international students in 2014. The student mobility including exchange studies and work placements was 871 outgoing students and 965 incoming students.

1.6 Key concepts

Even though digital financial management was introduced in Finland over a decade ago, so far the definition of digitalisation has been vaguely specified in professional literature (Lahti & Salminen 2008, 13). This subchapter clarifies the concepts related to digitalisation, which are worth knowing before proceeding with the study.

1.6.1 Digital financial management

Digital financial management refers to the automatisation of all information flows and data processing and handling them in a digital form. It aims to create a straightforward operating sequence, where unnecessary or overlapping processes are eliminated. (Lahti & Salminen 2008, 19.)

Despite the fact that digital and electronic financial management are commonly employed to mean the same thing there is, in fact, a slight difference between these two concepts. Whereas electronic financial management refers to enhancing processes by utilising information technology, applications, Internet, self-service and other electronic services, digital financial management aims to include the entire value chain. For example, a situation where the customer sends the payment material in paper form and the payroll then converts it to electronic data by scanning it, is indeed considered electronic financial management but in the case of digital financial management the customer would originally send the material electronically. Therefore it can be said that electronic financial management is a rudiment of digital financial management (Lahti & Salminen 2008, 21).

Digital financial management is also not the same as paperless financial management. The concept of paperless financial management was commonly used in the late 90s and early 2000s when electronic services started to become common. Digital financial management is naturally paperless but the difference stems from the fact that the paperless state can be achieved also ineffectively by manually converting the material into digital form by scanning. (Lahti & Salminen 2008, 22.)

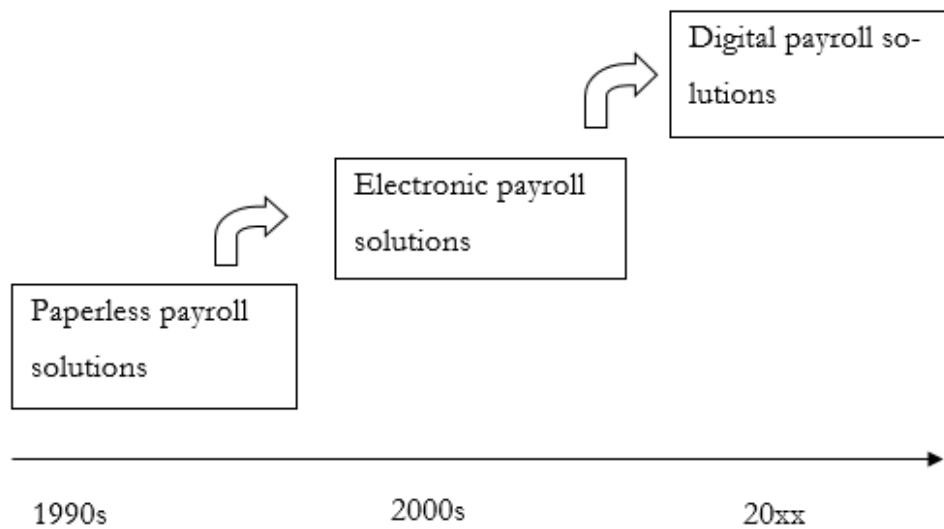Figure 2. Digital development in financial management

1.6.2 Digitalisation

Digitalisation refers to the processing, transferring and storing of information, which is in an electronic form. The information is often located in databases and it is processed with software or applications. Data, which is in digital form is more effectively processed than data in traditional physical form. (Lahti & Salminen 2008, 17.)

2 Payroll management

Payroll management is an essential part of a company, especially as for most businesses payroll forms the largest expense. The main responsibilities of payroll management include ensuring that all laws, statutes and agreements are complied with and that the correct monetary amount is paid to the customer at the right time. (Syvänperä & Turunen 2011, 13.) In addition to the main responsibilities, payroll management also includes a countless amount of other tasks, which are not as visible to the customers such as registering data, calculation of salary, creating certificates, providing data to stakeholders and dealing with retirement- and sickness insurances (Eskola 2004, 20).

Calculation of salaries is the core function of payroll management. Small organisations typically manage their salaries either manually or through palkka.fi –website, which is a free payroll service provided by the Finnish Tax Administration in cooperation with pension- and insurance organisations. Larger organisations require more extensive payroll software, which is generally integrated into other financial management software. (Syvänperä & Turunen 2011, 13.)

2.1 Salary

Salary is defined as compensation for a work performed in an employment relationship. Salary consists of actual salary, different fees, bonuses, commissions and overtime compensation. Salary is mainly a monetary payment but can also be paid in fringe benefits such as car, lunch or phone benefits. (Stenbacka & Söderström 2012, 22.)

Salary can be an intimate matter to a person, which is why it is essential to handle salary information with care and consideration as well as respect the confidentiality of the customers' personal data (Syvänperä & Turunen 2011, 15). Along with being an intimate subject to a person, salary can also be viewed on a larger scale as a politically and economically important factor in a society. The government, together with trade unions and employers' organisations, negotiates the Finnish national income policy agreement, which affects the collective agreements and thus, salaries. The national income policy agreement is a tripartite agreement covering a wide range of political and economic issues such as salaries, social policy, taxation and reforms related to employment. (Eskola 2004, 8.) Salary's significance to the society is demonstrated by the fact that issues related to salary regularly provoke strikes and demonstrations such as labour demonstrations on 18 Sep-

tember 2015 towards the government's austerity measures to cut Sunday bonuses, over-time pay and sick pay, making sectors dominated by female low- and middle-income earners suffer the most.

The average monthly salary in Finland was 3132 euros in 2011, which is higher than the average salary in the EU. Higher salaries can be found e.g. in Denmark, Sweden and the Netherlands whereas salaries in Germany are lower in average. Finland has a relatively low level of low-income earners, which is defined as employees earning less than 1900€ a month. Only 15% of full-time employees are considered as low-income earners whereas in Germany the amount is 32%. (Labour Institute for Economic Research 2014.)

There is no statutory minimum wage in Finland. However, most employees are covered by minimum pay rates for each sector specified in collective agreements. (WageIndicator 2016.) Finland has not been successful in its intentions to ensure equal pay for men and women. According to a study conducted by the Ministry of Social Affairs and Health (2015), even though women's educational attainment level has increased significantly faster than that of men, the salary gap between men and women has even so increased and women still earn only 83% of men's salary. Equivalent degree guarantees a higher salary for a man than for a woman.

2.2   Legislation

Awareness of legislation related to payroll is crucial for payroll professionals in order to comply with all agreements. Payroll professionals also need to actively follow amendments, which affect salaries. (Stenbacka & Söderström 2012, 14.)

University payroll management is based on the General Collective Agreement for Universities, which is negotiated between the Trade Union for the Public and Welfare Sectors (JHL), Federation for Salaried Employees (Pardia) and the Negotiation Organisation for Public Sector Professionals (JUKO) negotiating for the employee and The Association of Finnish Independent Education Employers (AFIEE) for the employer (Aalto University 2016). AFIEE represents all 14 universities in Finland (excluding National Defence University), 46% of Universities of Applied Sciences and the majority of independent educational institutes (Sivistystyönantajat 2015).

Figure 3. General Collective Agreement for Universities

Collective agreements are concluded for a fixed period; the latest collective agreement for universities applies 1 April 2014 - 31 January 2017. Collective agreement states the minimum conditions for the employee although the parties are free to agree on more favourable terms than those of the collective agreement. During the time the collective agreement is enforceable, both parties need to ensure industrial peace and strikes cannot be organised in order to change what has been agreed on. (Eskola 2004, 20.)

The Employment Contracts Act defines that an employment relationship exists when an employee agrees to perform work for an employer under the employer's direction and supervision in return for pay or some other remuneration (Ministry of Employment and the Economy 2014). The parties sign an employment contract, which can legally be oral, written or electronic but virtually should be made in written and with two signed copies to enable proving what has been agreed on in case of a dispute. Principally, the employment should be permanent and the employer needs to provide a justifiable reason in order to conclude a fixed-term contract. (Eskola 2004, 18-21.)

Many laws, statutes and agreements affect payroll management and it is their responsibility to ensure that these stipulations are complied with. The most essential laws and agreements related to payroll management are

- Employment Contracts Act
- Collective Agreements Act
- Working Hours Act
- Annual Holidays Act

- Prepayment Act
- Employees Pensions Act
- Employment Accidents Insurance Act
- Enforcement Code
- Accounting Ordinance

(Eskola 2004, 21.)

2.3   Social insurance contributions

Labour costs can be divided into direct and indirect costs. Employer commits to several obligations related to labour costs when recruiting a new employee. In addition to salary, a direct cost, the employer is also obliged to pay various indirect labour costs such as employer's social security contribution, accident- and unemployment insurance contribution, pension insurance contribution and employees' group life insurance contribution. Annual leave and sickness leave also cause costs to the employee. (Syvänperä & Turunen 2011, 139.) This forms a basis for the world-renowned Finnish social security system, which aims to ensure basic security in all situations in life.

Social security contribution is collected from all payments excluding auditing remunerations, pension, royalties, income from independent services and payments to under 16 and over 68-year-olds. Social security contribution consists merely of health insurance contribution since the national pension contribution was excluded from it in 2010. (Syvänperä & Turunen 2011, 146.) Social security contribution percentage in 2016 is 2.12% (Kela 2015).

Employer arranges a statutory earnings-related pension insurance for the employee, which provides the employee with security for senescence, disability and unemployment at elderly age. Since the employees' pension renewal in 2007 the obligation to take out pension insurance in the private sector has been based on the Employees' Pension Act (TyEL). There are several different pension acts for entrepreneurs, agriculture entrepreneurs, the Evangelical Lutheran Church and seafarers but in Aalto's case worth mentioning is the State Employees' Pension Act (VaEL). In addition to state employees, VaEL also applies to university employees born before 1 January 1980, which is an important factor to take into account at a university payroll department in order to collect the correct amount of pension insurance from the salary. The employer is free to choose the pension

insurance provider. The Ministry of Social Affairs and Health confirms the contribution percentage annually. (Syvänperä & Turunen 2011, 151.) In 2016 the employees' TyEL pension insurance contribution is 5.7% and VaEL 7.2% (Keva 2015).

Employer also takes out statutory unemployment insurance for the employees. Ministry of Social Affairs and Health confirms the unemployment contribution percentage each year. In 2016 the percentage is 1.15% for the employee and 1-3.9% for the employer depending on the total salary (The Unemployment Insurance Fund 2015). In addition to the unemployment insurance, the employer takes out statutory accident insurance and employees' group life insurance. The accident insurance secures the employee for occupational accidents and illnesses.

Table 2. Employer and employee contributions deducted from salary

Employer contributions	Employee contributions
Social security contribution	Pension insurance
Pension insurance	Unemployment insurance
Unemployment insurance	Health insurance contribution (included in the tax withheld)
Accident insurance	
Employees' group life insurance	

3 Digitalisation

In 2000 Google was only moving out of its garage office in California, YouTube was five years away from being invented, Apple was thought to be on the skids and the creator of Facebook was still in high school (Meister & Willyerd 2010, 1). No one could have envisioned the substantial changes that were about to take place within the next decade. Now digitalisation has become a part of our daily lives both in private life and workplace.

Contrary to many other world-changing inventions, such as the telephone or penicillin, the Internet had no one single inventor but, instead, evolved over time. The story of the Internet started in the United States during the Cold War. In 1957 the Americans became alarmed by the fact that whereas they had prioritised their most talented scientists and engineers to create something bigger, bigger cars and bigger televisions, the Soviet Union were about to win the Cold War with their beach-ball-sized Sputnik, which had just been launched into orbit. (History 2015.)

After the launch of Sputnik the Americans started to invest in science and technology: schools increased the amount of courses in chemistry, physics and mathematics, businesses invested in scientific research and the government founded new agencies such as NASA and the Department of Defence's Advanced Research Projects Agency (ARPA) (History 2015).

The biggest concern during the Cold War was how would the country survive if the Soviet Union were about to attack the telephone system and this way eradicate the entire network, which makes long-distance communication possible. To address this problem, ARPA created a way of exchanging information between two computers. In 1969 still only four computers were connected to this ARPAnet system and in the 1980s it was still mostly used by scientists and researchers. This all changed in 1991 when Tim Berners-Lee introduced the World Wide Web creating the Internet that we know today. (History 2015.)

3.1 Digitalisation in business environment

Today, the world is at the state where the post-dot.com boom enthusiasm has faded and the society has gained a more practical and rational way of seeing the Internet and ICT. This has appeared in people and organisations getting online and exploring challenges and opportunities brought about by the Internet and related technologies. (Li 2007, 1.)

The development of ICT technologies has been a rapid and on-going process and has become a major part of people's daily activities at work and educational institutes. This, however, does not mean that revolutionary innovations did not happen constantly. On the contrary, new technologies continue to invade corners of the economy and daily lives of the society, rapidly blurring boundaries between products, services and channels as wells as work, leisure and education. Within the next years, organisations will bring to bear new innovative ways of working by utilising the potential of the Internet and related technologies. (Li, 2007, 1.)

Digitalisation is gaining an essential role in the workplace. Meister's and Willyerd's The 2020 Workplace predicts how technology will alter the working environment within the next decade. One of the major factors is that it will make work-life more flexible by providing a possibility to work remotely. The device, laptop or mobile, will increasingly become the office of the employee. This allows employees to balance their lives in terms of family and work. The authors also expect social media to gain more importance in the recruitment process. The recruitment process will increasingly start in social networking sites such as Facebook or LinkedIn. Social media skills are also required from the head of the organisation as keeping in touch with customers, the marketplace and the employees belong to the role of CEO. Fastest way to broadly communicate to these stakeholders will be through tools such as blogging or Twitter.

3.2 Digitalisation of payroll

Digital payroll management has emerged as an option for traditional payroll management based on manual processes. Digital solutions enhance financial management processes and decrease the amount of routine tasks, enabling the staff to focus on specialised tasks. Digital solutions are becoming more and more common not only within large corporations and public sector but also within small and medium-sized enterprises. (Helanto, Kaisaniemi, Koskinen, Kuntola & Siivola 2013, 4.) Due to their large volumes, large companies typically have stronger interest to automate their payroll. Within small companies, the goals related to digitalisation still mainly focus on electronic payslips and reporting to stakeholders electronically. However, regardless of the size of the company it is essential for companies to identify what changes are expected to take place in the rapid expansion of digital universe to allow the organisation to be prepared for these prospective changes and react to them rapidly. (Lahti & Salminen 2014, 147.)

Payroll and the entire financial management sector are facing pressure from different directions. Due to new developments in technology, effectiveness and improved quality of

service are expected from the payroll. Simultaneously, as globalisation drives competition, payroll is expected to serve customers promptly and flexibly. (Lahti & Salminen 2008, 10.) Digital payroll system enables processing all the same payroll tasks as a traditional method but in a more effective and flexible manner (Helanto & al. 2013, 28).

Finland has legalised digital financial management already in 1997 in the Accounting Act and is now one of the top countries in financial management digitalisation. Lahti & Salminen (2008, 23) claim that some of the reasons why digitalisation has developed so rapidly in Finland are that Finland was already one of the top countries in Internet usage, Finland's solid bank standards and that Finns had already developed a trust in online services due to online payments becoming popular in Finland at an early stage.

3.2.1 Digitalising payroll processes

Payroll management is a much wider entity than just calculation and payment of salaries. The entire payroll process chain needs to be taken into account when planning the digitalisation of payroll processes.

One of the core payroll processes is the maintenance of personal data register and other basic salary information. In addition to personal and salary information the payroll also needs to register the employee's tax card and bank account number. When the initial data is saved in the system carefully, the payment process and calculation of salaries can operate relatively automatically. In this process phrase the most challenging part to automate is when there are changes in the terms of the employment. These changes include salary changes, holiday and sickness absences, tax rate changes, cost pool changes and other exceptional circumstances. Digital system enables saving this information where the data is initially available, typically at the HR, which helps to avoid overlapping and duplicate tasks. In order to digitalise this process phrase, the payment material needs to be delivered on an electronic form and the employee needs an access to the system to update his/her information. (Lahti & Salminen 2014, 142-143.)

Calculation of salaries can be a relatively effective and automated process phase at its best after all the salary data has been saved in the system correctly. Automation of this process phrase enables the software to automatically calculate payroll taxes and other employer and employee contributions associated with the salary. (Lahti & Salminen 2014, 141.)

Payroll is responsible for reporting to stakeholders such as the Finnish Tax Administration, pension and insurance providers and the Social Insurance Institution Kela. The data can typically be submitted to the stakeholders electronically via their web sites. Reporting to stakeholders in currently undergoing an extensive development project. The aim of the project is that in the future all payroll data could be reported to one common register, to which all parties who operate with salary data have an access. This would enable real-time monitoring of salary data and eliminate the need to file an annual information return to the Tax Administration. (Lahti & Salminen 2014, 141.)

After running the payments is completed, the employee receives a payslip, which specifies the salary, tax withheld and other employee contributions. In the 1990s it was still quite typical to deliver the payslip in the workplace in paper but soon after employers started to send the payslip to the employee's home address. In the 2000s the development of electronic services has enabled the delivery of the payslip directly to the employee's online bank through Posti's iPost service. (Lahti & Salminen 2014, 141.)

All in all, digitalisation of payroll means dealing with payroll data with modern tools and automated processes. It aims to perform different payroll processes with as little manual work and consumption of paper as possible. It includes sending payroll material electronically, electronic payslips, automated postings, electronic archive, reporting to stakeholders electronically and an online-based software. (Helanto & al. 2013, 28.)

3.2.2 Benefits of payroll digitalisation

In traditional financial management documents are handled several times and by several different people. This is not only ineffective but also results in overlapping work tasks, which increases the possibility of human error and adds expenses for the employer. The documents need to be handled, checked, accepted and sent to the payroll by the HR staff, after which the documents need to be appointed to the correct payroll team, saved in the system, booked and filed. Scanning and printing also increase expenses. Filing the payment material requires costly storage areas. (Helanto & al. 2013, 12.)

The problem with traditional payroll management is that manual routines and searching for documents and other payment material takes up most of the time of an educated, knowledgeable staff, which potential is therefore not utilised as effectively as it could be. Customer satisfaction can easily decline if there is a delay in the payment process or in receiving the documents they have requested. Traditional payroll management is also challenging in terms of scheduling and cost-efficiency. (Helanto & al. 2013, 13.)

In terms of day-to-day payroll activities, digitalisation specifically shows in decreased amount of manual tasks and improved predictability. As the material flows to the payroll department steadily, the workload can be divided more evenly. The document is simultaneously recognised for the payment, accounting, stakeholder reports and archive, which decreases the amount of overlapping tasks. The information needed for stakeholder reports is automatically collected from the document and the reports sent electronically. (Helanto & al. 2013, 14.)

Along with automation productivity increases. This allows to company to serve more customers with the same amount of staff and optimise its resources so that the payroll can provide its customers with additional value: not only saving the material in the system but also specialised services.

Digitalisation is a cost-effective solution. It enhances payroll processes, which causes savings. A cloud-based software eliminates investments related to software, updates and servers. A cloud service refers to any resource that is provided over the Internet. The user does not pay an expensive licence to use the software as cloud services are based on monthly payments. Hence, a cloud-based service does not require a large initial investment on the software.

Many businesses hesitate selecting cloud services due to information security and reliability issues. However, providing a reliable service is vital for the service provider and negligence of security issues can cause significant damage to the provider's reputation. Hence, the information security is typically carefully maintained by service providers. Information security can also be improved by ensuring that passwords are changed regularly. (Helanto & al. 2013, 37.)

Digital system allows postings to be created automatically, which decreases the manual saving work at the payroll to a fraction of what it is traditionally. Default postings can be saved in the system after which the work focuses on monitoring that they work as planned as opposed to manually saving the postings in the system separately for each document as in traditional payroll management. (Helanto & al. 2013, 16.)

Electronic archive makes searching information faster and easier due to the fact that the material is available irrespective of the time and place and by allowing the employee to use more versatile search criteria while searching for the material (Helanto & al. 2013, 15).

3.2.3 Risks of digitalisation

There are also risks and challenges associated with digitalising payroll as there always are when initiating new procedures. Choosing digital solutions significantly alters the traditional payroll processes, hence even the most experienced employees need to learn new methods of working. Digitalising payroll also requires acquiring new software and learning to use it. Especially for small organisations, the expenses related to acquisition and maintenance of new software can be an issue. Training the staff to use the new software also takes up a lot of time. (Helanto & al. 2013, 17.)

According to the Research Institute of the Finnish Economy (ETLA) digitalisation threatens a third of all professions in Finland within the next 20 years. On their list of 20 most threatened professions, payroll professional is the 10th most threatened profession, with a 97% probability of the profession to either completely vanish within the next 10-20 years or its content facing a substantial change (Yle 2014). Helsingin Sanomat (2015) writes that digitalisation is already wiping away jobs in financial management. According to a research by Accountor, digitalisation wipes off over 25 000 jobs in the field of financial management, which is over third of all jobs (Kauppalehti 2014). Experiences from several organisations adopting digital solutions support Accountor's estimation on the personnel cuts (Lahti & Salminen 2008, 25).

Another risk is the general reluctance towards changing the procedures in an organisation due to e.g. concerns over security issues or not wanting to learn to use different software. The organisation may find that they do not gain enough benefits by adopting digital solutions compared to how much effort new digital software requires or that they do not have enough technical skills for it.

3.3 Digitalisation and the environment

Sustainability has become an essential part of an organisation's mission. Customers are becoming more environmentally aware and small emissions can be a considerable marketing advantage to an organisation while trying to differentiate itself from the competitors.

Digitalisation is an environmentally friendly solution. Digital payroll management reduces CO_2 emissions in several different ways, but in particular it affects the consumption of paper, transportation of material and consumption of electricity and heat e.g. in terms of printers and archive space. (Lahti & Salminen 2014, 33.)

According to a research by Federation of Finnish Financial Services (2010) an electronic invoice is on average four times more environmentally friendly than a paper invoice. The carbon footprint of an electronic invoice is around 150g whereas the carbon footprint of a paper invoice is 450g.

In addition to decreased amount of paper waste, digitalisation can also have other indirect environmental impacts. Digitalisation enables working remotely, which leads to diminished commuting and reduced need for office space. This leads to reductions in use of fossil fuels and natural resources needed to build and maintain office spaces. (Salo 2010, 149.)

ICT's share of all emissions is relatively small; Gartner has estimated that of all global carbon monoxide emissions, 2% is generated by information- and communication technologies. ICT emissions can be reduced by utilising cloud computing technologies. (Salo, 148.) Compared to traditional forms of computing, cloud computing has a higher utilisation rate. The rate is estimated to be only around 12-18% in basic data centres. This makes cloud computing more environmentally efficient, generates savings in power usage and consumes fewer resources. (Gapgemini 2009.)

4 Research methods

A research can follow either qualitative or quantitative research design. Quantitative method is often referred to as a synonym for any data collection techniques that generates numerical data such as questionnaires, graphs and statistics. Qualitative method is associated with interpretive philosophy due to the fact that researchers need to make sense of the subjective and socially constructed meanings of the phenomenon being studied to gain in-depth understanding. (Saunders, Lewis & Thornhill 2012, 161-163.)

Quantitative surveys can be used on much larger samples than qualitative interviews, allowing inferences to be made to wider populations. However, it has been argued that a qualitative research is able to get closer to the actor's perspective through detailed interviewing and observing as opposed to quantitative research relying on more remote, inferential empirical methods (Denzin & Lincoln 2000, 10). A quantitative design is appropriate e.g. in a situation where the researcher is trying to find out how people intend to vote. Qualitative design would be appropriate in cases such as exploring people's life history or everyday behaviour. (Silverman 2005, 6.)

Due to the wider population a quantitative research can be considered more reliable and objective, however, only following purely quantitative logic would rule out many interesting phenomena in terms of what people do and how they feel in their day-to-day lives (Silverman 2005, 6).

If resources allow, the two methods can be combined. This is called mixed methods research design. Quantitative and qualitative research may be used to test a theoretical proportion, followed by further quantitative or qualitative research to gain a richer theoretical perspective. (Saunders & al. 2012, 164.)

The choice of methods should not be predetermined but instead a method that is appropriate to what the research is trying to find out should be chosen. This thesis applies a mixed methods research design to thoroughly address the research question. The research follows qualitative method in order to document the details of suggestions, attitudes and perceptions towards digital payroll services within Aalto payroll staff as well as quantitative method to identify the variance. Whereas the qualitative findings of the research arise from studying a few individual employees and exploring their perspectives more in-depth, this data is considered to be insufficient and to prevent the results to be

generalised and therefore a quantitative research is required in order to assess the variance of this phenomenon. All in all, a more complete and in-depth understanding of the research question is gained by using a mixed methods research design.

Due to the newness of the topic, there were several unknowns in the research. Therefore, the research questions were first studied qualitatively in order to learn which variables need to be studied. These findings were then used to develop an instrument, the survey, which was sent to a larger sample in order to generalise what was learned in the interviews and identify whether issues varied by demographic characteristics.

Qualitative data was gathered by interviewing Aalto University payroll and IT staff. The interview with the account manager at Aalto IT department Jaana Rissanen aimed to discover the financial and strategic goals of digitalisation at Aalto and to determine the current state of digitalisation at the university level and what are the next steps towards digitalisation. The second interview was conducted with an HR and payroll professional with 5 years of experience at Aalto payroll department, Susanne Saransalmi, in order to study the payroll staff's perceptions and attitudes towards digitalisation as well as determine the problem areas in the current payroll processes. Qualitative data related to current payroll processes at Aalto payroll was gathered in the meeting with the team leaders of Aalto payroll department and IT staff. All interviews took place at Aalto premises in December 2015.

The quantitative data was researched through a Webropol survey. The survey was tested by three people before it was sent to the payroll staff in order to ensure its understandability and functionality. The survey was sent to the payroll staff via their personal Aalto e-mail along with a cover letter and the research material was gathered 1.2.-5.2.2016. The questionnaire consisted of eight questions, which mainly aimed to identify the variance of the findings of the qualitative interviews and bring more specification to the problem areas. These eight questions included both open-ended questions and closed-ended questions and they measured the staff's attitude towards the weaknesses and advantages of digitalisation as well as their preparedness to adopt new procedures.

The questionnaire was sent to 19 HR and payroll professionals at Aalto University and received 17 responses, forming a response rate of 89%.The results of the quantitative research were analysed with SPSS Statistics software.

5 Results

The results of the research have been divided into four parts on the basis of the investigative questions. The first subchapter provides a detailed look at the payroll processes from the moment the payroll material is created to the moment when the payment has been made and the payroll data has been reported to the stakeholders and the second subchapter defines the problem areas in the processes. The third subchapter studies what cost reductions are related to automation of payroll and whether professionals consider it financially beneficial in the long run. It also studies how digitalisation is associated with Aalto's strategic goals. The fourth subchapter answers to the investigative question: what are the advantages and weaknesses related to digitalisation? It observes the staff's perception of risks and possibilities related to digitalisation. The fifth chapter focuses on the staff's attitude towards digitalisation and willingness to implement new payroll procedures.

5.1 Description of current payroll processes at Aalto

The present state of payroll processes needs to be analysed in order to define the problem areas in the process. Analyse is based on a meeting with Aalto payroll team leaders, who are familiar with the process flow and are able to do exact observations on the fluency of the process.

Payroll responsibilities consist of several different processes, which need to be performed in detail in order to ensure accurate and timely payments and payroll tax and other social contributions compliance. Figure 2 presents a process flowchart from the moment the payroll material is created to the moment the payment has been made and the final payment data reported to stakeholders.

University payroll process typically starts from the HR department and student services. HR department prepares the employment contracts and non-recurring fee invoices and sends them to the payroll via internal mail. Student services are responsible for grant applications. A non-recurring fee is e.g. occasional or assisting work related to teaching (such as lectures, exam supervision, correction of assignments or preparing study material), a fee associated with master's theses or doctoral degrees or fee for opponents. A non-recurring fee can also be compensation for independent services or compensation for copyright or industrial property right. Before the payment material is delivered to payroll, it typically needs to be reviewed and approved by a supervisor.

Payroll is also responsible for the upkeep of personal data register. Keeping the customers' bank details up-to-date is crucial but other contact information needs to be collected as well in order to send the payslip to the correct address and to contact the customer in case of any missing information.

After the document arrives at the payroll the first step is to record the payment material, update the customer's personal data and record the tax card information. Information is collected from the documents and saved in the system manually one by one. Therefore, this process phrase includes a high amount of repetitive tasks. Payroll material typically states the monetary amount (including hourly pay and hours worked), accounting data and signatures. Information related to reporting and allocation, such as project and cost pool codes need to be collected from the document as well. If there are any errors in the payment data, the information should be detected and corrected at this point in order to ensure a smooth process flow. Other additional information, such as sickness or holiday absences should be collected at this point as well. It is essential to have all necessary information on the personal data document including the social security number, address and bank account number in order to proceed with the payment.

The payment material goes through a dual checking process in order to ensure data accuracy. The first part of the checking process focuses on exposing errors by comparing the payment data to their sources. The second part focuses on the accuracy of the accounting data by ensuring that all the amounts allocated to specific bookings are correct. This process phrase is very effective in detecting errors but it is also very time-consuming.

Payments are run twice a month. In the payment run the money flows through the service provider to the intermediary bank, which then sends the money to the customers' bank accounts. Enforcement fees, which are recorded by the payroll staff, are automatically deducted from the salary and sent to the enforcement authorities in the payment run.

Membership fees to trade unions such as AKAVA or the Finnish Union of University Professors are also directly deducted from the salary and recorded by the payroll staff. In the payment run the accounting material is sent to the accounting department and the payslip sent to the address provided by the employee.

After the payment run the material is filed as soon as possible to ensure all material is easily available in case information is requested. Filing the material is a time-consuming process phrase taking up several days a month per each employee. In terms of archive,

the payroll department is responsible for preservation of the material, providing information related to the material and disposing irrelevant data (Arkistolaitos 1994). The legal rights and privacy of customers and institution needs to be acknowledged in the filing process. The retention periods are determined within the organisation. At Aalto employment contracts and invoices for non-occurring fees are retained for 70 years. Tax cards and personal data forms are retained for 2 years.

Payroll has an obligation to report to different stakeholders. TyEL retirement earnings are reported to the insurance provider, Varma, on a monthly basis. Varma is the largest provider of statutory earnings-related pensions of private sector employees and self-employed persons in Finland and currently handle the pension coverage of 862 000 people. Varma is also the largest private investor in Finland. (Varma 2015.) VaEL retirement earnings of employees born before 1 January 1980 are reported to Keva, which is an insurance provider for local governments, the state, the Evangelical Lutheran Church of Finland and Kela (Keva 2016). These earnings are reported on a yearly basis.

Income tax returns are reported to the Finnish Tax Administration on a monthly basis in order to provide the details necessary for income-tax assessment. The report includes the total amount of salaries paid in the organisation, the total amount of tax withheld, the total amount of salaries under tax at source, tax at source withheld and social security payments. Income tax returns are submitted via the Tax Administration's e-filing services and the deadlines for tax returns vary between different taxpayer entities.

Organisations are also expected to file an annual information return to the Tax Administration. Annual information return includes annual withheld taxes and social security contributions and is typically reported in January. If an organisation does not file the annual information on time or fails to comply with the filing requirements, a penalty is collected (Finnish Tax Administration 2015).

Occupational Safety and Health Act obliges the employer to provide the employees with statutory occupational health care, which aims to ensure a healthy and safe working environment and prevention of occupational illnesses. It also endeavours to maintain and further the ability to work. Employment relationships are reported to the Occupational Health Care provider on a weekly basis to determine the employees who are entitled to receive occupational health care.

Confederation of Finnish Industries (EK) is a business organisation, which main responsibility is to make Finland an internationally attractive and competitive business environment. EK defends the interest of Finnish businesses both on the national level and international level. They represent around 16 000 Finnish companies. Payroll reports the salary information to EK once a year. (Confederation of Finnish Industries 2016.)
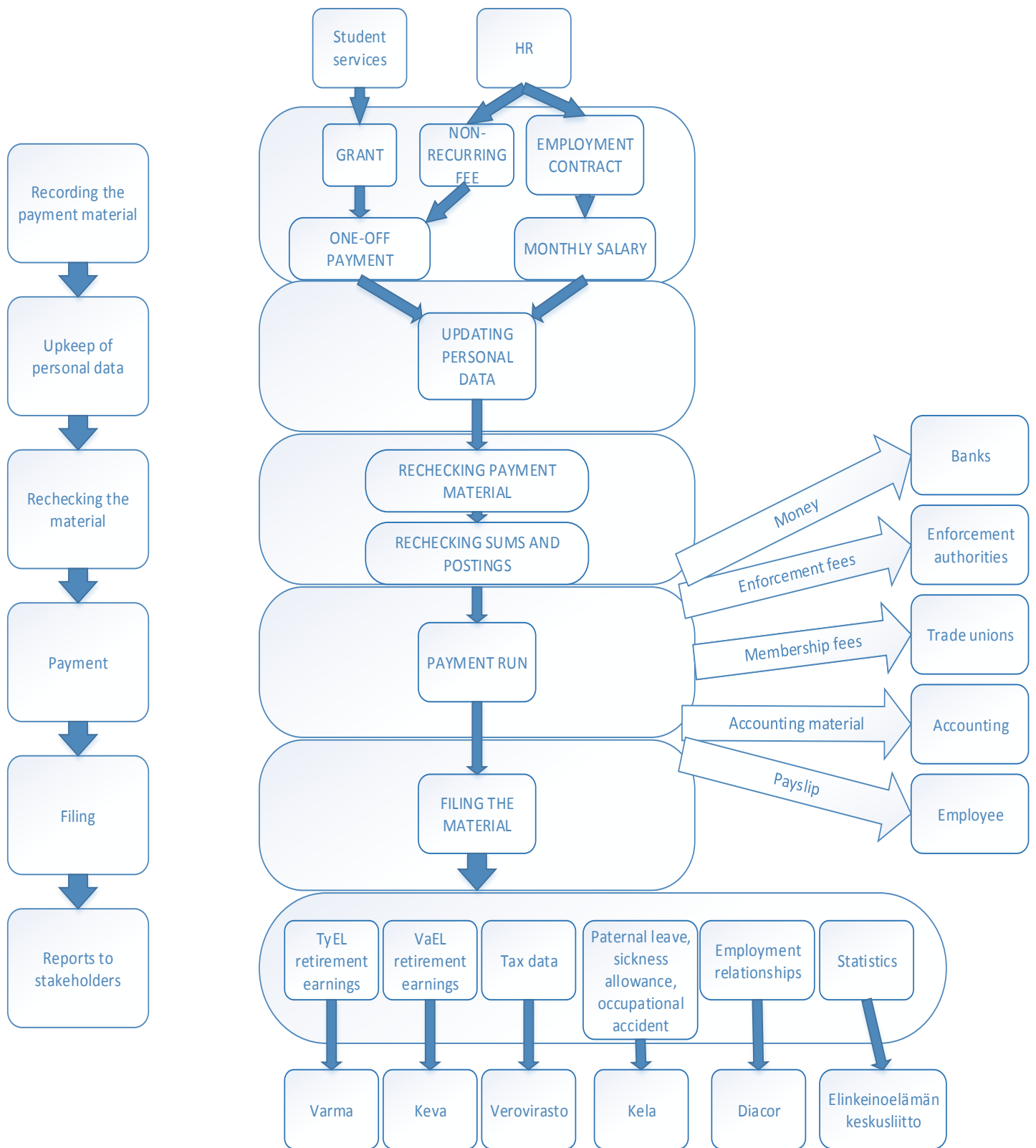
Figure 4. University payroll process flowchart

5.2   The problem areas

Determining the problem areas in the payroll process is essential in order to assess which payroll processes need to be altered and why an alteration is sought in the first place. If there are no problem areas in the process, there is also no need for development or alteration.

The current problem areas in the payroll processes resolve around the arriving payment material. Missing, incoherent or insufficient information on payment documents causes both overlapping tasks as well as delays in the payment process. The payroll is also facing issues associated with postponed arrival of material, e.g. employment contracts arriving at the payroll after the employment has already began (Saransalmi 2015).

Nearly half of the respondents estimated that 5-10% of the payment material include incoherent or insufficient information, which requires certain procedures from the payroll professional in order to proceed with saving the material in the system (Figure 5). 35% of the respondents estimated 10-20% of the material to include erroneous information. However, none of the respondents estimated the amount of incoherent information is over 20%.
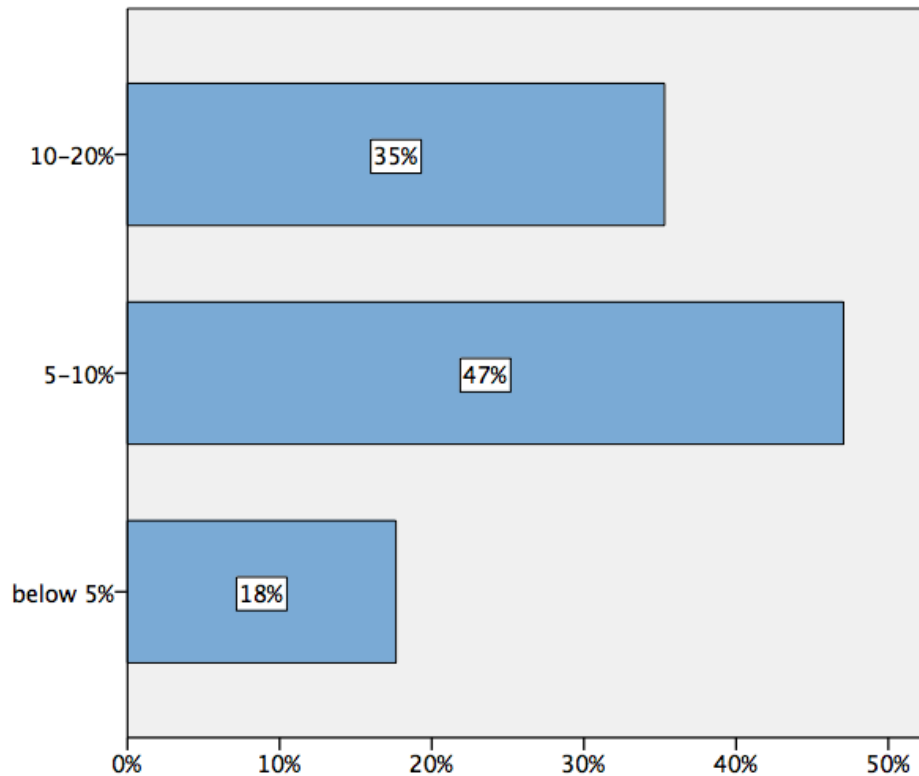
Figure 5. The amount of missing or incorrect information in the payment material, which requires procedures before being able to handle the material (n=17)

The overall daily amount of arriving payment material at the payroll can add up to hundreds of documents, which makes the high amount of erroneous material a prominent problem area. Every incoherent document requires the payroll professional to contact the HR, student services or the customer in order to fill out the missing information, which is ineffective, causes delays in the payment process and forces the staff to perform duplicate tasks.

The source of the missing information on documents was studied by asking the payroll staff to record the erroneous documents for two weeks in November 2015. According to the research the errors centre around missing cost pool or project information, incoherent bank account information and missing social security number.

Quantitative data related to the amount incoherent information and the data indicating the source of erroneous information indicate that there is a high probability of human error in the payroll process. Currently, high probability of human error is eliminated in the payroll's strict checking process. According to Saransalmi very few errors eventually end up in the final payments after the checking process. However, the process phase is extremely time

consuming and takes up approximately four working days a month per employee (Saransalmi 15 December 2015).

The flow of material to the payroll is not steady. A peak in material arriving at the payroll can often be seen before the holiday season when HR and student services staff are finalising the unfinished documents before the holidays and before the final deadline for each pay date. (Saransalmi 15 December 2015.)
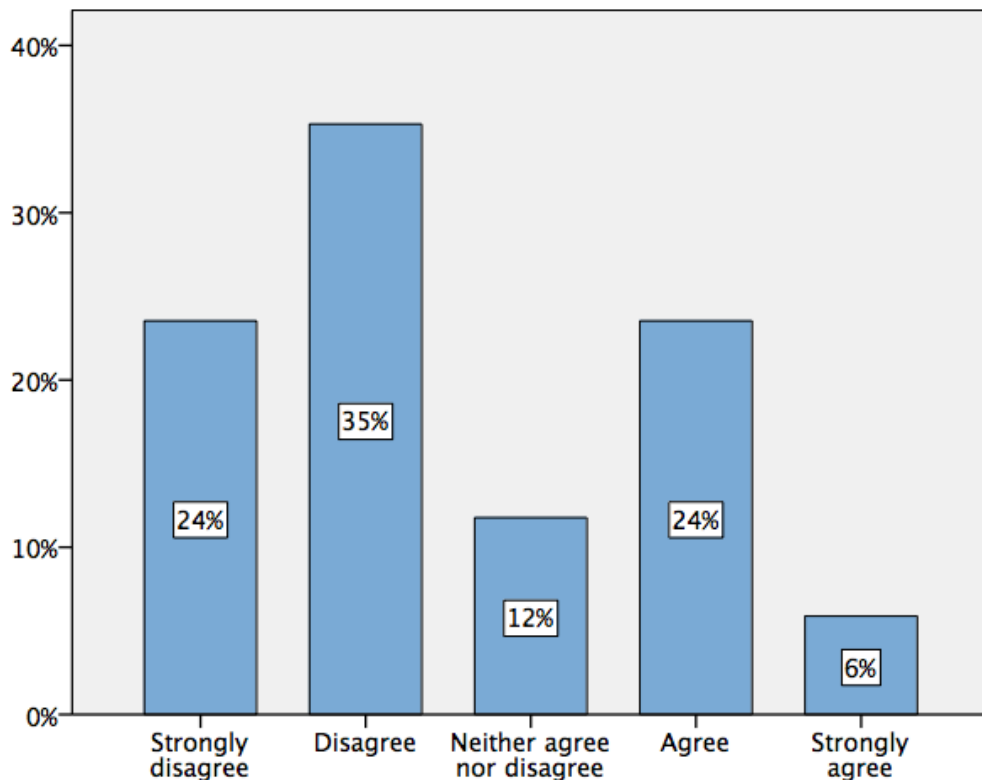

Figure 6. The payment material arrives at the payroll department steadily (n=17)

The majority of the respondents see that the payment material does not arrive at the payroll steadily (Figure 6). 59% of the respondents either disagrees or strongly disagrees with the statement "the payment material arrives at the payroll department at regular steadily" and identifies peaks in the payroll cycle.

Material arriving at the payroll steadily improves predictability and preparedness for exceptional situations. It allows the staff to allocate the workload more evenly and to ensure that all data is saved before the payments are run. Quantitative data shows that a minority of the staff considers that the material arrives at the payroll steadily. Electronic solutions allegedly improve the flow of material because the material is recognised simultaneously at the payroll and the HR instead of manually sending the material via internal mail.

The high amount of manually conducted tasks is one of the main problem areas in the payroll process (Saransalmi 15 December 2015). Manually entering the data into the system slows down the work performed by the staff as well as decreases the effectiveness of work. 76% of the respondents either agree or strongly agree that the amount of manually conducted tasks at the payroll department is too high (Figure 7).
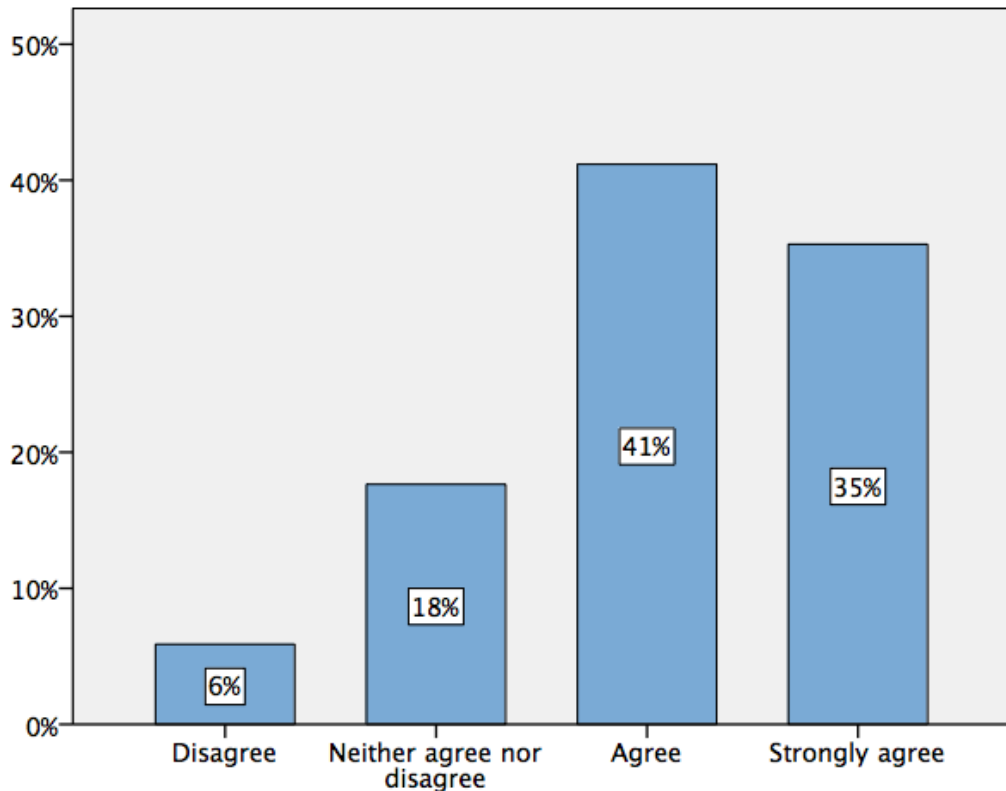

Figure 7. The amount of manually conducted tasks is high (n=17)

5.3 Strategic and financial aspects

If Aalto aims to reach its ambitious goal of achieving a world-class status by 2020 and becoming a leading university in technology it needs to focus on modern technologies. A project towards digitalisation of services was started two years ago in order to achieve Aalto's strategic goals (Rissanen 4 December 2015). In their strategic statement, Aalto has set ICT and digitalisation as one of their four key research areas (Aalto 2015). A strong competitive position is essential for universities and other educational institutes especially during the times of major government cuts on funding for universities as they try to seek other sources of financing.

Aalto aims to cover a fifth of the government cuts by reducing facility costs. Mobile workstations based on digital, cloud-based system are an essential part of reducing facility costs. Mobile workstations are based on the idea that all employees are not on-site at the same time due to the increasing number of employees working remotely and therefore workstations are not required for each employee. As all tools needed to work are online the employee does not need a steady workstation and is able to work anywhere in the office building by only connecting the laptop into the cloud service. Digitalisation also brings facility cost reductions in terms of archive. (Rissanen 4 December 2015.)

All in all, Rissanen (4 December 2015) finds that in the long run renewing the software will unquestionably be beneficial and bring cost reductions at Aalto. According to her calculations the costs related to HR systems has decreased by 400 000 euros, almost halved, since the foundation of Aalto in 2010.

5.4   Advantages

A high amount of manual tasks results in human error. According to Rissanen (4 December 2015) process phrases where repetitive human error takes place can be detected and coded in order to eliminate these mistakes. Automating process phrases requiring a high amount of manual work decreases the amount of monotonous tasks and allows the educated, knowledgeable staff to focus on more challenging tasks, which better correspond to their level of education.

The respondents' opinions on whether the tasks they are assigned to are challenging enough are relatively scattered. 47% of the respondents think that the tasks they currently have correspond to their level of education and are considered demanding enough whereas 35.3% of the respondents wish more challenging tasks.

Table 3. Tasks I have been assigned to are challenging enough (n=17)

	Frequency	Percent
Strongly disagree	1	5,9
Disagree	5	29,4
Neither agree nor disagree	3	17,6
Agree	3	17,6
Strongly agree	5	29,4
Total	17	100,0

Due to their disunity, responses do not show a significant correlation between the high amount of manual work affecting the payroll employees' feeling of fulfilment and content in working life.

The payroll receives voluminous amounts of paper documents on a daily basis. Documents are received from different campus areas, different cities and abroad. (Saransalmi 15 December 2015). Aalto strives for responsibility in all its activities, reducing waste being a crucial part of Aalto's sustainability goals. Aalto has managed to cut the paper consumption from nearly 50 000 packages to 20 000 packages since its foundation (Figure 6).
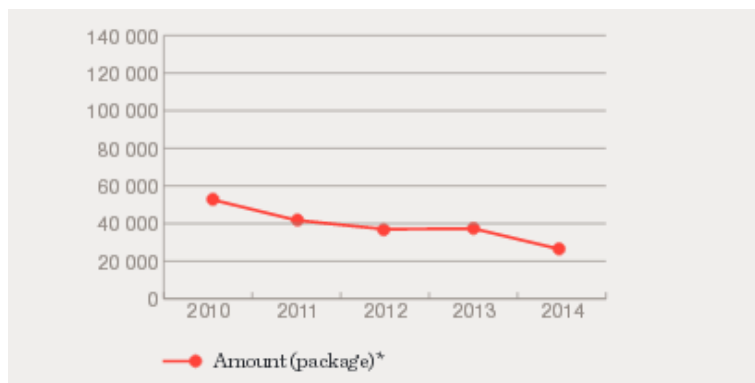

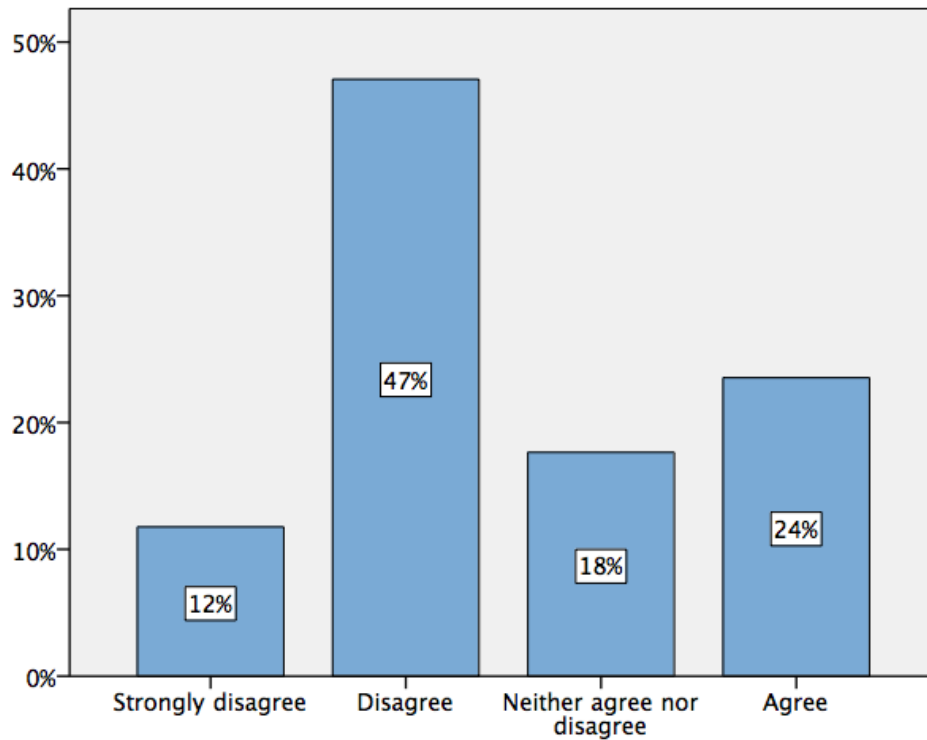Figure 8. Copy paper consumption at Aalto

Figure 9. Enough attention is paid to sustainability at the payroll department (n=17)

The majority of the respondents, 59%, claim that enough attention is not paid to sustainability at the payroll department (Figure 9). The result indicates that the respondents see that the paper consumption at the payroll is unnecessarily high. Qualitative interview revealed that on top of the payment material arriving on paper, the high amount of printing also increases the usage of paper. The payment material checking process specifically requires printing out voluminous amounts of paper. (Saransalmi 15 December 2015.) Digitalisation of payroll leads to major reductions in paper consumption.

Payment material needs to be checked and accepted before it is sent to the payroll. This process phrase is often time-consuming as the material goes through three different personnel members before it is ready to be sent. Electronic form alleviates delivering the document from staff member to another and therefore shortens the time the document waits to be accepted and checked, which has a major effect on material arriving to the payroll on time. It eliminates the postponements related to postal services such as the postal strike in November 2015 when the Finnish Post and Logistics Union announced a strike to protest the weakened terms of employment causing widespread impact on delivery services.

The amount of remote work increases constantly at Aalto. Different location services are utilised to increase the amount of remote work and the university actively promotes the

use of Skype in meetings and other cooperation. Some departments have already taken advantage of mobile workstations. (Rissanen 4 December 2015.)

Table 4. I would be interested in working remotely (n=17)

	Frequency	Percent
Strongly disagree	0	0
Disagree	2	11,8
Neither agree nor disagree	5	29,4
Agree	5	29,4
Strongly agree	5	29,4
Total	17	100,0

59% of the respondents would be interested in working remotely. A relatively high percentage of respondents were not able to comment on the question. Respondents may feel uncertainty towards the question due to large amount of paper material needed to perform their tasks currently and incapability to use the archive space while working remotely.

Although working remotely has its disadvantages of being isolated from the workplace social life, higher amount of distractions and difficulties of balancing work and personal life it also provides a wide range of advantages. The flexibility related to working remotely specifically benefits employees with young children, relieving the reliance on child care. It also saves time as the time used for commuting is eliminated.

Saransalmi sees that digital solutions have potential to decrease the bureaucracy related to payroll processes currently causing some sluggishness in payroll processes. The ability to work more efficiently improves the quality of the service experienced by the customers. (Saransalmi 15 December 2015.)

Saransalmi thinks that an electronic archive would majorly improve the effectivity of payroll processes if scanning and searching for paper documents in the storage space could be eliminated. An electronic form could be found in the system promptly and easily. This would allow working time to be allocated on other tasks as 35% of the respondents use 2 days a month to archive paper material. In some cases over 4 days a month is used to file the material (Figure 10). Not needing to handle internal mail would also save time. (Saransalmi 15 December 2015.)
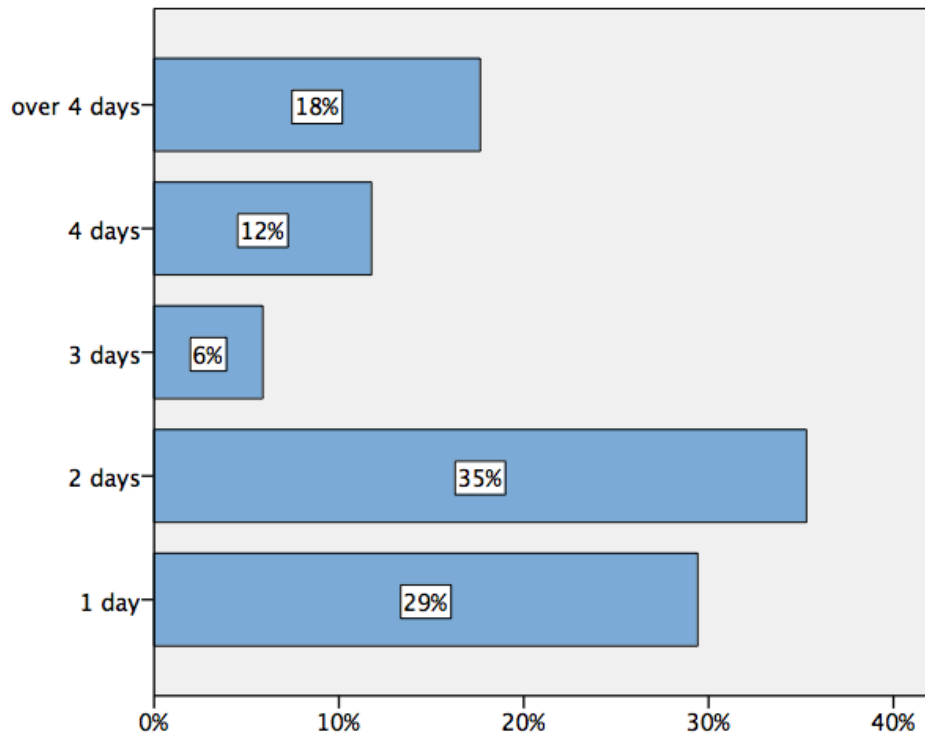
Figure 10. Days per month used to archive paper material (n=17)

5.5 Threats

Rissanen does not consider the decreasing need for staff caused by digitalisation a threat at the moment. Even though digitalisation has caused cost savings of 400 000 euros and nearly halved the costs related to HR systems since the foundation of Aalto in 2010, a reduced need for staff has not been identified. However, according to a research by ETLA payroll professionals are the 10th most threatened position by digitalisation, with a 97% probability of the profession of either completely vanishing or its content facing a substantial change within the next 10-20 years (Yle 2014).

Saransalmi (15 December 2015) estimates that payroll services include too many exceptional circumstances to become completely automated and is therefore personally not concerned about the decreasing labour market for payroll professionals. However, she finds that the tasks will probably change in the future focusing more on HR related tasks and specialised tasks.
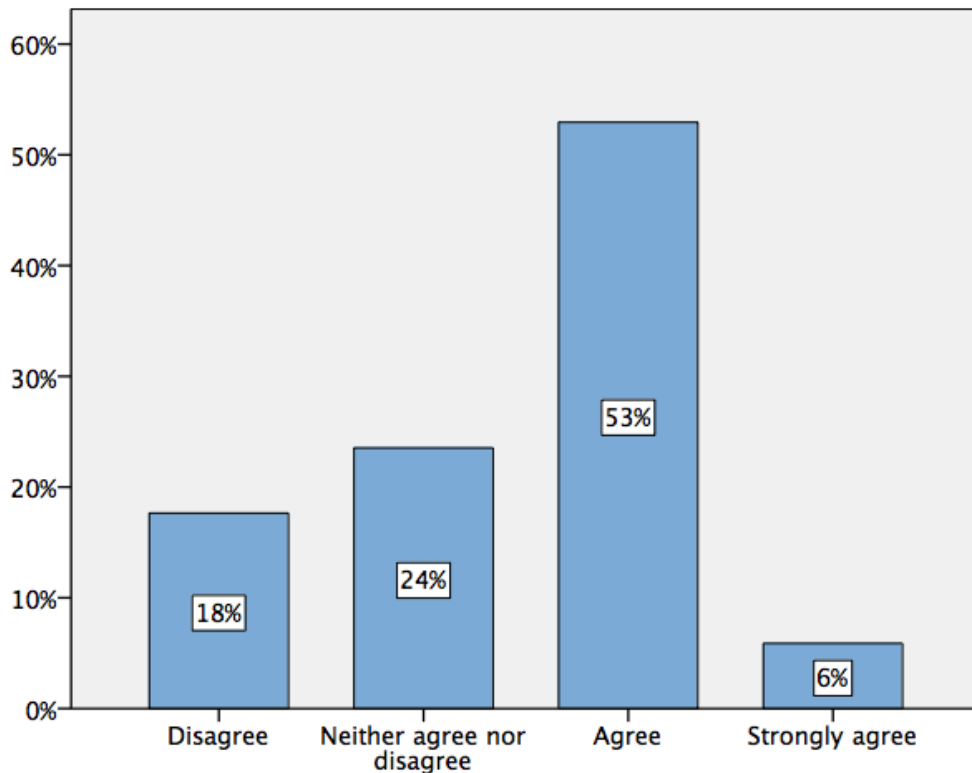
Figure 11. I am concerned about the decreased need for human resources caused by digitalisation (n=17)

60% of the respondents agree that the decreased need for human workforce is a significant threat. Aalto University has gone through two statutory employer-employee negotiations within the past two years, which causes the staff to feel vulnerable towards any threats of layoffs. In 2015, the unemployment rate in Finland was 9.4 on average, hitting the 15-year high, which also affects the respondents' anxiety towards digital solutions replacing human workforce in the payroll sector (Tilastokeskus 2016). Concerns on losing a job can easily cause reluctance towards digital services, which is an essential factor to take into account when planning to automate the service.

A threat always associated with digital solutions is the malfunction of software. As the malfunction can be anything from a couple of minutes to weeks, a back-up plan needs to be created. It is crucial that salaries can be paid in a state of emergency. Therefore, there needs to be a backup system to run the payments in case of a malfunction. Another way of addressing the threat is to distribute the IT know-how in the organisation so that the system will not collapse if the person responsible for it is not able to be present. (Rissanen 4 December 2015.)
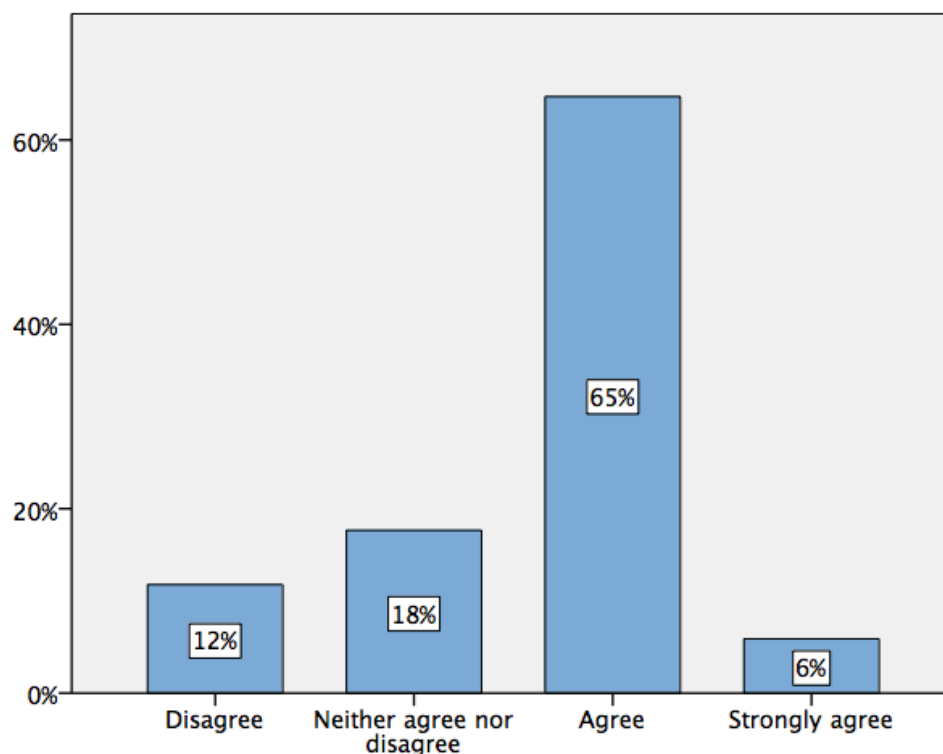
Figure 12. I am concerned with the data security risks related to digitalisation (n=17)

The questionnaire reveals that 71% of the respondents are concerned with data security risks related to digital solutions. Online services are perceived vulnerable to malicious programs, hackers and unwanted actions of unauthorised users. The payroll deals with highly confidential data such as social security numbers and bank account details, which, if getting into the hands of an unauthorised user, can have serious consequences.

Instead of being a data security threat, Rissanen sees that electronic solutions have potential to increase the data security in the university. Information, which is online behind strong passwords and other data protection mechanisms and access control measures, is more secure than having documents lying around an office table, where the data is easily reachable by any office visitors or staff. Similar data security aspects are associated with electronic payslips; sending payslips via traditional mail includes higher risk of interference and therefore, also a higher data security risk than sending the payslip directly to the customer's online bank without any intermediaries. (Rissanen 4 December 2015.)

Digital solutions decrease the amount of manually conducted tasks by allowing postings to be created automatically. Default postings are saved in the system after which the role of the payroll professional focuses on monitoring the data instead of manually saving the information in the system (Helanto & al. 2013, 16). However, Saransalmi (15 December

2015) suspects that this can allow certain errors, which require specialised knowledge, to occur in the payments unless checked strictly by a payroll member. Saransalmi's perception of the problematicness of automating payroll processes related to exceptional circumstances corresponds with Lahti & Salminen's findings, which indicate that the most challenging part of automation is when the terms of employment change.

5.6   General perception of digitalisation

The questionnaire reveals that the staff strongly feels that digital solutions are necessary at Aalto payroll department signifying that the staff is open to new reformations and prepared to adopt new working methods and procedures. 94% of the respondents considered digital solutions to be necessary and 6% responded that digitalisation is not obligate at present. This can be a reference to a difficult situation that Finnish universities are going through currently due to government cuts on education. None of the respondents thought that digitalisation is not necessary.
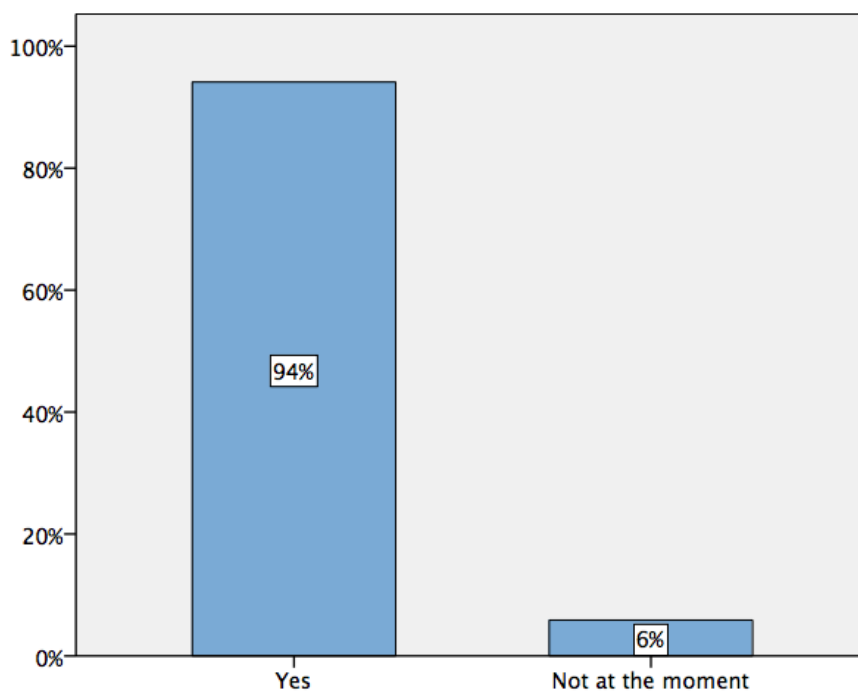

Figure 13. Do you think it is necessary to automate payroll processes further than what it is currently? (n=17)

Open-ended questions with general comments on digitalisation revealed that the staff thinks that digitalisation of payroll provides opportunities of growth and development. The comments also revealed that the respondents assume other payroll departments to be more advanced in automation of payroll processes.

The respondents say that especially basic payroll procedures such as saving grants, non-recurring fees and personal data in the system should be automated. They also believed that this should be rather easy to put into practice. Electronic archive specifically stood out in the respondents suggestions on what should be automated in their opinion.

Respondents were also asked to choose the three most important advantages that they associate with digital payroll solutions. Electronic archive, sustainability and decreased amount of manual tasks were considered the most essential factors by the staff (Figure 14).
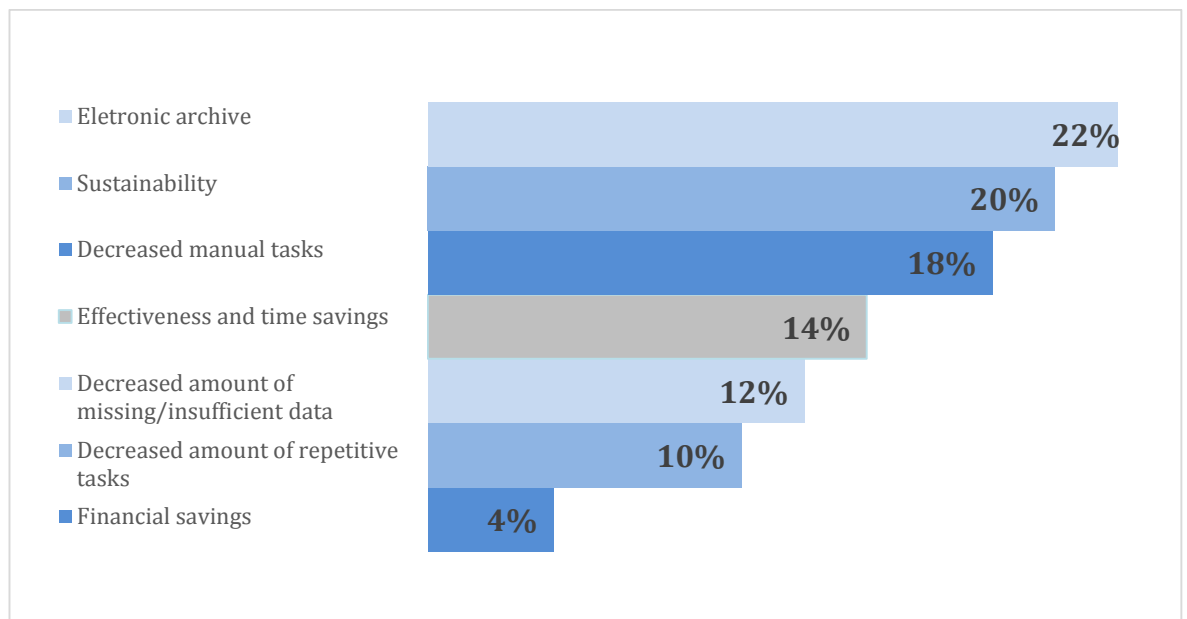

Figure 14. Most important advantages associated with digitalisation

Respondents think that exceptional circumstances, which do not follow the repetitive pattern, should not be automated. Examples of cases where automation would not work were enforcement fees, parental- and sickness leave and pension. The most alarming threats of digitalisation were the staff's own reluctance towards changing their current procedures, insufficient technical resources and capabilities and information security risk (Figure 15).
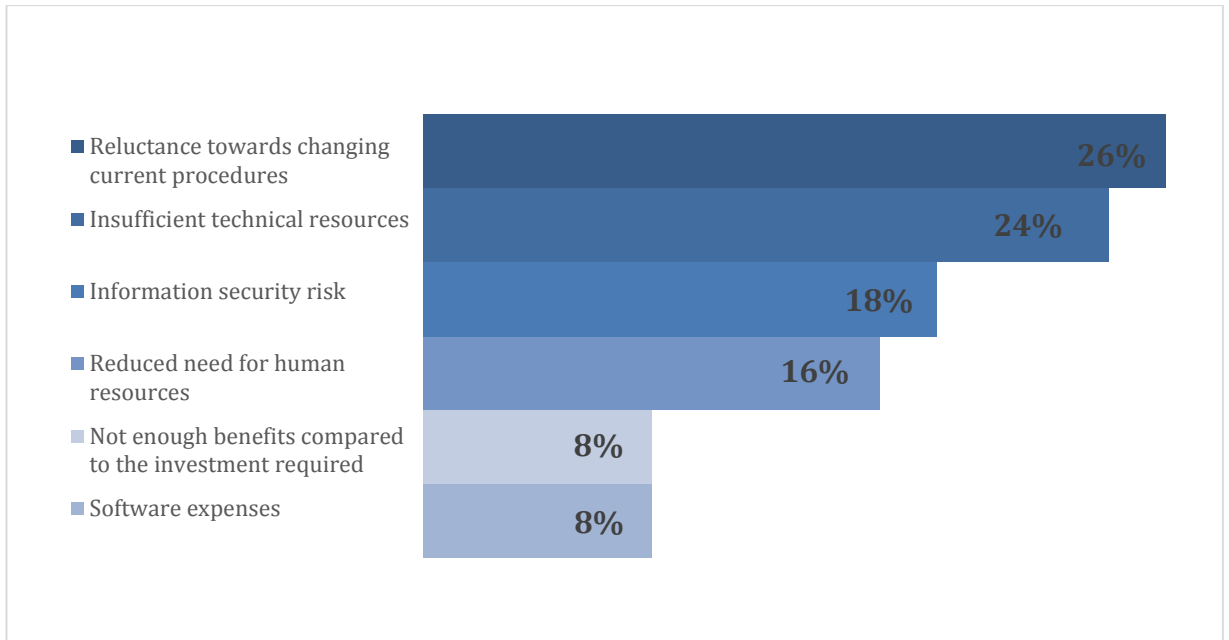
Figure 15. Most alarming threats associated with digitalisation

6   Discussion

The main objective of the thesis was to support Aalto University in incorporation of electronic payroll solutions. The thesis intended to map out the current payroll processes and identify the problem areas, which could potentially be solved by digital solutions, within the processes. It also aimed to critically analyse the advantages and weaknesses of digitalisation and research what is the general attitude towards digital solutions and preparedness to adopt new methods of working within payroll professionals.

The entire payroll process chain is a complex entity with many different stakeholders connected to it. It includes creating the payroll documents at the HR department or student services, sending it to the payroll, saving the payment material in the system, checking that the material is correctly saved, running the payments, filing the material and reporting to stakeholders. It is essential to save the original information correctly so that the rest of the process chain runs smoothly.

The research revealed that the problem areas in the payroll processes resolve around insufficient information on the arriving payment material, high amount of manually conducted tasks that the current processes require the payroll professionals to do and two specifically time-consuming process phrases: traditional paper archive and checking the payment material.

The research found the amount of insufficient information on payment material a significant problem area in the current process chain. Nearly half of the respondents estimated 5-10% of the payroll material to require certain procedures before being able to handle the material. A third of the respondent estimated that 10-20% of the material are erroneous. This delays the payment process, takes up working hours and deteriorates the quality of service. The research found that if payment material was sent electronically to the payroll, the digital form could be coded so that all required information needs to be filled in before proceeding sending the document. It would also have the ability to identify erroneous cost pools, projects and accounts.

76% of the respondents claimed that the amount of manually conducted tasks is too high at the payroll. This is not only ineffective but also increases the margin of error. Literature argues that instead of replacing human workforce by automated processes, digitalisation allows the payroll staff to focus on more specialised tasks, which better corresponds to their level of education. This is supposed to increase the level of fulfilment at work as repetitive and monotonous manual tasks are eliminated and the employee is able to focus

on more challenging tasks. According to the research, however, 47% of the staff already feels that the tasks they have been assigned are challenging enough so the argument does not play a major role at Aalto payroll department. The open comments revealed that the work tasks of payroll professionals are already relatively versatile and do not merely centre around repetitive tasks of saving the payment material. The tasks include many specialised tasks related to stakeholder reporting, pensions, parental- and sick leave and legal stipulations.

The amount of manual tasks can be reduced by automating payroll processes. Digital solutions allow postings to be created automatically decreasing the amount of manual saving work to a fraction of what it is traditionally. Default postings can be saved in the system after which the work focuses on monitoring that they work as planned as opposed to manually saving the postings in the system separately for each document arriving at the payroll. However, the research discovered that the payroll professional's role shifting from the manual saver of the payment data to checking the pre-filled data, would potentially allow certain errors to occur. Concerns arise over whether it would potentially be easier for the payroll professional to overlook the errors on documents in this case.

Both qualitative and quantitative data indicated that electronic archive is considered the most important target of digitalisation. Currently, filing and searching for material is very time-consuming. Electronic archive was chosen as the most important advantage of digitalisation by the respondents.

The respondents were concerned about information security. 71% of the respondents felt that digital services are vulnerable to malicious programs, hackers and unwanted actions of unauthorised users. Payroll deals with highly confidential information such as social security numbers and bank account details, which is why the security needs to be ensured. IT professionals, however, suggest that digitalisation can improve the information security. Information, which is online behind strong passwords and other data protection mechanisms and access control measures, is more secure than having documents lying around an office table. It also needs to be taken into account that the service provider is responsible for the information security and providing a reliable service is vital to the provider. Risking the security of the system can hurt the brand image and reputation and result in a loss of customers and revenue. Information security needs to be maintained e.g. by ensuring that passwords are changed regularly.

Digitalisation requires close cooperation between the payroll department and the HR. The HR needs to be educated why all required information matters and how to use the digital

system. Digital system has potential to eliminate missing and incoherent data completely. Incorrect data cannot be eliminated entirely, as human error always exists, but by ensuring that the material is saved only by one employee and it is saved where the original data is created the amount of human error can be decreased.

All in all, payroll professionals are open to new innovations and willing to learn and take on board new digital solutions. The response rate of the survey was very high, 89%, which indicates that the subject of the thesis is very important to payroll professionals. 94% of the respondents feel that it is necessary to digitalise payroll processes further.

However, simultaneously reluctance towards changing current procedures was chosen as the biggest threat preventing the payroll from adopting digital solutions. This can be explained by the fact that Aalto payroll has been working with the same software for ten years (Saransalmi 15 December 2015). This indicates that most of the staff are not familiar with other software and especially not with cloud-based software. New processes require new competencies. Learning a new ability is always a challenge, which is habitually associated with change resistance. Learning a new ability can be an empowering experience at its best but if the learning process is not appropriately dealt with, it can lead to frustration and change resistance as something, which used to be a simple work task turns into difficult. If the payroll system is digitalised, Aalto needs to make sure that the staff is thoroughly educated to use the new system. If the staff is not trained in detail, the digitalisation cannot achieve the improved effectivity, which is one the most important advantages that a company receives from digitalising its processes.

Aalto aspires to responsibility in all its activities and its mission statement obliges the university to promote sustainable development. Aalto's aim is to be Finland's leading sustainable university campus by 2020. It is the first Finnish university to join the International Sustainable Campus Network and has signed the universities' Rio +20 declaration. Reducing paper waste is an important aspect in terms of sustainability and a lot of attention has been paid to the issue in the university. During 2010-2014 Aalto managed to reduce paper waste from over 50 000 packages to around 20 000 packages (Aalto Annual Report 2014). Digital solutions encourage the reduction of paper waste and enhance Aalto's efforts towards reaching the sustainability goals set by the organisation's Roundtable for Sustainability, internal working group giving suggestions on setting sustainable development targets (Aalto Annual Report 2014). Digital solutions also have other, indirect ways of reducing CO2 emissions by reducing the emissions related to transportation of material as well as consumption of electricity and heat e.g. in terms of printers and archive space.

Digitalisation enables working remotely, which leads to diminished commuting and reduced need for office space.

Digitalisation shifts the society from face to face processes to automated processes. It aims to eliminate organisation's internal operations, which include human interaction. For instance working remotely, a result of digitalisation, eliminates the everyday workplace social life; interacting with co-workers and clients and communal lunch and coffee breaks. This can create a feeling of isolation. Employee acting more and more independently instead of interacting with others can be effective from the organisation's financial point of view but how the lack of humanity affects the employees psychologically is debatable. Human interaction is an essential factor in terms of the society's well-being and contentment.

Contradiction between what is beneficial to the staff and what is beneficial for the university financially stands out also when the staff was asked to choose the three most important advantages of digital solutions; merely 4% of the respondents think that financial savings brought to the university, is one of the most important benefits.

Although literature related to digitalisation has given a very positive image on the advantages of digitalisation, a critical viewpoint needs to be maintained. Digitalisation threatens a third of all professions in Finland within the next 20 years, payroll professionals being the 10th most threatened profession. Digitalisation is expected to cause an enormous turning point in the current labour market and to result in mass unemployment. Digitalisation decreases labour markets only in specific sectors, which causes inequality. "Several researchers agree that this might be a time for pessimism. Future prospects indicate that new jobs are not born as fast as new technology wipes them off" says Ismo Kosonen from the Ministry of Transport and Communications (Yle 2013).

Digitalisation is inevitable. Whether or not it benefits certain parties is debatable but closing the eyes to the changes related to digitalisation and sticking with old operating procedures can be both dangerous and unprofitable in a business environment.

All in all, even though the research indicated that payroll professionals see some unsolved questions related to digitalisation Aalto payroll should adopt digital solutions in order to maintain its competitive position and in order to modernise its operating model. Through digitalisation Aalto can optimise its processes and create savings, which are crucial to the university in the midst of major government cuts on education. In Aalto payroll's case the biggest advantages of digitalisation are enhanced processes, improved predictability, electronic archive and sustainability.

6.1 Research reliability and validity

Reliability and validity are key characteristics of research quality. Reliability refers to whether the data collection techniques would produce consistent findings if they were repeated on another occasion or if they were replicated by a different researcher. Ensuring reliability is not easy and there are a number of threats, which can affect the reliability e.g. participant or research bias or error. Validity is concerned with the extent to which the research measures what they were intended to assess. (Saunders & al. 2012, 192-193.)

Research reliability was ensured by reporting the research methods in a fully transparent way. This allows the reader to judge for themselves and to replicate the study. Validity of this research was ensured by carefully describing the research objectives and demarcation. Quantitative research questions are strongly linked to the theory and research objectives.

Aalto University was going through statutory employer-employee negotiations while the research was conducted. This needs to be taken into account while assessing the internal validity of the study. The financial problems of the university can potentially affect the respondents' perceptions especially while studying the financing of a digital system.

Small population of the research affects the external validity of the study. External validity measures whether the research findings can be generalised to other relevant settings or groups (Saunders & al. 2012,194). Due to the fact that the study was conducted in only one university, generalisation of the results in terms of other universities is debatable. Small population was chosen for the study due to commissioning university's need to understand particularly their own payroll department's preparedness to start operating a digital payroll system. It is essential to take into account that the nature of the research is very specific and the findings should not be applied to other sectors per se but the data can be considered indicative. However, the fact that the research results support many previous findings increases the validity of the research.

6.2 Follow-up research

This thesis introduces a research on digitalisation of payroll to provide Aalto payroll department with suggestions related to whether or not the service should be digitalised further. A follow-up research could centre upon comparing different software qualifications and analysing which software would be the most suitable for Aalto. Another follow-up research, which would be of interest to several other university payroll departments, would

be to analyse the alteration of processes after digitalising the payroll compared to traditional payroll.

6.3 Reflection of learning

The idea of the thesis topic started to take shape during my work placement at Aalto University payroll department in summer 2015. Negotiations with the head of the payroll department revealed that a university-wide project towards digitalisation of services was about to be established in the near future and that a notable amount of process descriptions and research on digital solutions were required from different departments before undertaking the project.

The research process started in September 2015. Based on advice from experienced writers and researchers the theory was carefully studied before starting the research. The theoretic frame of this thesis was of great interest to me professionally as it helped me to understand details of salary and payroll, which do not come across in the daily life of a payroll professional. Writing a thesis whilst working full-time as a payroll professional taught me important organising skills, which will be beneficial in my future career. The process taught me to face arduous tasks without procrastination.

The research process majorly improved my analytic thinking and problem solving skills. Gathering the research data for the thesis and being able to make conclusion on the basis of my own research has been extremely rewarding and has majorly increased my academic confidence. Analysing which part of the theory related to digitalisation was objective, reliable data and what was actually written as marketing for digitalisation and digital systems improved my critical thinking skills and the ability screen important data. Succeeding to complete this process of over 6 months propelled me to set higher goals than before, which are ambitious but still reachable.

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Appendices

Appendix 1. Questionnaire

Sähköinen palkkahallinto

1. Kuinka monessa prosentissa palkkahallintoon saapuvasta materiaalista arvioit olevan puuttuvaa/virheellistä tietoa, joka vaatii toimenpiteitä ennen käsittelyä? *

○ alle 5%
○ 5-10%
○ 10-20%
○ yli 20%

2. Koetko tarpeelliseksi palkkahallinnon prosessien sähköistämisen pidemmälle? (esim. materiaalin vastaanottamisen sähköisessä muodossa, sähköisen arkistoinnin) *

○ Kyllä
○ En
○ En juuri tällä hetkellä
○ En osaa sanoa

3. Valitse parhaiten mielipidettäsi kuvaava vaihtoehto seuraavista palkkahallinnon sähköistämiseen liittyvistä väittämistä *

	Täysin eri mieltä	Jokseenkin eri mieltä	Ei samaa eikä eri mieltä	Jokseenkin samaa mieltä	Täysin samaa mieltä
Toivon lisää etätyömahdollisuuksia	○	○	○	○	○
Ympäristöasioihin kiinnitetään riittävästi huomiota palkkaryhmässä	○	○	○	○	○
Olen huolestunut digitalisaation myötä vähenevästä henkilöstön tarpeesta	○	○	○	○	○
Olen huolestunut digitalisaatioon liittyvistä tietoturvariskeistä	○	○	○	○	○
Manuaalisen työn määrä on liian suuri	○	○	○	○	○
Palkkahallinnon ja muiden osastojen välillä esiintyy päällekkäisiä työvaiheita	○	○	○	○	○
Materiaali saapuu palkkahallintoon tasaisesti	○	○	○	○	○
Työtehtävät ovat minulle tarpeeksi haastavia	○	○	○	○	○

4. Kuinka monta päivää kuukaudessa arvioit käyttäväsi paperisen materiaalin arkistointiin? *

○ Vähemmän kuin 1
○ 1
○ 2
○ 3
○ 4
○ yli 4

5. Valitse mielestäsi 3 tärkeintä palkkahallinnon sähköistämisen hyötyihin liittyvää tekijää seuraavista *

☐ Virheellisen/puuttuvan tiedon väheneminen palkkamateriaalissa
☐ Paperisen arkistoinnin puuttuminen ja sähköisen materiaalin etsimisen helppous/nopeus
☐ Manuaalisesti tallennettavan tiedon vähentyminen
☐ Ympäristöystävällisyys
☐ Palvelun tehostuminen ja ajan säästö
☐ Rutiinitehtävien vähentyminen ja sitä kautta erikoistumista vaativiin tehtäviin keskittyminen
☐ Kustannusten pieneneminen palvelun tehostuessa
☐ Lisäarvon tuominen asiakkaille
☐ Jokin muu, mikä? (Ole hyvä ja vastaa alla olevaan kenttään)

6. Valitse mielestäsi 3 huolestuttavinta palkkahallinnon sähköistämiseen liittyvää tekijää seuraavista: *

- [ ] Riittämättömät tekniset valmiudet siirtyä sähköiseen palkkahallintoon
- [ ] Haluttomuus muuttaa nykyisiä toimintatapoja
- [ ] Sähköisen järjestelmän hankkimiseen liittyvät kustannukset
- [ ] Tietoturvariski
- [ ] Vähenevä henkilöstön tarve
- [ ] Palkkahallinnon sähköistämisen tarjoavan hyödyn vähäisyys verrattuna siihen vaadittavan panostuksen suuruuteen
- [ ] Jokin muu, mikä? (Ole hyvä ja vastaa alla olevaan kenttään)

7. Onko palkkahallinnon prosesseissa mielestäsi osia, joita ei pysty/kannata sähköistää? Mitä?

8. Mitä palkkahallinnon tehtäviä toivoisit sähköistettäviksi ja muita mahdollisia kommentteja sähköistämiseen liittyen

Appendix 2. Cover letter

Hei,

Olen kansainvälisen liiketalouden opiskelija HAAGA-HELIA ammattikorkeakoulusta ja osana tutkintoani toteutan opinnäytetyöni Aalto-yliopiston palkkaryhmälle. Opinnäytetyö käsittelee palkkahallinnon sähköistämistä sekä siihen liittyviä hyötyjä ja riskejä. Tällä lyhyellä kyselyllä, johon pyydän sinua osallistumaan, haluan erityisesti selvittää palkanlaskijoiden asennoitumista digitalisaatioon sekä mitkä palkanlaskennan prosessin osat he näkevät parhaiten soveltuvina sähköisiin ratkaisuihin.

Kyselyn vastaamiseen kannattaa varata noin 5-10 minuuttia. Se tapahtuu sähköisesti alla olevan linkin kautta ja kaikkea kyselyyn liittyvää tietoa käsitellään täysin nimettömänä.

https://www.webropolsurveys.com/S/F2E5F9925793A307.par

Opinnäytetyö on sen valmistuttua luettavissa Theseus – sivustolla. Kyselyyn liittyvissä kysymyksissä minuun voi ottaa yhteyttä sähköpostitse: iina.sorvari2@myy.haaga-helia.fi.

Kiitos vastauksestasi ja mielenkiinnostasi aihetta kohtaan!

Ystävällisin terveisin,

Iina Sorvari

Appendix 3. Interview 1 structure

Interviewee: Jaana Rissanen

Method: Face-to-face interview

Date and time: December 2 2015, Aalto University premises

Interview questions:

Financial aspects

Basic information about the digitalisation project taking place at Aalto

Is there a budget for the project?

Is digitalisation financially beneficial for Aalto considering the cost reductions in archive, use of paper e.g.

Do you think that the government cuts on education slow down the digitalisation project at Aalto?

Practical aspects

How would digital solution amend the daily life of a payroll professional?

What threats and advantages are associated with digitalisation?

Future of digitalisation at Aalto University

Are the estimations when the digitalisation project will be established?

Have you got any past experiences of going through a digitalisation project in an organisation?

Appendix 4. Interview 2 structure

Interviewee: Susanne Saransalmi

Method: Face-to-face interview

Date and time: December 11 2015, Aalto University premises

Interview questions:

Which payroll process phrases are most vulnerable to errors?

How do you ensure that these errors are detected before the final payment is made?

Describe the amount of missing/incoherent information in the arriving payment material?

Would you consider electronic archive to have a positive effect on your work?

How much work does a traditional archive require in the payroll department?

What positive/negative effects can you imagine related to digital solutions?

Would digitalisation improve the quality of service and customer satisfaction?

Are you concerned about the decreased need for workforce caused by digitalisation?

What are the manually conducted tasks at the payroll and which tasks could be prioritised if the manual tasks were automated?

Comment on the amount of paper used in the payroll department?