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ARTIFICIAL INTELLIGENCE IN THE PREVENTION OF FINANCIAL CRIME

– Effects on human resources and leadership on
the financial sector

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ARTIFICIAL INTELLIGENCE IN THE PREVENTION OF FINANCIAL CRIME

- Effects on human resources and leadership on the financial sector

Regulation considering banks and other companies in the financial industry is increasing. This provides the companies on the field an unprecedented task of increasingly monitoring their customers transactions, collecting customer information, and preventing fraud and money laundering. Meanwhile, the implementation of artificial intelligence (AI) in operational level tasks can provide opportunities for companies in the financial industry.

This master's thesis studies the opportunities of artificial industry in the prevention of financial crime and explores the effects of AI to the leadership requirements and human resources in finance. The theoretical part of the thesis examines relevant literature about the concepts of prevention of financial crime, money laundering and AI, alongside with necessary terminology.

The empirical part of the thesis researches the concepts laid out in the theory in the form of a questionnaire survey aimed to individuals working in the financial industry in Finland. The aim of the research is to explore the leadership and human resource aspects of the implementation of AI in finance.

The research carried out for the master's thesis indicates, that while it as accepted that AI is beneficial in handling vast amounts of data, human expertise is necessary to perform more complex duties also in the future. Furthermore, respondents expect leadership, risk management and open communication in AI related matters.

KEYWORDS:

Artificial intelligence, financial crime, money laundering, financial services, leadership

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ARTIFICIAL INTELLIGENCE IN THE PREVENTION OF FINANCIAL CRIME

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Pankkeihin ja muihin finanssialalla toimiviin yrityksiin kohdistuu enenevässä määrin sääntelyä. Sääntelyn kasvava määrä edellyttää alalla toimivilta yrityksiltä alati lisääntyviä maksutransaktioiden seurannan, asiakkaan tuntemisen sekä rahanpesun estämisen toimia. Samanaikaisesti tekoälyratkaisuiden käyttöönotto operatiivisissa tehtävissä tarjoaa finanssialalla toimiville yrityksille uusia mahdollisuuksia.

Tämä opinnäytetyö selvittää tekoälyn tuomia mahdollisuuksia talousrikollisuuden torjunnassa, sekä tutkii tekoälyn vaikutuksia finanssialan henkilöstövaikutuksiin ja johtamistyöhön. Työn teoreettinen osuus käsittelee talousrikollisuuden torjunnan, rahanpesun estämisen ja tekoälyn keskeisiä konsepteja ja termejä lähdekirjallisuuden avulla.

Opinnäytetyön empiirinen tutkii teoriaosassa käsiteltyjä asioita kyselytutkimuksen keinoin. Opinnäytetyötä varten tehty kyselytutkimus on suunnattu finanssialalla työskenteleville henkilöille, ja pyrkii selvittämään alalla toimivientyöntekijöiden näkemyksiä tekoälyn käyttöönoton vaikutuksia työllisyyteen sekä johtamistyöhön.

Työtä varten tehty kyselytutkimus osoittaa, että vaikka tekoälyn uskotaan olevan hyödyllisimmillään suurien tietomäärien käsittelyssä, tullaan ihmisen asiantuntemusta jatkossakin tarvitsemaan monimutkaisempien tehtävien suorittamiseen. Tutkimukseen osallistuneet vastaajat peräänkuuluttavat työnantajilta johtajuutta, riskienhallintaa ja avointa viestintää tekoälyyn liittyvissä kysymyksissä.

ASIASANAT:

Tekoäly, talousrikollisuus, rahanpesu, finanssiala, johtaminen

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LIST OF ABBREVIATIONS

AML	Anti-Money laundering. Anti-money laundering refers to a set of laws, regulations, and procedures intended to prevent criminals from disguising illegally obtained funds as legitimate income.
KYC	Know Your Customer. The process where companies and operators on the financial industry strive to identify and know their customers to meet current legislative and regulatory requirements.
FSA	The Financial Supervisory Authority of Finland
AI	Artificial Intelligence
ECB	European Central Bank
FATF	Financial Action Task Force
NBI	National Bureau of Investigation (Finland)
FIU	Financial Intelligence Unit of Finland

1 INTRODUCTION

Regulation concerning the financial industry has increased significantly during past few years. Financial industry companies face the unprecedented task of increasingly monitoring their customers transactions, collecting customer information and preventing fraud and money laundering. Meanwhile, another big change that is expected to change the financial industry is the implementation of artificial intelligence and machine learning in completing everyday low-level tasks which do not require human expertise.

Customer transaction monitoring is a labor-intensive and time-consuming task in the financial industry and number of employees working on the area can be counted in hundreds in Finland alone and the number is on the rise. This master's thesis aims to study that how artificial intelligence (AI) could be made use of in combating money laundering and fraud. The use of AI might free valuable resources to other relevant and more human dependent tasks within the bank. In the current situation algorithms create different alarms and notifications about transactions which demand careful inspection and the further processing is up to human employees. This can possibly create unnecessary overlap between employees due to communication issues, wasteful use of human resources and the unnecessary delays in the domestic and international transaction traffic.

Outside the technical viewpoint the implementation of AI to perform everyday tasks presents another strategic question for a company: Can the implementation of AI free valuable resources to other, more demanding duties or lower the HR costs of the company altogether? This is the main research question presented in the thesis. The implementation of AI to such vital and statutory field of banking must be well planned and documented in a financial company. This master's thesis wishes also to explore the possible ways in which the use of AI can be monitored and restricted in a financial company. Must the use of AI have a stand-alone strategy within the company, or should it be embedded into the actual company strategy? How will the use of AI be monitored, and how will the responsibilities of possible AI-oriented errors be handled and decentralized? An important part of the master's thesis is the leadership point of view. As an organization embeds AI solutions into its everyday operations, the leadership roles, employee training and efficient communication throughout the organization are paramount.

The theoretical part of this master's thesis explores the concept of anti-money-laundering (AML) by reviewing relevant terminology of the subject matter as well as the effects of anti-money-laundering activities on the financial industry. The emphasis in this master's thesis is mainly on the Finnish and European financial industry and thus all regulatory and legislative content is written from this point of view. However, Finnish and European legislation will not be reviewed in detail, as this master's thesis is not juridical in nature. The concept of artificial intelligence is reviewed from the financial industry viewpoint. The current situation and possible future applications are explored in this part alongside relevant terminology. Finally, the leadership aspects of artificial intelligence are assessed. Strategical point of view and the impacts to human resources are concepts that the master's thesis seeks to explore.

The research part of this master's thesis is carried out by executing a questionnaire, which targets professionals currently working on the financial industry in tasks considering anti-money-laundering, transaction monitoring and the prevention of financial crime. The case company for the thesis is a large financial services company based in Finland. The targeted sample size is estimated at few dozen individuals including entry-level, specialist level and team leader level professionals. The questions aim to find insight about the views that the professionals have about artificial intelligence as a method of assisting them in their operational tasks, while also looking into the attitudes that financial industry professionals may have towards the use of artificial intelligence altogether.

In the closing chapters the results of the research are reflected and analyzed against the theoretical background. The closing chapters aim to find the connections between the theory and practice and further find results supporting the leadership aspects laid out in the theoretical part. Literature about the possibilities of artificial intelligence is abundant today. The most important works referenced in this master's thesis included the 2018 book *Tekoäly -matkaopas johtajalle* by Antti Merilehto and the 2019 book *Tekoäly -bisneksen uudet työkalut* by Heidi Kananen & Harri Puolitaival which offered good insight into the basics of AI alongside with its opportunities. However, when discussing money laundering and financial crime, the most important sources of information were provided by organizations and entities such as Financial Action Task Force, Financial Supervision Authority of Finland and Finance Finland, which all provided relevant and accurate information on the subject.

2 ANTI-MONEY-LAUNDERING (AML) IN THE FINANCIAL INDUSTRY

2.1 Terminology

Money laundering

Money laundering can be best described as an activity which aims to obliterate and conceal the illegal origins of funds that have been acquired through criminal activities. The purpose of the money laundering process is to make the funds or assets appear legitimate, and to evade authorities and law enforcement by embedding the illegal funds into the legitimate bank system. Money laundering can also be considered as an integral part of the operation of organized crime, and as such as part of international crime. (Police of Finland 2020.)

The financial scope on money laundering is hard to estimate, as the money laundering activities are illegal and take generally place outside the legal systems and statistics. Therefore, all estimations about the financial scope of money laundering are rough estimations. However, some study has been conducted about the matter. A study by the United Nations Office on Drugs and Crime (UNODC) estimated that the global volume of laundered criminal proceeds amounted to total 3,6 percent of the global gross-domestic-product (USD 1,6 trillion) in year 2009. Despite the study, any definitive figures are impossible to give due to the illegal nature of these transactions. (Financial Action Task Force 2020.)

Money laundering can be broken down into three individual phases: Placement, layering and integration (Figure 1).

The placement phase is the initial phase of a money laundering activity. In this phase the perpetrator introduces illegal funds into the financial system typically either by smaller and harder to detect transactions into traditional bank accounts in a straightforward manner, or through the purchase of different monetary instruments such as cheques or money orders which can be collected at another location.

In the layering phase of the activity the money launderer initiates series of transactions or movements of the funds in order to distance them from the original source. This can once again happen in different forms, such as purchasing and selling of financial

instruments (investments) or transferring the funds directly via series of transfers internationally. Typically, the targeted areas of the transactions are those which do not co-operate in AML investigations.

The third and final part of the illegal process is integration, in which the money launderer re-enters the funds into the legitimate economy. In this phase the originally illegal funds can be used in the acquisition of real estate, investments or other assets of value. (Financial Action Task Force 2020.)



Figure 1. Three Stages of Professional Money Laundering (Financial Action Task Force 2018).

Terrorist financing

According to the Financial Action Task Force (FATF) funds and other assets are needed in terrorism to finance purchases of weaponry, accommodation, travel and training of terrorist activities. The disruption and prevention of financial flows and transactions is

one of the most effective tools in combating terrorism. In addition to disrupting material support the prevention actions provide valuable information in tracking and preventing potential terror threats globally. (Financial Action Task Force 2020.)

According to Europol, terrorist organizations use funds generated in Europe to establish health, social and educational services in areas controlled by them. The type of terrorism and the location of the terrorist group affects the origins of the funds and how the funds are collected and transferred. Organizations and groups located within European borders typically finance their operations using funds hailing from their base of supporters. Means of collecting funds range from traditional cash transactions to selling of merchandise and propaganda material. Online donations are also a source of funds, and funds are partially collected using cryptocurrencies. (Europol 2020, 22-24.)

Terrorist groups and organizations that are active outside Europe use funds generated in Europe to support their operations in areas under their control. Funds are generated through business operations that appear legitimate, trafficking activities and partially by raising funds from supporters and sympathizers. Funds are moved outside Europe using various methods: cash operations, corporate structures, trade transactions etc. Typically, a combination is utilized. (Europol 2020, 22-24.)

The *hawala* system is also widespread in the movement of terrorist funding outside Europe. Hawala is an informal funds transfer system, in which funds are transferred between two locations using through service providers – or *hawaladars* – regardless of the nature of the transaction or countries involved (Figure 2) (International Monetary Fund 2002.)

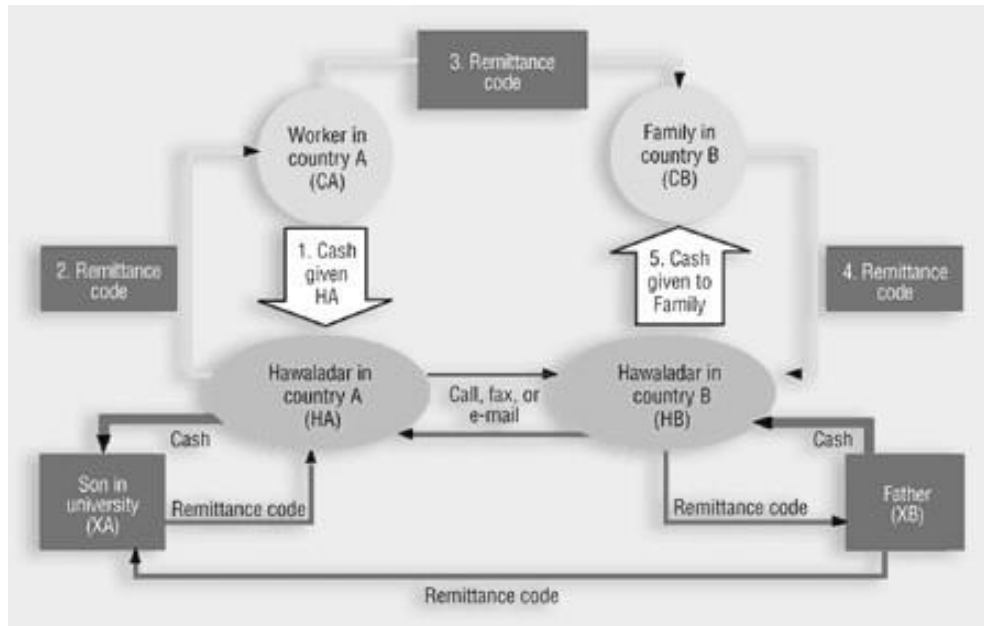


Figure 2. Example of a hawala transaction system. (International Monetary Fund 2002)

Prevention of money laundering / Anti-Money-Laundering (AML)

Prevention of money laundering consists of customer due diligence, detecting suspicious transactions and reporting of such transactions. The prevention of money laundering is based on international standards and regulation around AML aims to ensure that uniform customer due diligence procedures are observed globally on the financial markets. In Finland, the procedures are observed by the Financial Supervisory Authority and reports investigated by the Financial Intelligence Unit operating under the National Bureau of Investigation. In Finland AML and the prevention of terrorist financing is governed by the *Law on the prevention money laundering and terrorist financing (28.6.2017/444)* (Financial Supervisory Authority 2020.)

Reporting entities

Reporting entities are operators on certain fields which are expected by law to identify their customers, monitor their customers' activities, report suspicious activities to the Financial Intelligence Unit (FIU) and to take necessary measures to ensure that the legislative obligations are known and observed in their operation. The obligations of the

reporting entities consider operators which are able to identify money laundering and terrorist financing activities in their normal business operations. These reporting entities can be considered a key part in identifying suspicious activities. (Regional State Administrative Agencies 2020.)

2.2 Monitoring compliance with the Anti-Money Laundering Act and possible sanctions

After the Anti-Money Laundering Act came into force in July 2017 authorities were given administrative sanction authority for monitoring compliance with the act. The authority over the sanctions for failing to comply with the act was handed over to the Regional State Administrative Agency for Southern Finland. The sanctions include administrative fines, public warnings and penalty payments.

Administrative fines are imposed on obliged entities which fail to comply with one of the following obligations laid down by the Anti-Money Laundering Act:

1. Customer Due Diligence (CDD), identifying the customer or retaining CDD data
2. Making reports on suspicious transactions
3. Applying for the entry into the AML supervision register
4. Preparing procedures for reporting suspected violations of the act
5. Employee training and protection and preparing employee guidelines

The amount of the fine is based on an assessment which considers the nature, scope and duration of the breach. The minimum fine is EUR 500 for a natural person and EUR 5000 for a legal person, and the maximum fine is EUR 10 000 for a natural person and EUR 100 000 for a legal person.

Public warnings are typically imposed when the matter doesn't warrant more severe actions to be undertaken. Public warnings can be issued when if an entity intentionally or through negligence violates the provisions laid down by the Anti-Money Laundering Act. Basically, when the neglect does not fulfil the conditions for administrative fines. Public warnings can also be issued to a natural person should they not comply with their personally binding provisions.

Penalty payment can be imposed for the violation of same obligations as for the administrative fines. However, the prerequisites for a penalty payment are stricter than

when imposing administrative fines and they are generally imposed for violations that are serious, recurrent or systematic. In terms of size, the penalty payments may be significantly more severe than the administrative fines. The actual amount of payment is based on a comprehensive assessment which considers the duration, scope and nature of the violation. Additionally, the assessment considers financial position of the offender, possible profits gained, and possible damage caused. The maximum sum of the penalty payment for legal persons is 10 percent of the offender's previous years revenue or EUR 5 000 000 depending which is larger.

(Regional State Administrative Agencies 2020.)

According to the financial consultancy firm Duff & Phelps, the worldwide fines derived from AML negligence was estimated at USD 444 million in 2019. The previous years showed even higher numbers in total global fines (in 2018 USD 3,297 billion and in 2017 USD 2,136 billion). Failings in compliance with AML regulation generally fell under four categories between the years 2015 and 2020: Customer due diligence, AML management, suspicious activity monitoring and compliance monitoring and oversight. (Duff & Phelps 2020.)

The Finnish financial industry has generally avoided major sanctions considering their compliance, AML and KYC procedures. However, in December 2019 the Financial Supervisory Authority of Finland imposed a penalty of EUR 980 000 to S-Bank Ltd following negligence in their AML and KYC procedures and the shortcomings in their data systems and processes. In the same process FSA issued a public warning on FIM Asset Management which is a part of the S-Bank Group (Financial Supervisory Authority of Finland 2019.)

2.3 Effect of AML on the Finnish financial industry

According to Finance Finland, the Finnish financial sectors overall spending in the prevention of money laundering is estimated at EUR 100 million annually, and in 2019 Finnish banks reported over 10 000 suspicious activities to the authorities. Furthermore, AML operations take up hundreds of full-time-equivalent work years. However, the reports seldom lead to actual criminal charges or even pre-trial investigations. There are numerous reasons for the relative ineffectiveness of the system. According to Mika Linna, the Head of Financial Crime and Cybersecurity at Finance Finland, key problems

on the field are for example the unclear approach and aim by the legislation, ineffective focusing of resources and lack of flexibility. Potential solutions for the issues include the increased mutual exchange of information between banks, mutual system of alerting other operators about suspicious transactions and increase in resources available to the authorities to investigate cases of suspected money laundering (Finance Finland FFI, 2020.)

3 ARTIFICIAL INTELLIGENCE (AI) IN THE FINANCIAL INDUSTRY

3.1 Terminology

Artificial intelligence

Artificial intelligence is an action carried out by a machine that would be considered intelligent when carried out by a human being. However, AI is not limited to human level. Typical tasks of an artificial intelligence include learning, deduction, anticipation, decision-making, vision and hearing. Artificial intelligence can further be divided into two separate types: weak AI and strong AI. A weak AI is capable of carrying out a single task in which it is trained (such as recognizing tumors from imagery). Current level of artificial intelligence falls under this category. Strong AI, however, is able to carry out a vast array of complex tasks. Strong AI has not yet been developed (Merilehto 2018, 18.)

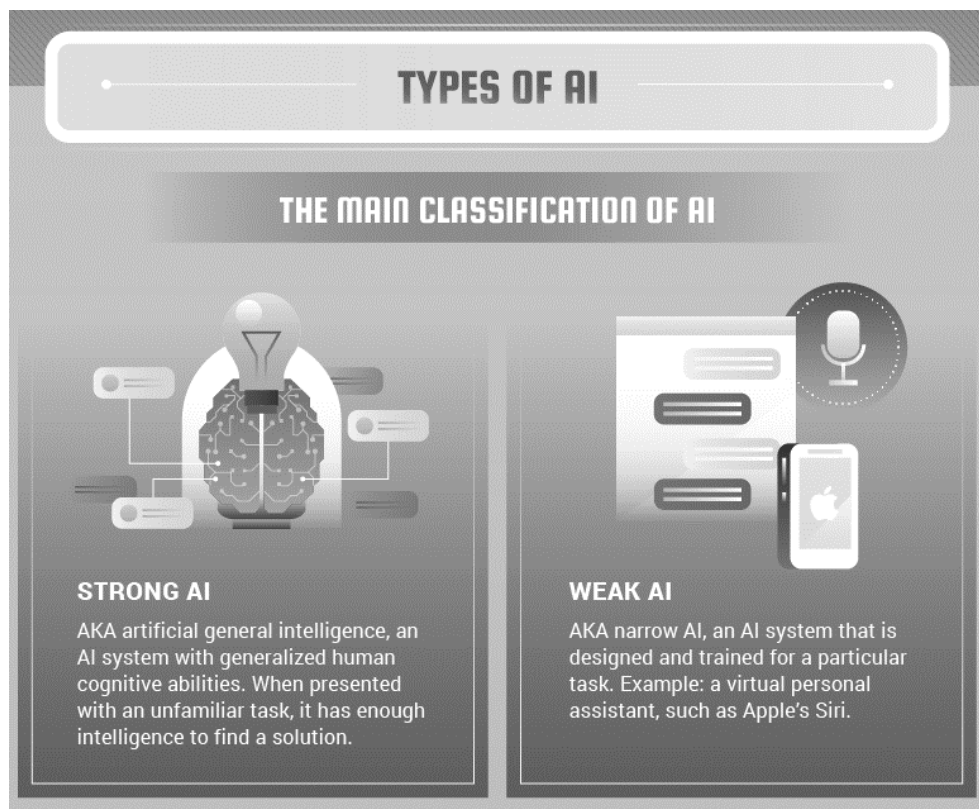


Figure 3. Strong AI vs Weak AI (Manning Global 2019)

Machine learning

The basis of machine learning is that there is no defined and precise guideline given to the machine, but the machine rather learns independently from available data. The majority of current AI applications are based on machine learning. There are three further sub-categories for machine learning: In guided learning the machine is provided the correct answer in the learning data. In unguided learning the machine deduces things using relations and conformities in the data. In fortified learning the machine is provided feedback on how successfully it operated in a given circumstance without actually providing the machine with the correct answer (Merilehto 2018, 19.)

Machine learning can greatly affect how software is created to match the changing needs of customers and users. The classic software development is based on the logic which the developer has written inside the software. The logic has been based on previous business understanding added with data that is considered relevant. In machine learning however, the model is merely given a goal and the model in itself deduces the best way to reach the goal (Merilehto 2018, 30.)

Neural networks

A neural network is a group of neurons – or simple processors – which are interconnected and communicate with one another (Merilehto 2018, 20). Neural networks can be considered as means of performing machine learning in which a computer system learns how to perform certain tasks by analyzing training examples. These training examples can include for example images that are used by the computer to perform visual pattern recognition (Massachusetts Institute of Technology 2017.)

Deep neural networks aim to imitate the function of human brain. The networks in itself consist of neurons and synapses. Neurons can be described as miniature machines which operate on a single task at the time by receiving a feed, processing it and giving it forward to another neuron. Neural networks learn more efficiently the more they receive data. Neural networks have a great advantage over other models of machine learning: their applicability. Networks which are similar in architecture can be used in plethora of different problems (Merilehto 2018, 47-49)

Deep Learning

Deep learning is the optimization of deep neural networks in order to solve complex problems (Merilehto 2018, 20.) A system based on deep learning can i.e. learn to independently recognize a given object when given a larger amount of example image data beforehand. (Merilehto 2018, 56.)

3.2 AI on the financial industry today

Artificial intelligence is already widely used in the financial industry. One of the main applications is to automate routine tasks for efficiency. US based JP Morgan Chase has utilized AI in researching loan documents, and according to the bank the use of AI saves 360 000 manhours of work compared to the pre-AI era. AI can also be utilized in automated trading of securities and in customer services. Typical examples of these services include software carrying out securities trade and chatbots that operate independently (OP 2018.)

According to Mark Swain, AI is one of the biggest areas of investment for operators in the financial industry. Artificial intelligence can reshape front-end activities and deliver efficiency to back-office operations. Swain mentions chatbots, document analysis and management, fraud detection, machine learning and robotics as areas where artificial intelligence is already working today in the financial industry. Chatbots are being deployed by banks to carry out high-volume front-office tasks such as general customer service tasks. In document analysis AI can save thousands of manhours by reviewing and managing documents previously handled by human workers. In fraud detection AI can process vast amounts of data and produce alerts and notifications on possibly fraudulent activities. Also, robotics are already playing a role in today's banking as banks are utilizing them in tasks such as customer service, staffless offices and loan processing (Swain 2019, 105-110.)

3.3 Impact of AI and analytics in the prevention of financial crime

Artificial intelligence has already been globally embraced by different industries, However, in compliance there has been a certain reluctance in embarking on this “technology bandwagon.” In the end of year 2016 only few banks globally had started working with AI in order to bolster their efforts in risk management and compliance. It is expected, that by 2020 most banks are adopting analytics tools for their risk and compliance programs. In the increasingly regulated field of financial services compliance operations face unprecedented pressure to preserve the integrity and reputation of the organization. AI solutions in areas of KYC and AML can possibly help compliance operations in controlling the ever-growing sea of transactions. In the upcoming years financial industry companies can be witnessed increasingly adopting analytics-powered tools in order to combat financial crime (Holzenthal 2020.)

Terrorism, illicit migration and human trafficking are dependent on funding and the networks behind the illegal operations are typically developed across multiple nations and areas. Cutting off the flow of funds is paramount in order to combat aforementioned illegal activities. However, the pool of transactions is too vast to be effectively monitored – or sanctioned - without analytics and tools. Tools currently in use typically screen sanction lists in order to seize unwanted payments and scan anomalies in customers’ typical transaction behavior, in order to spot uncharacteristic transactions (Holzenthal 2020.)

The collection of vast amounts data and information (or *big data*) might not be sufficient or efficient in itself but requires powerful and advanced analytics to detect relevant threats from the vast amounts of data. In addition to better quality of outcome, advanced analytics can greatly help financial crime analysts in prioritizing alerts and focusing their efforts to relevant fraudulent activities. Analytics-based models of compliance are able to analyze a wide range of factors simultaneously and rank them before they are flagged. These models help analysts to focus their resources to suspicious activities that are deemed most vital and threatening. As the regulation and legislation around KYC and AML becomes stricter, analytics-powered tools will probably see a more widespread adoption. Artificial intelligence and analytics can provide banks the capabilities needed to combat fraudulent activities and terrorist financing (Holzenthal 2020.)

4 ARTIFICIAL INTELLIGENCE AND LEADERSHIP

4.1 Strategic point of view

With the implementation of AI major cost reductions can potentially be achieved. As an example, artificial intelligence can be utilized in route planning, thus saving in fuel consumptions. In the planning of work shifts, AI can reduce the amount of time consumed in the planning of working hours while taking employee wishes and collective labor agreements into consideration. Therefore, duties that include regularities and easily accessible data can quickly be outsourced to AI (Kananen & Puolitaival 2019, 201.)

Before implementation, the utilization of AI should be discussed throughout the whole organization. During this process, it is paramount to take into consideration how the optimization of a certain business area will affect the other areas inside the organization. It is noteworthy, that the implementation of artificial intelligence can decisively alter the lead time of certain processes and even render some processes useless. Typically, processes are either consecutive or parallel and thus the optimization and increased effectiveness of one area can lead to bottlenecks and stalling of others. It is also worthwhile to consider will the end product be perceived by the customer in a positive manner or will the advantages of optimization leave unutilized due to the rigidity of the organization (Kananen & Puolitaival 2019, 201-202.)

According to Antti Merilehto, one of the key elements of successful transition to the use of AI is the creation of an experimental culture and atmosphere within the organization. A concrete step towards this transition is to share the data and knowledge throughout the organization. As the effectiveness of artificial intelligence is highly dependent on the quality and amount of data available for it, there should no barriers inside the organization that might block the effective use of data. After all, the easier the data is accessible, the quicker business-oriented decisions can be made using it. It is typical that decision-making and responsibility is decentralized in an organization to a larger group of individuals. When data is easily accessed and processed with visualization and analytics tools an organization is able to answer to existing and emerging customer requirements significantly faster (Merilehto 2018, 174-175.)

The advantages of AI and machine learning can generally be perceived as more immediate or slower in nature. It is possible to achieve quick business advantages with the use of different machine learning solutions. On shorter notice, AI can for example offer predictions on leaving customers and analyze best tools for customer retention. It is quite possible to see generated value in the matter of weeks when implementing machine learning solutions. However, according to Merilehto the understanding what machine learning solutions bring over time can be significantly more important. A greater understanding about the company's customer accounts and the profitability of certain products can be achieved when the data is collided with the people working on the field. In addition to straightforward solutions, the machine learning algorithms can potentially reveal the factors behind the solutions and thus create value for the company. As an example, the factors causing customers to walk away on certain business segments can be revealed by AI thus creating the possibility of enhancing customer satisfaction. The greatest possibility however is to include AI as a part of decision-making. This demands the continuous support of the whole top management as process would be flawed should it be decided solely by the most senior manager (Merilehto 2018, 177-178.)

4.2 Impact of AI to human resources

One of the typical negative perceptions about artificial intelligence is related to the fear of human workers losing their employment due to the implementation of AI. Generally, this perception is exaggerated. The way in which humans learn is complex and difficult to be taught to artificial intelligence, and the capabilities of AI is often exaggerated. While it is hard to define the capabilities of AI in the future, today's AI is still unable to understand complex matters and are not aware of themselves. It is, however, natural for humans to overestimate the short-term effects of technology and underestimate the long-term effects (Kananen & Puolitaival 2019, 212-213.)

In a 2014 study by Pew Research Center altogether 1896 professionals were interviewed about their perceptions on the future of AI and analytics. One of the key questions was, whether the respondents believed that whether the solutions based on AI and robotics would reduce more jobs than they generate. The answers were generally mixed, as 48 percent of the respondents believed that more jobs would disappear than be created by

the AI solutions. Other negative perceptions included the concerns that income gaps and inequality would increase and the social order waver. The positive respondents generally believed that new jobs would be created as old duties would be carried out by AI-based solutions. It is noteworthy, that both sides shared concerns and hopes about the effects of the rise of artificial intelligence and analytics. Typical concerns included the inability of the social structures, especially school systems, to answer to the future needs. On the other hand, both sides expressed hopes that the future solutions could give rise to the opportunity to modify one's way of working and thus granting humans more free time (Marttinen 2018.)

Industrial revolutions in the past brought change into the employee market and struck fear into employees at the time. On some fields, the need for human work was indeed reduced due to the evolution of technology. However, the revolutions also increased prosperity as effectiveness increased. While many technological breakthroughs were originally designed to reduce human work, the number of human labor hasn't reduced. Therefore, it is reasonable to ask that why hasn't automation of work reduced the amount of human labor? As with earlier examples of technological advancement it is quite possible that AI can create human positions that may not even exist at this moment. The views about the effects of AI in human resources differentiate with one another. It has been suggested that while earlier innovations have reduced mainly low-income labor, AI could affect medium and high-income work such as doctors and jurists as well. On the other hand, AI solutions are suggested to replace repetitive routine tasks rather than whole professions. This could make the specialist work more fruitful as mundane routine tasks are reduced (Kananen & Puolitaival 2019, 214-215.)

4.3 Risk management and leadership

Applications based on AI need vast amounts of data and they are typically used to create personified solutions. This sets customers and entities requirements for the increased usage of personal data and information. For example, in healthcare we are seeing an ongoing discussion about the openness and accessibility of one's personal data. In addition to matters of privacy, the discussion also revolves around the ethics of using AI and robotics on fields that traditionally are considered private. While artificial intelligence, analytics and robotics provide an increasing amount of opportunities, it is also important to bear in mind that the solutions can make mistakes and provide wrong solutions. When

AI is given the opportunity to make independent decisions, it is important to assess the worst-case scenarios as well. In the end, the attractiveness of new technologies is highly dependent on the level of trust and ethical choices made by consumers (Kananen & Puolitaival 2019, 215-216.)

There are always questions related to ethics and data privacy when discussing artificial intelligence. As mentioned in the previous chapter, AI requires vast amounts of data to show results. Possible concerns related to the privacy of consumer's personal data (location data, facial recognition, browsing history etc.) need to be taken into consideration when implementing AI solutions. European Union passed the General Data Protection Regulation (GDPR) in 2018, and the regulation aims to strengthen consumer's power and control over their personal data and privacy. In the development and implementation of AI solutions the restrictions set by GDPR need to be taken into consideration by the organization. It is important to clarify whether the organization is the register holder or merely user of the data. Even in subcontractor relations it is paramount to recognize and document the organizations responsibilities for the privacy, transparency and user permissions of the used data (Kananen & Puolitaival 2019, 218-2020.)

When an organization plans on making use of AI-based solutions it is important to assess how these solutions are managed by the organization's leadership. As AI, analytics, machine learning and such are complex concepts to comprehend, it is not fruitful to expect that the whole organization should have advanced expertise on the subject. Typically, the matter should be addressed by identifying the individuals who have the understanding and capability to show leadership on the subject. Companies planning to use AI and generate turnover greater than EUR 20 million annually could benefit by harnessing an individual employee to AI-related matters. Many companies already have the role of Chief Digital Officer (CDO), but it is worth discussing whether this position is too broad and horizontal to focus solely on AI. On the other, a specified AI responsible person has deeper understanding on AI solutions and focuses on certain projects at the time rather than the digital needs of the whole organization. The actual title of the person is not relevant, but rather the capability and skill to drive the organization forwards in AI-related matters (Merilehto 2018, 168-169.)

5 QUALITATIVE RESEARCH IN THE MASTER'S THESIS

5.1 The background of the research

The subject of the research in this master's thesis was selected as a result of the writer's background in banking and the personal interest in the prevention of money laundering and AI solutions. While working in the financial industry for over a decade I have witnessed the transformation of the industry from traditional ways of banking towards a more digitalized world of finance. As robotics, analytics and AI-based solutions have become more commonplace in finance, the topic of the research is very current. There is a great potential for artificial intelligence in finance, and the prevention of financial crime is no exception. However, the prevention of financial crime is still labor-heavy part of business and includes a great amount of legislation and regulation. Because of the requirements for manpower, I have found it very interesting and topical to explore the possibilities of AI in this field of banking. Therefore, the main research question of the master's thesis was the following:

Can the implementation of AI free valuable resources to more demanding specialist duties and how might the transformation affect HR requirements on the field?

In the theoretical part of this master's thesis it was established that AI is already used to carry out simple and repetitious tasks in finance, such as customer service chatbots et cetera. However, the research part of this master's thesis aimed to further explore how employees (operations level workers, specialist and team leaders) in the financial industry view the possible expansion of AI on the very field they work on, and how they perceived its possible effects on their employment.

5.2 Tools and methods

The query for the thesis was carried out by creating a questionnaire using the Microsoft Office Forms -application. According to Microsoft, Office Forms is "a simple, lightweight app that lets you easily create surveys, quizzes, and polls. In educational institutions, it can be used to create quizzes, collect feedback from teachers and parents, or plan class and staff activities. In business organizations, it can be used to collect customer

feedback, measure employee satisfaction, improve your product or business, or organize company events” (Microsoft 2020). The main reason for choosing Microsoft Forms was its simplicity and widespread use. The link to the questionnaire was shared via email together with a cover letter which conveyed the purpose and background of the query. The actual questionnaire was 100 percent anonymous and no implication of the identities of respondents could be found within the answers of the questionnaire. After the initial email invitation to answer the questionnaire, three reminder emails were sent to the recipients. The purpose of the reminders was to ensure adequate reply percentage.

5.3 Target group

Qualitative research typically focuses on a relatively limited number of cases which are analyzed as accurately and thoroughly as possible. The scientific criteria of the sample is the quality rather than quantity. Qualitative research also set requirements for the person carrying out the study: One should have the capability to build a strong theoretical basis for the study, which also guides the acquisition of the sample data (Eskola & Suoranta 1998.)

The target group of the qualitative research was estimated to be 72 employees currently working in a large financial services company in the Finnish financial industry. The target group included employees of the case company on the operational level, specialist and team leader duties. The diversity of different roles provided important feedback whether the current position in an organization affected the results of the research. There were no limitations set for the age, education background or geographical location of the employees in the target group. The common factor among the individuals was, that all of the respondents work in duties related to the prevention of financial crime.

5.4 Handling of data

The questionnaire form (appendix 1) was sent to recipients via email and the email included a link to the actual form. The answering link was not personalized and therefore any individual in the possession of the link could answer the questionnaire. In the cover letter it was stated, that the questionnaire is carried out completely anonymously, and no

personal data that could connect the replies to an individual would be collected. It was established, that no recipient names, company or team names or other personal data would be present in the questionnaire form or in the final master's thesis – thus making the answering process completely anonymous. After the master's thesis is accepted and published, all digital and possible physical copies of the recipient data will be deleted. I found it very important to have the process as anonymous as possible in order to receive the most truthful and honest replies from the recipients. During the writing process, the answer data was stored digitally in TUAS OneDrive – cloud storage, protected with a personal password and a secure connection.

5.5 Expectations before the research

Before the research I was interested in finding out how well the results of the questionnaire would correlate with the earlier research mentioned in the theoretical part of this master's thesis and how well the results match the theoretical part in general. The chapter 4.2. of the theoretical part of the thesis assessed the 2014 study by Pew Research Center, in which the perceptions about AI's role in job creation were researched. I was interested in finding out, whether the results of this master's thesis would correlate with the results 6 years earlier, or whether there would be more dispersion in the results. In the 2014 study the perceptions were generally mixed, and I was interested in seeing whether the results of the questionnaire in this master's thesis would more homogenous or not.

In addition to the relation to the earlier studies, I found the leadership point of view as a paramount part of the master's thesis. Before the research I was expecting to receive good insight to the leadership expectations of employees working in finance in relation to an organization's artificial intelligence capabilities and leadership. Questions about risk management, employee training and strategy fell under the category of leadership when considering my expectations before the research.

6 RESULTS AND KEY FINDINGS

6.1 Reply percentage and general information

The questionnaire was sent to altogether 72 individuals working in finance, and the deadline for the replies was set to two weeks after the initial email invitation. The respondents worked in a major Finnish company in the financial industry. By the deadline date altogether 47 replies were received, thus making the reply percentage 65,3 percent. I consider the reply percentage very good as it provides an adequate sample of data for the research. Active reminders to the recipients were key in achieving the aforementioned percentage, while the informative cover letter presumably enhanced the reply activity. According to Eskola and Suoranta (1998), a theoretical, purposeful and discretionary sample is natural for a qualitative research. Therefore, the research is based on a relatively small amount of cases or replies.

The cover letter for the questionnaire estimated the answering time to be around ten minutes. Office Forms data shows, that the average reply time was 7 minutes and 30 seconds, which is clearly shorter than estimated before the research. It is possible, that the relatively swift reply time mentioned in the cover letter increased the motivation of the recipients to answer the questionnaire. While the master's thesis was executed in English, the cover letter and questionnaire was created in Finnish language. The respondents are based in Finland and language selection was based on the assumption that using mother tongue in answering enhances the motivation to take part in the questionnaire.

6.2 Background information of the respondents

The first five questions in the questionnaire consisted of the recipient's background information.

1. Gender

Out of the 47 respondents in the questionnaire 16 (~34 %) were men and 26 (~55 %) women. 5 (~11 %) respondents chose not to specify their gender.

The gender distribution among the recipients can be considered quite typical in financial industry. The distribution correlates well with the 2020 report by Finance Finland. In the

report it is stated that in 2020 altogether 64 % of total workers in financial industry in Finland were women, while 36 % were men. The distribution has shifted heavily in the past 20 years, as in the beginning of the 21st century the share of women on the field was as much as 85 % (Finance Finland 2020.)

2. Age

The age distribution of the respondents was broad. The age distribution is represented in the Figure 4: Youngest respondents belong to the category 18-25 years, while the eldest respondents belong to the age category 55-65+ years. The age category of 25-35 years is dominant among the respondents. The age groups dominance among the respondents correlates with the amount of experience in the financial industry (Figure 5).

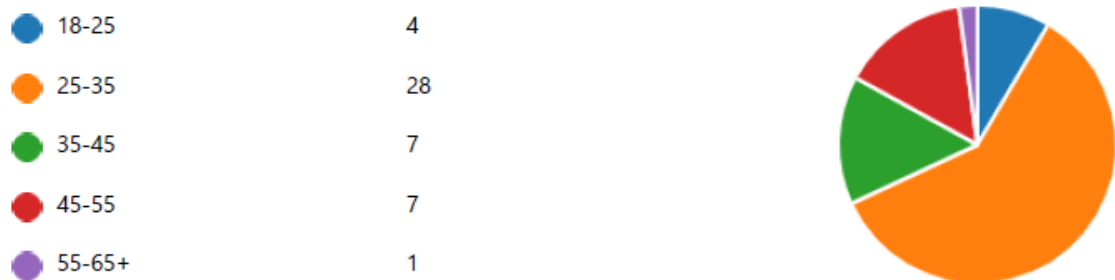


Figure 4. Respondent age

3. Work experience in finance

Respondents work experience in finance varied from 0-2 years up to 35+ years. Most respondents (29 respondents) had accumulated between 2-10 years of experience in finance (Figure 5). The amount of experience gained on the field correlates with the age of respondents: It is reasonable to believe, that many of the respondents have been employed after graduation, thus explaining to similarity between work experience and age.

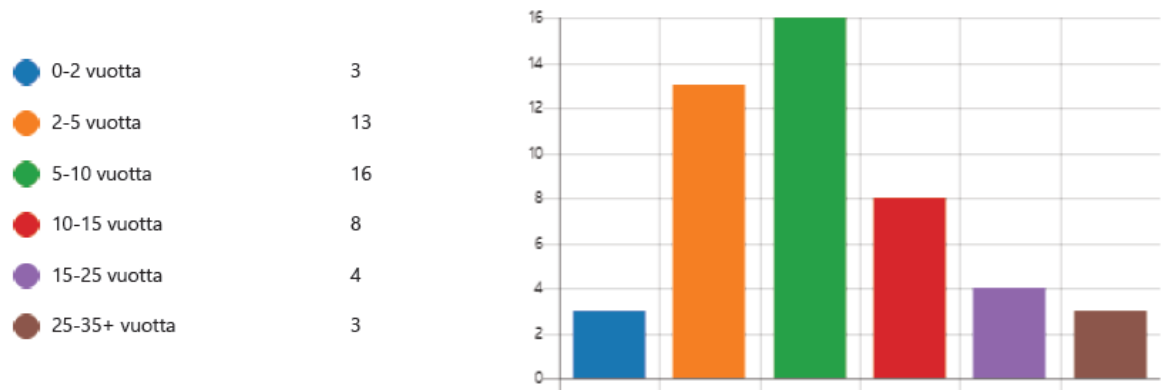


Figure 5. Work experience in finance (years)

4. Position in the current organization

The position in which respondents work in their organization was researched with a simple multiple-choice question. The clear majority (35 out of 47, 74 %) of respondents work in an employee level position. Minority of respondents work in a specialist or leadership position. No respondents were currently doing an internship. Figure 6 represents the distribution of the respondents in different positions.

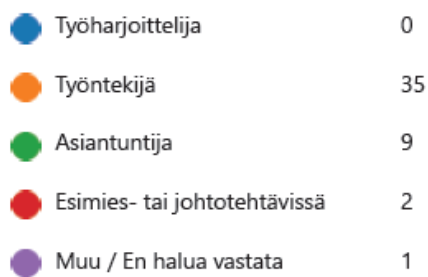


Figure 6. Position in the organization.

Once again, the distribution corresponds well with the age and work experience of the respondents. It is reasonable to assume, that most junior employees (in terms of age and experience) work in employee level positions, and more senior employees in specialist and leadership duties.

5. Education background

Respondents educational background was divided into five individual categories: basic education, vocational education (secondary level education), matriculation (secondary level education), bachelor's degree level and master's degree level. Majority of the respondents (~64 %) had a bachelor's level education, while secondary level education provided the second highest portion (32 %) of the respondents. Only two of the total of 47 respondents held a master's level education during the time of the questionnaire.

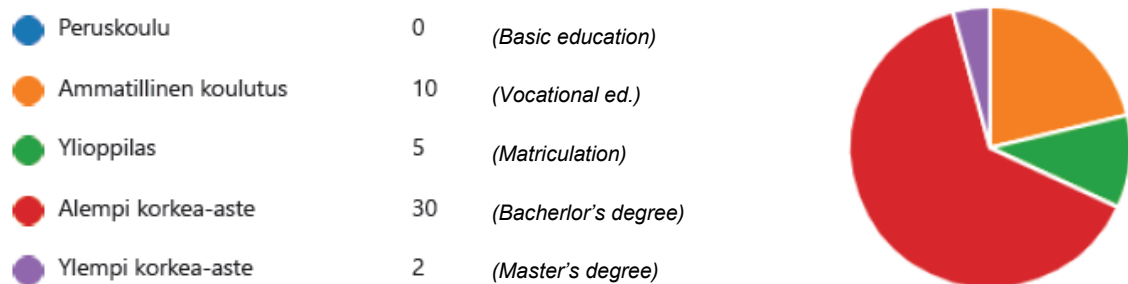


Figure 7. Education background

According to the report by Finance Finland in 2019, the number of employees holding a higher-level education is increasing in the Finnish financial industry. Traditionally, a large number of employees holding a secondary level degree have worked in finance. Between the years 2013 and 2017 altogether 2560 persons holding *merkonomi* degree (secondary level degree in business administration) were employed in finance, while the overall number was 9155 employees. During the same period, a total of 6844 persons holding a bachelor's or master's degree were employed in the field of finance (Finance Finland 2019.) This suggests a clear shift in the educational background towards higher education. The statistics correspond with the replies of the questionnaire, as majority of respondents held a higher education degree.

6.3. Respondents earlier understanding of AI

The next four questions of the questionnaire studied the respondent's previous knowledge and understanding about AI-related matters. First, the respondents were asked about their familiarity about terms related to artificial intelligence. The six terms

included artificial intelligence (*tekoäly*), machine learning (*koneoppiminen*), algorithm (*algorithm*), analytics (*analytiikka*), robotics (*robotiikka*) and neural networks (*neuroverkot*). In Figure 8 the distribution of answers shows that respondents were generally quite familiar with the terms related to AI. It is noteworthy, that terms such as neural networks and machine learning were the most unfamiliar among the respondents. As mentioned in the chapter 4.3 of the theoretical part, is it not necessary or fruitful for the whole organization to possess advanced level understanding about AI solutions. This is consistent with the familiarity of the terms presented in the questionnaire: It is reasonable to assume that basic terms about artificial intelligence are well known among employees, but terms that require deeper knowledge and understanding are more unknown. As the the majority of respondents are aged between 18 and 45 years, it is quite possible that they have familiarized themselves with the terminology beforehand.

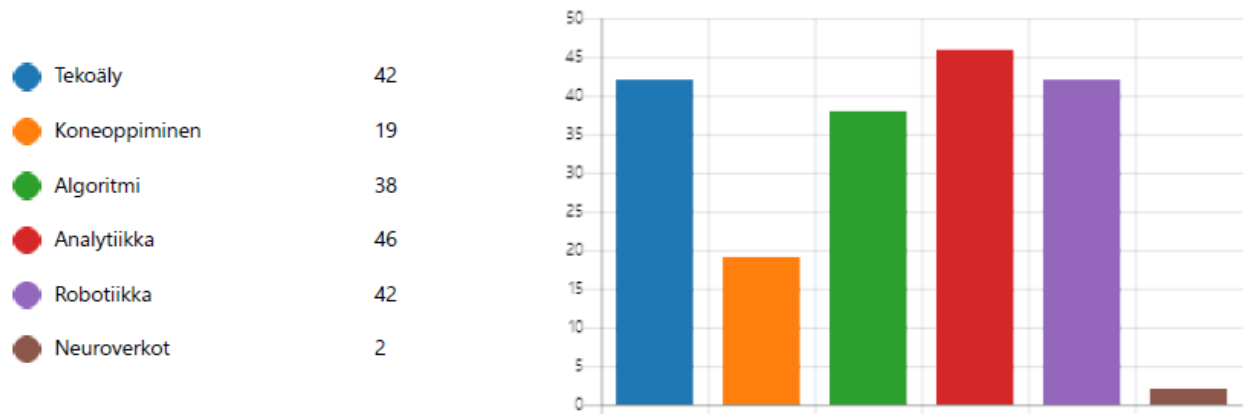


Figure 8. Familiarity with the relevant terminology

In the report *Töissä Finanssialalla 2019* by Finance Finland it is stated that the financial industry will require a more education-wise diversified workforce in the future as the changes in customer needs and technology shapes the future of finance. It is mentioned that lately the numbers of IT-specialists and data analysts employed in finance have grown as technology-based self-service increases (Finance Finland 2019.) While the typical employee in banking and insurance presumably does not encounter AI in one's everyday duties, it is noteworthy that in the future basic understanding about the subject can be a key asset.

While most of respondents were familiar with relevant terminology, more than fifth (~ 21 %) of the respondents were not aware that his/her organization would be utilizing artificial intelligence at the moment (Figure 9). In addition, only 8,5 % of the total respondents

had received any training about artificial intelligence in the current or previous organizations (Figure 10).

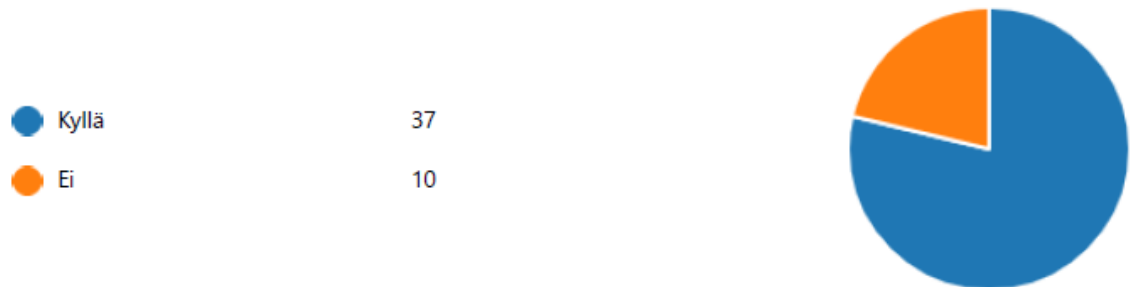


Figure 9. Awareness of AI being utilized in current organization

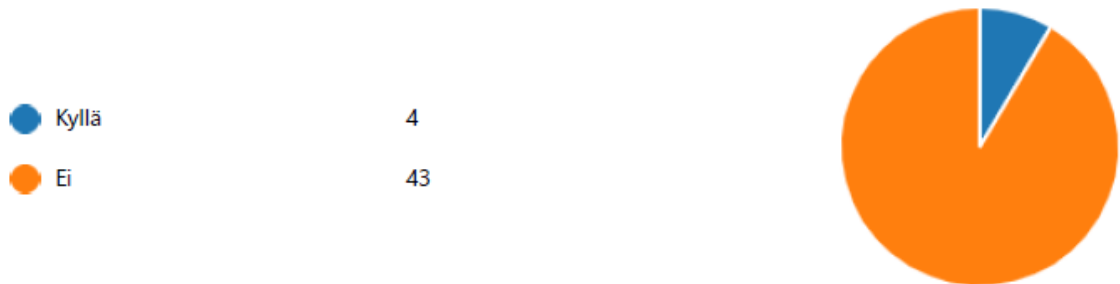


Figure 10. Number of respondents to have received training about AI

The final question of the section studied whether respondents had studied artificial intelligence independently by completing coursework or by reading about the subject. 15 percent of the respondents agreed to have studied the subject independently one way or another (Figure 11).

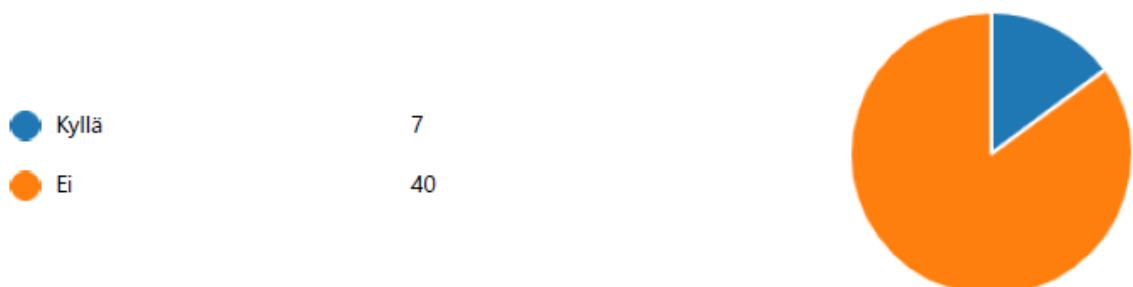


Figure 11. Number of respondents to have studied the subject independently

6.4. AI in the prevention of financial crime

The next part of the questionnaire studied the respondent's opinions on the usage of artificial intelligence solutions in combating financial crime. The respondents were presented with a set of claims, to which the respondents could reply with one of the following statements: *I agree, I somewhat agree, I cannot say, I somewhat disagree and I disagree*. Purpose of the presented claims was to study whether the respondent's opinions about the subject were homogenous or more mixed. As the respondents work in the prevention of financial crime and anti-money laundering, it was expected that the results would possibly show some consistency. The introduction to the question was the following:

It has been claimed that with the use of AI the monitoring of transactions would be significantly more efficient. Which of the following claims you agree upon, and which ones you disagree upon?

The distribution of respondent's opinions to the different claims is depicted in Figure 12.

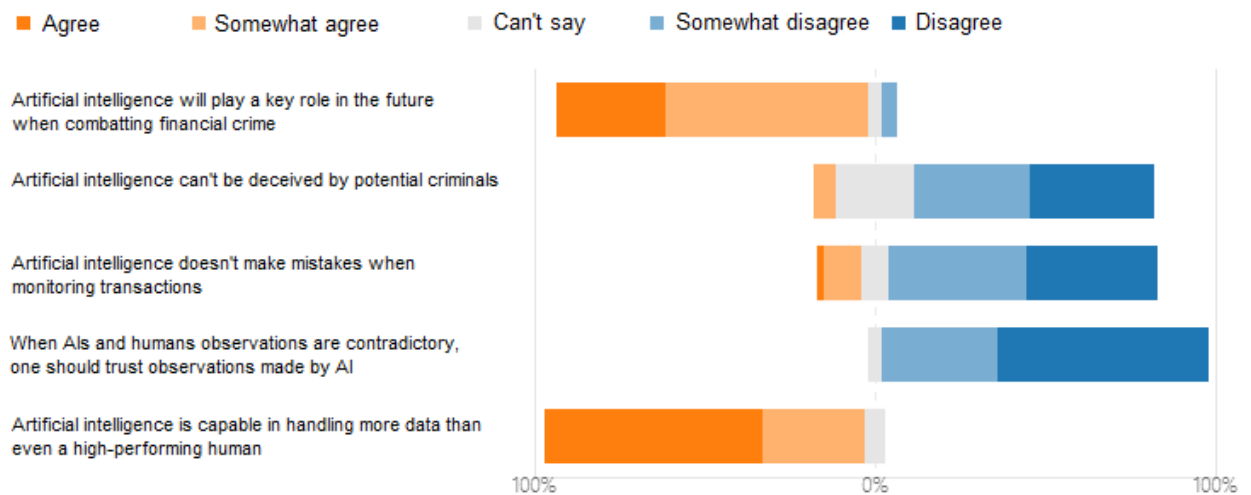


Figure 12. Distribution of responses to the claims on AI's performance in transaction monitoring

The respondents overwhelmingly agreed that artificial intelligence will play a key role in the future when combating financial crime: 91,5 percent of respondents agreed or somewhat agreed with claim. Respondents also almost unanimously agreed (93,6 % agreed or somewhat agreed), that artificial intelligence is capable of handling more data

than even a high-performing human. However, the respondents were more sceptical about the claims of artificial intelligence's potential flawlessness: 70,2 % of the respondents felt, that artificial intelligence can be deceived by potential wrongdoers, while only 6,4 % agreed, that AI is foolproof for deception. 78,7 % disagreed on the claim that AI doesn't make mistakes when monitoring transactions, while mere 12,7 % agreed that AI can operate flawlessly in monitoring duties. Finally, the respondents almost unanimously disagreed (95,7 %), that artificial intelligences solutions should be trusted when AI's and humans' observations are contradictory.

According to the responses, respondents clearly agreed that AI can handle vast amount of data more efficiently than a human worker and also felt that AI will play a key role in the future of the prevention of financial crime. However, it was noteworthy that respondents didn't trust AI to be foolproof against criminals nor should its solutions be prioritized over those made by humans. Moreover, AI was deemed to be susceptible in making errors. The observation that can be made from the responses is that while AI can provide an efficient tool in prevention of financial crime, it can't fully replace human in said duties. In chapter 4.2 it was stated that people tend to over-estimate the negative effects of AI in the short term. However, the responses to claim contradict this view, as AI was deemed unable to replace a human at least in more complex situations.

6.5. Artificial intelligence and leadership

An important aspect of this master's thesis was stated to be leadership. The next claims in the questionnaire studied the respondent's opinions on AI leadership and the possibility of employee training on the subject. As in the previous section of the questionnaire, the respondents were presented with a set of claims, to which the respondents could reply with one of the following statements: *I agree, I somewhat agree, I cannot say, I somewhat disagree and I disagree*. Firstly, the respondents were inquired about artificial intelligence and leadership. The subject was introduced with following statement:

AI leadership is a relatively modern concept. It has been suggested that organizations utilizing AI solutions should have carefully considered leadership roles, which are clearly communicated throughout the organization. In the next sections you will find claims about AI and leadership

The distribution of respondent's opinions to the different claims is depicted in Figure 13.

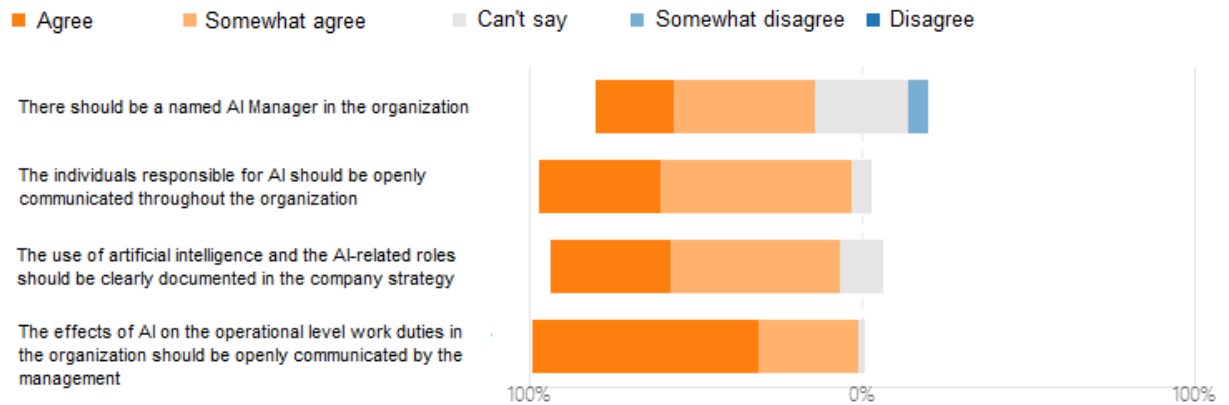


Figure 13. Distribution of responses to the claims on AI leadership

The claim that whether an organization should have a named AI manager received the most mixed response among the respondents. While 66 % agreed or somewhat agreed that an organization should have named member of management responsible for AI, 34 percent were uncertain or somewhat disagreed. The openness of communication and the documentation of AI into strategy were met with an overwhelming agreement among the respondents: 97,9 percent of respondents agreed or somewhat agreed that the effects of AI solutions to operational level duties need to be clearly communicated by the management. Likewise, open communication about the AI-related roles in the organization was generally agreed upon (93,6 % agreed or somewhat agreed). Furthermore, respondents clearly agreed that the utilization of AI and AI-related roles need to be documented into the organization's strategy (87,2 % agreed or somewhat agreed). It is noteworthy, that the vast majority of respondents expected open communication about artificial intelligence. However, the claim that an organization should have a named AI manager was met with significantly more mixed reception. In the chapter 4.3 of the theoretical part of the master's thesis it was stated that large companies might benefit from a named AI manager. Whether the responsibility could be bestowed upon a Chief Digital Officer already employed by many organizations is more disputable. The respondent's opinion on the matter corresponds with this, as the matter was left more ambiguous in the responses.

The second part of the section assessed the respondent's opinions about the possibilities of receiving training about artificial intelligence and its applications. The subject was introduced with following statement:

The concepts related to AI can be complex and difficult to understand. On the other hand, advanced understanding about the subject might not be necessary if there are responsible individuals named for the matter. The following section presents claims about AI-related education and training possibilities together with roles in a finance sector organization.

The distribution of respondent's opinions to the different claims is depicted in Figure 14.

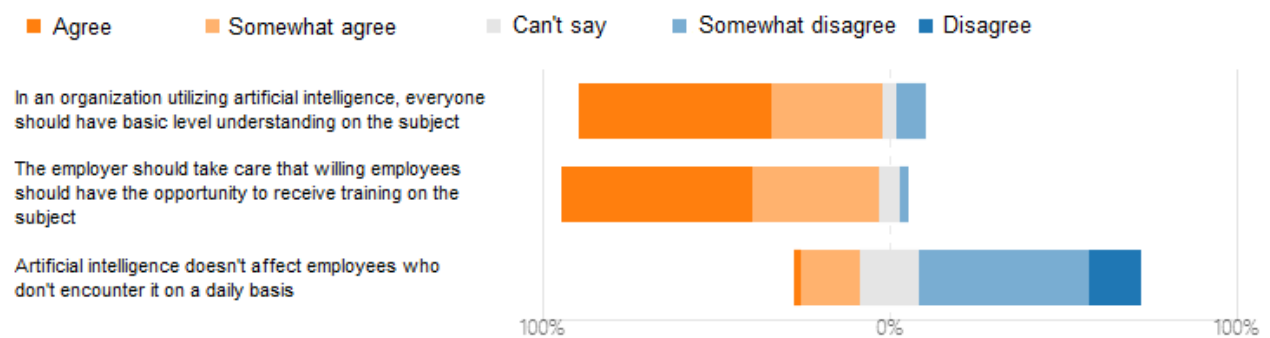


Figure 14. Distribution of responses to the claims on AI related employee training

The section consisted of three claims. Firstly, it was studied whether respondents felt that all employees in an organization utilizing AI should possess a basic level understanding about artificial intelligence. 87,2 % agreed or somewhat agreed that employees should have a basic level understanding of the subject, while the rest (12,8 %) were uncertain or somewhat disagreed. Secondly, respondents were asked whether their employee should offer training and education about artificial intelligence to the willing employees. The overwhelming majority (91,5 %) felt that employee should offer such opportunities. Finally, it was claimed that AI does not concern those who don't encounter it in their everyday work. The respondents generally disagreed on the matter as 63,8 % of the respondents either disagreed or somewhat disagreed. The reception to the claim was more mixed however, as 17 % were uncertain of their stance and 19,1 % agreed that AI shouldn't concern employees unaffected by it on a daily basis.

The responses to the two sections offered good insight on how artificial intelligence is generally viewed among the respondents. It is obvious, that when AI is utilized in an organization it needs to be openly communicated throughout and documented in the company strategy. Respondents also felt, that named individuals could be considered

responsible for AI related matters but were mixed whether the responsibility should be bestowed upon a certain AI manager. Furthermore, respondents largely agreed that in an organization which utilizes AI in its operation everyone should have basic level understanding on the matter, together with access to education and learning. However, a third of respondents were simultaneously uncertain or agreed on the claim that AI shouldn't consider employee who don't encounter it on a daily basis. A key finding about the contradiction could possibly be that while it is good to have a certain level of understanding, AI training shouldn't be coerced upon all employees but rather reserved to those who are willing and find the subject interesting.

6.6. Risk management and effects on human resources

The final section of the questionnaire aimed to study respondents' opinions on the potential errors and risks of artificial intelligence, as well as AI's effects on human resources and employment. Similar to the previous sections of the questionnaire, the respondents were presented with a set of claims, to which the respondents could reply with one of the following statements: *I agree, I somewhat agree, I cannot say, I somewhat disagree and I disagree*. In the first part of the section the respondents were inquired about the potential risks and errors of AI. The subject was introduced with following statement:

Artificial intelligence can make mistakes. In this section claims about the risks of the usage of AI are presented.

The distribution of respondent's opinions to the different claims is depicted in Figure 15.

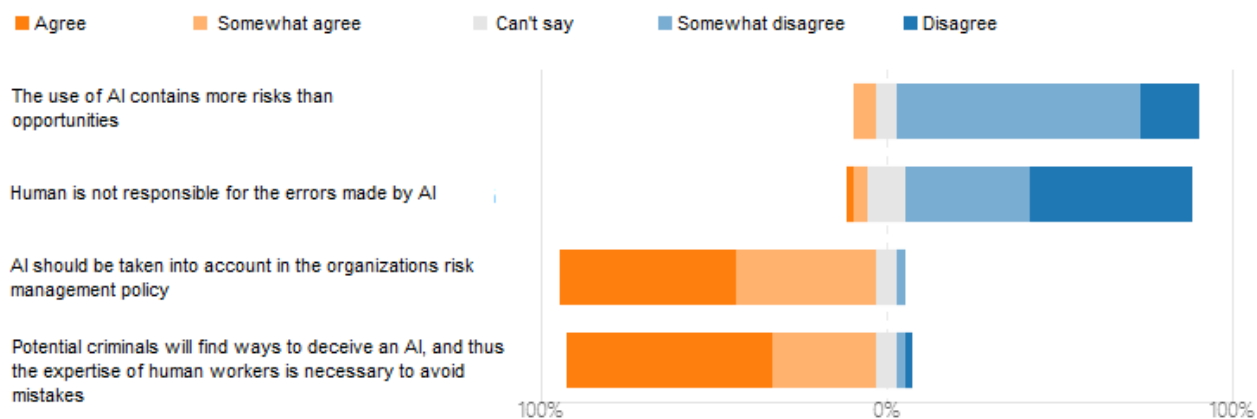


Figure 15. The distribution of responses to the claims on the risks of AI usage

The respondents mostly disagreed with notion that the use of AI would present more risks than opportunities. 87,2 % on the respondents disagreed or somewhat disagreed with this claim, while 12,8 % were uncertain or somewhat agreed. When asked about the responsibility for the errors made by AI, the majority of respondents felt that in the end human is responsible for the mistakes made by an artificial intelligence. While the vast majority (85 %) disagreed, the responses were slightly more mixed on the matter as 10,6 % were uncertain about their stance and altogether 6,4 % agreed or somewhat agreed. The next claim explored the statement that whether the use of AI should be documented in the organizations risk management policy. The claim was met with strong agreement as 91,5 % of respondents agreed or somewhat agreed on the notion. Finally, the respondents were presented with the claim that should AI be deceivable by potential criminals, the expertise of human workers is necessary to avoid mistakes. The respondents strongly agreed with the statement, as 59,6% agreed and 29,8 % somewhat agreed on the matter. However, while the majority agreed on the claim 9,6 % were still uncertain or disagreed with the matter.

It is noteworthy, that while respondents clearly felt that AI offers more opportunities than risks, they simultaneously agreed that in the end human is responsible for the errors made by AI. This reflects to the notion that the use of AI should be embedded to the company strategy, something which the respondents strongly agreed upon. The respondents also firmly believe that human expertise is necessary to avoid AI's mistakes which might hail from deception by potential wrongdoers. This corresponds with the results received in the chapter 4.2, where respondents strongly disagreed on notion that AI is immune to deception by criminals, and with the statement that should the observations contradict each other the human point of view should generally be favored. Furthermore, this indicates a firm believe that human expertise is necessary to solve more complex issues while artificial intelligence is superior to human when handling vast amounts of monitoring data.

The second and final part of the section studied the effects of artificial intelligence to human resources and employment by making four claims on the subject. The subject was introduced with the following statement:

It has been argued that AI would affect negatively to the need of human labor, especially in operational tasks. On the other, one could argue that artificial intelligence has the potential to create new duties and help to allocate human resources to more complex duties. In the next section there are claims about AI's effect on employment and HR.

The distribution of respondent's opinions to the different claims is depicted in Figure 16.

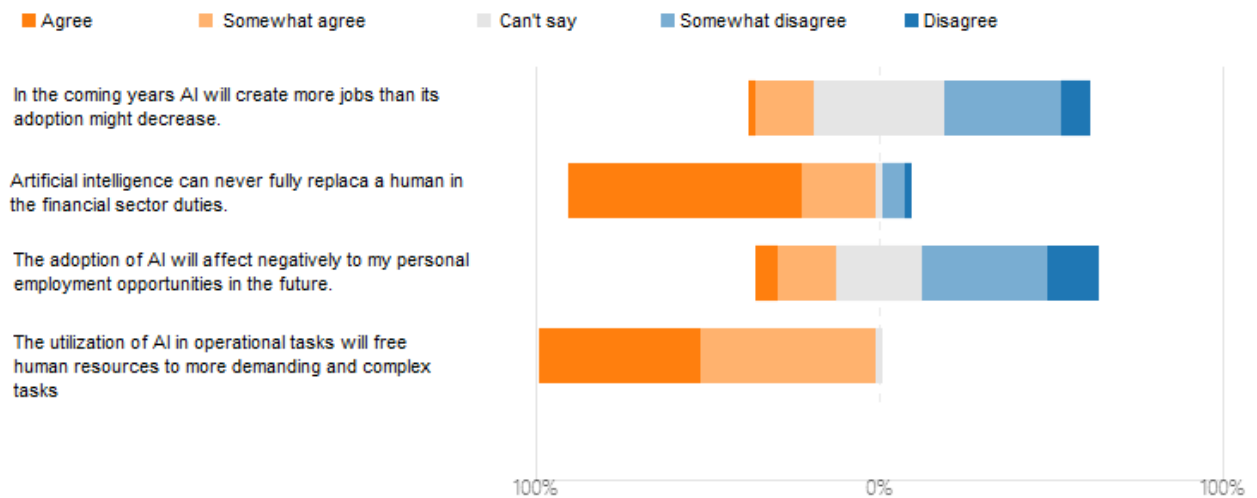


Figure 16. The distribution of responses to the claims on the AI's effects to employment and human resources

The last part of the questionnaire generated more mixed responses than the previous parts. Firstly, the respondents were asked about job creation: Would AI create more jobs in the near future than its adoption decrease? While 42,5 % disagreed or somewhat disagreed that AI would generate more jobs than decrease, 38,3 % were uncertain of their stance. Less than one fifth (19,1 %) agreed or somewhat agreed that more jobs would be created than would be lost due to AI. Despite this, 89,4 % on the respondents agreed or somewhat agreed that AI could never fully replace human in the financial sector duties. When claimed that AI would affect negatively to respondent's future employment, the reception was generally mixed: 14,9 % disagreed, 36,2 % somewhat disagreed, 25,5 % were uncertain, 17 % somewhat agreed and 6,4 % agreed. The fourth and final claim stated that the utilization of AI would free human resources to be allocated to more complex and demanding specialist duties. The claim was met with overwhelming agreement, as 97,9 % agreed upon the notion.

It is clear that whether AI affects human resources and future employment caused a lot on uncertainty among the respondents. The chapter 4.2 of the theoretical part assesses a study made by Pew Research Center in 2014 in which a similar question was presented to respondents. Also then the response was mixed, as altogether 48 percent of respondents believed that more jobs would disappear due to AI than be created by it (compared to the 42,5 %) in the research made for this master's thesis.

7 CONCLUSION

The adoption of solutions based on artificial intelligence will undoubtedly increase in the coming years. The financial industry has globally begun to utilize AI solutions in operational tasks, such as chatbots, customer service, document analysis and the trade of securities. Transaction monitoring, fraud detection and the prevention of financial crime are areas of banking where AI can generate true added value. Compared to human workers, AI is able to process and monitor vast amounts of data and flag suspicious activities efficiently. This said, human expertise is also required in the future when discussing the prevention of financial crime, as artificial intelligence can be prone to deception, errors and unable to interpret complex scenarios which don't fit to the predetermined molds. In contradictory situations the human experience will prove key when combating financial crime. While artificial intelligence provides possibilities, it still demands solid risk management and leadership from the organization wishing to utilize it. The findings on the research part of this master's thesis supports the notion made in the theoretical part which states that larger companies can benefit from clear roles in the AI leadership. Clearly defined roles, open communication and the embedding AI into to the company strategy are ways of creating a culture where human workers and artificial intelligence can thrive.

The research carried out for this master's thesis indicated that artificial intelligence as a concept and its possibilities are generally well known among employees currently working in the prevention of financial crime in the Finnish financial sector. The novelty of the AI based solutions is visible however, as employees have not generally received training on artificial intelligence by their employer – nor have the majority studied the matter independently. This is reflected through the fact that most employees are not aware whether their organization is currently using AI as a tool in their business. Employee training on the subject can potentially provide a major opportunity for financial sector companies to achieve a competitive edge over their competitors. When the solutions based on artificial intelligence become more widespread, the companies with employees familiar with the possibilities can trailblaze the industry due to the achieved intellectual property. The notion that majority of the employees in the case company are not aware whether AI is currently used in the organization is an indication of lacking communication. As the case company has utilized AI in their operations, it is important

and beneficial for the company to raise awareness and enhance the employees skillset on the matter. This affects both the employees professionalism and the general feeling of open communication.

Based on the research for this master's thesis, employees currently working in the prevention of financial crime face the aspect of job creation by AI with great uncertainty. It is generally believed that the widespread adoption of artificial intelligence will not affect the need for human resources in a positive manner. This echoes the theoretical part of the thesis, where the matter is discussed. While the opinions on job creation are generally pessimistic, employees on the field are still optimistic that human workers will be needed alongside AI and that the adoption of AI will not affect negatively to their future employment opportunities. It is noteworthy, that AI is firmly believed to free human resources to more complex specialist duties while AI can carry out operation level duties with great efficiency.

This master's thesis provided a good angle to predetermined research question. While AI can partially replace human workers in basic operation tasks, human expertise is valuable for the organization alongside AI in the future. AI can however shift the focus on what skills are needed in the future from the people employed in the finance, as the understanding of AI, analytics, robotics etc. have the potential to become competitive advantages. Companies could explore the possibility of embedding AI into the company strategy or creating a standalone AI strategy. As employees expect leadership and training on the subject, it has great potential to create significant competitive edge for companies in the field of finance. The target sample used for the research was accurate in answering the research question but limited in number. Therefore, future research on the subject can be carried out by expanding the target sample both in number and in field of expertise. It is probable, that by researching a greater number of respondents working also outside the prevention of financial crime a wider angle and a more diverse point of view could be achieved.

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Questionnaire form

Tekoäly talousrikollisuuden torjunnassa

Tämä kysely on suunnattu finanssialalla talousrikollisuuden torjunnan, rahanpesun estämisen sekä kansainvälisten pakotteiden parissa toimiville henkilöille. Kysely on osa YAMK-opinnäytetyötä ja kyselyn vastauksia käytetään opinnäytetyön tutkimusosan aineistona. Tärkeänä osana opinnäytetyötä on johtamistyö, ja valtaosa kysymyksistä käsittelee tekoälyjohtamista ja tekoälyä strategisena osana organisaatiota.

Kyselylomake pitää sisällään monivalintakysymyksiä ja väittämiä. Kyselytutkimus toteutetaan täysin anonymisti, eikä opinnäytetyössä viitata työntekijöihin nimeltä. Vastaajiin viitataan opinnäytetyössä yksinkertaisesti finanssialalla työskentelevinä ammattilaisina. Kyselyn tuloksia säilytetään kunnes opinnäytetyö on hyväksytty ja julkaistu, jonka jälkeen kaikki mahdolliset sähköiset ja fyysiset kopiot vastausaineistosta hävitetään asianmukaisesti.

Kyselyyn vastaamisessa menee noin 10 minuuttia. Kiitän jo etukäteen ajastanne ja vastauksistanne, apunne on ensiarvoisen tärkeää opinnäytetyön onnistumisen kannalta!

Patrik Ekeboom
OP Turun Seutu & TUAS Master School

Perustiedot

Tässä osiossa kartoitetaan vastaajien perustietoja.

1. Sukupuoli

- Mies
- Nainen
- En halua vastata

2. Ikä *

- 18-25
- 25-35
- 35-45
- 45-55
- 55-65+

3. Työkokemus finanssialalla *

- 0-2 vuotta
- 2-5 vuotta
- 5-10 vuotta
- 10-15 vuotta
- 15-25 vuotta
- 25-35+ vuotta

4. Asema organisaatiossa *

- Työharjoittelija
- Työntekijä
- Asiantuntija
- Esimies- tai johtotehtävissä
- Muu / En halua vastata

5. Koulutustausta *

- Peruskoulu
- Ammatillinen koulutus
- Ylioppilas
- Alempi korkea-aste
- Ylempi korkea-aste

Tekoäly käsitteenä

Tässä osiossa kartoitetaan vastaajien aikasempaa ymmärrystä tekoälystä konseptina

6. Seuraavat käsitteet ovat minulle työni kautta tuttuja, tai olen kuullut asiasta puhuttavan työssäni *

- Tekoäly
- Koneoppiminen
- Algoritmi
- Analytiikka
- Robotiikka
- Neuroverkot

7. Tiedossani on, että tekoälyä hyödynnetään nykyisessä organisaatiossani *

- Kyllä
- Ei

8. Olen saanut nykyisen/aikaisemman työpaikkani kautta koulutusta tekoälyyn liittyen *

Kyllä

Ei

9. Olen opiskellut tekoälyä itsenäisesti (esimerkiksi Elements of AI tai vastaava) tai lukenut aiheesta *

Kyllä

Ei

Tekoäly talousrikollisuuden torjunnassa

Tässä osiossa esitetään väittämiä liittyen tekoälyn käyttöön talousrikollisuuden torjunnassa, ja selvitetään vastaajien näkemyksiä ja asenteita tekoälyn käyttöön liittyen.

10. On väitetty, että tekoälyn avulla transaktioiden ja liiketoimien monitorointi tehostuisi huomattavasti. Mitkä seuraavista väittämistä pitävät mielestäsi paikkansa, ja mistä olet eri mieltä? *

	Samaa mieltä	Jokseenkin samaa mieltä	En osaa sanoa	Jokseenkin eri mieltä	Eri mieltä
Tekoäly on tulevaisuudessa avainasemassa talousrikollisuuden torjunnassa.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tekoäly ei ole harhautettavissa mahdollisten rikollisten toimesta.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tekoäly ei tee virheitä transaktioiden tai liiketoimien monitoroinnissa.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tekoälyn ja ihmisen havaintojen ollessa ristiriitaisia, tulee luottaa tekoälyn tekemiin ratkaisuihin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tekoäly kykenee käsittelemään enemmän dataa ja hälytyksiä kuin harjaantunutkin ihminen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Tekoälyjohtaminen finanssialalla

Tässä osiossa selvitetään, että millaisia odotuksia ja näkemyksiä vastaajilla on tekoälyyn liittyvästä johtamistyöstä ja koulutusmahdollisuuksista finanssialalla.

11. Tekoälyjohtaminen on suhteellisen moderni käsite. On esitetty, että organisaatioissa joissa tekoälyratkaisuita hyödynnetään, tulisi myös asiaan liittyvät johtajaroolit olla tarkkaan harkittu ja viestitty. Seuraavassa osiossa on väittämiä liittyen tekoälyyn ja johtamistyöhön. *

	Samaa mieltä	Jokseenkin samaa mieltä	En osaa sanoa	Jokseenkin eri mieltä	Eri mieltä
Organisaatiossa tulisi olla nimetty tekoälyjohtaja	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tekoälystä vastaavat henkilöt tulisi olla avoimesti viestitty läpi koko organisaation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tekoälyn hyödyntämisen ja tekoälyyn liittyvien roolitusten tulisi olla selkeästi kirjattu yrityksen strategiaan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tekoälyn vaikutuksista operatiivisiin työtehtäviin tulee viestiä johdon toimesta avoimesti	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Tekoölyyn liittyvät konseptit saattavat olla vaikeaselkoisia ja hankalasti hahmotettavia kokonaisuuksia. Toisaalta syvempi ymmärrys asiaan ei ole välttämättä tarpeellista, jos asialle on nimetty erilliset vastuuhenkilöt. Seuraavassa osiossa esitetään väittämiä tekoölyyn liittyvistä koulutusmahdollisuuksista ja rooleista finanssialan organisaatiossa.

	Samaa mieltä	Jokseenkin samaa mieltä	En osaa sanoa	Jokseenkin eri mieltä	Eri mieltä
Tekoölyä hyödyntävässä organisaatiossa kaikilla tulisi olla perustason ymmärrys asiaan liittyen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Työnantajan tulisi huolehtia, että halukkailla on mahdollisuus kouluttaa itseään tekoölyyn liittyen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tekoöly ei kosketa työntekijöitä, jotka eivät törmää siihen päivittäisessä työssään	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Tekoäly voi tehdä virheitä. Tässä osiossa esitetään väittämiä liittyen tekoälyn käytön riskeihin.

	Samaa mieltä	Jokseenkin samaa mieltä	En osaa sanoa	Jokseenkin eri mieltä	Eri mieltä
Tekoälyn käyttö sisältää enemmän riskejä kuin mahdollisuuksia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ihminen ei ole vastuussa tekoälyn tekemistä virheistä	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tekoälyn tulee olla huomioitu yrityksen riskienhallinnallisissa linjauksissa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Talousrikolliset keksivät keinot harhauttaa tekoälyä, ja siksi ihmisen asiantuntemus on tarpeellista virheiden välttämiseksi	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Tekoäly ja työllistyminen

Tässä osiossa selvitetään vastaajien näkemyksiä tekoälyn vaikutuksista työllisyyteen ja työtehtävien säilyvyyteen.

14. Tekoälyn on pelätty vaikuttavan negatiivisesti ihmistyövoiman tarpeeseen, varsinkin suorittavissa tehtävissä. Toisaalta tekoälyn voidaan ajatella synnyttävän myös uusia työtehtäviä, tai auttavan työntekijäresurssien keskittämisessä vaativampiin tehtäviin. Seuraavassa osiossa esitetään väittämiä liittyen tekoälyn työllisyysvaikutuksiin.

	Samaa mieltä	Jokseenkin samaa mieltä	En osaa sanoa	Jokseenkin eri mieltä	Eri mieltä
Tekoäly tulee lähivuosina synnyttämään enemmän työpaikkoja kuin mitä sen käyttöönotto vähentää	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tekoäly ei voi koskaan kokonaan korvata ihmistä finanssialan tehtävissä	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tekoälyn käyttöönotto tulee vaikuttamaan negatiivisesti omaan työllistymiseeni tulevaisuudessa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tekoälyn käyttäminen suorittavissa tehtävissä vapauttaa ihmisten aikaa vaativampiin asiantuntijatehtäviin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>