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ARTIFICIAL INTELLIGENCE IN FINANCE

Understanding how automation and machine learning is transforming the financial industry

ABSTRACT

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The main aim of this study was to examine the influence of artificial intelligence on modern world, especially in the field of finance. This research focuses on application of artificial intelligence, its challenges, opportunities and its impact on jobs and functions. This thesis consists of the results of qualitative document analysis on the topic of artificial intelligence in finance.

The theoretical part of this thesis discussed the general concept including present, past and future of artificial intelligence along with the focus on its benefits and challenges. The researcher likewise investigated the global adoption of artificial intelligence when studying the artificial intelligence investment and start-ups in Europe. The method of data collection used for this thesis was document analysis of qualitative research method. The researcher evaluated twenty electronic documents and publications regarding artificial intelligence in finance. The application and impact of artificial intelligence in finance was explored while studying how artificial intelligence is changing the financial service industry.

This study found out that many financial sectors have been benefiting greatly by implementing different artificial intelligence applications. This thesis points that there is lack of skilled talents in the field of artificial intelligence even though several routine and manual tasks performed by humans have been replaced by automation. This research concludes that throughout the value chain in financial services whether it is processing, analytics or investing, there's going to be more and more technology that can get things done.

Key words Artificial intelligence, business, employment, finance, future, machine learning, technology.

CONCEPT DEFINITIONS

AI	Artificial Intelligence
ML	Machine Learning
NLP	Natural Language Processing

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1 INTRODUCTION

Artificial Intelligence (AI) is a significant advancement in the technology that has everyone talking on its exciting promises in the technology world. When it comes to AI, it also includes its areas such as machine learning (ML) and profound learning. While AI could be described as the ability of machines to make intelligent human-like decisions and improve over time, ML involves building models, mostly statistical models that give predictive results and can be developed. Many who are not very informed about this area associate AI with robots that imitate human operations and intelligence in their working. This is of course since film industries have taken their time in convincing us AI refers to robots. While this is true, there is more to it from face recognition, fingerprints recognition, chatbots, pattern recognition, predictive business models and sentimental analysis. Previously, AI integration in the software development was only possible to the large companies that had the resources to hire highly qualified professionals. Over time, AI frameworks with high abstraction level have been developed, and with few coding lines in any programming language of choice, one can be able to come up with an intelligent system.

The main aim of this thesis is to investigate how AI is being implemented in different industries, particularly in the field of finance. This thesis will discuss the following research questions: What are the opportunities and challenges that come with AI? What are the uses of AI in financial sector? How is AI adopted globally and in Finland? What impact will AI have in the jobs and functions of finance profession? How does the future of AI look like? What steps should organizations take to succeed in the competitive era of technology? Document analysis of qualitative research method will be used as an approach to be solving these questions.

A lot of modern smartphone devices can recognize faces and fingerprints and use that as a primary security check. AI integration has also been used in the banking system in fraud detection where they spot abnormal operations and raise the alarm. In the business world, many business applications today have been built using AI in producing predictive models that could be improved over time. The predictive models could be integrated into real estates prices estimations, stock exchange prices, financial and accounting models, market prediction models and to some extent sentimental analysis which gives how consumers react to a given product. Its integration in the business world has led to improved sales where

Amazon records to over 60% sales from its recommendation systems. With the increase in online customers from large companies, replacing human support with chatbots has been a great success whereby these Chabots are replacing human workforce in providing automated and real-time support.

Several industries are turning to AI to do tasks that were earlier accomplished by people. Financial services industry incorporates AI to process massive data, locate fraud by identifying unusual operations, communicate online with customers, and perform several other essential functions. With regards to facial reorganization, voice recognition and ML there are extremely some great beneficial cases. New technologies are providing great benefits to enhance customer value propositions to drive efficiency and effectiveness in the organization.

AI tools can bring essential benefits to the world of finance, which enable some tasks to be automated, which give a boost for analytical capacity in comparison with traditional techniques that are now fast becoming outdated. But these in spite of the life-changing benefits AI applications offer, they also come with different limitations, which can make them not be suitable for performing some activities, coupled with a range of risks that have to be adequately managed appropriately.

This thesis is organized in the following way. In Chapter 2, we introduce the term "AI", its types and its evolution over the years. Chapter 3 deals with the conceptual analysis of AI which studies the opportunities and challenges of AI. In Chapters 4 and 5, we continue the research by discussing the adoption of AI globally as well as in Finland. Chapter 6 is mainly based on the description of the research process used for this thesis. Document analysis of qualitative analysis is used for this research. It comprises of a list of electronic documents and publications that are used for the research. Chapter 7 analyzes the results of the study on the topic of AI in finance. This chapter is based on the study of how AI is changing the financial service industry, the applications of AI in the financial sector and its impact. Required recommendation is presented for the businesses that are planning to adopt AI in their organizational function. Chapter 8 concludes this thesis and summarizes all that has been done in the study.

2 CONCEPT OF ARTIFICIAL INTELLIGENCE

While the origin of AI can be traced over fifty years back, its possibilities have significantly risen in today's world. This has spurred the design of a variety of its practical applications, in the financial sector in addition to other areas of specialization.

In this chapter, we begin by introducing the concept of AI and brief discussion about its subfields. The history, present and future of AI is discussed on the "Evolution of AI" topic. Some of the learning algorithm which is used to make machine smart is studied in the types of AI.

2.1 Introduction to artificial intellligence

AI is a wide term that relates to advancements that make machines "intelligent." John McCarthy coined the term AI in 1956. There are numerous different terms related to AI, for example, deep learning, ML, image recognition, natural language processing (NLP), cognitive computing, cognitive augmentation, machine augmented intelligence, and augmented intelligence. AI, as used here, includes all of these ideas. (Yaninen 2017.)

AI's aim is to develop an intelligent and autonomous system. ML is an AI subset that enables the computer to learn and improve its understanding automatically without explicit programming. There are two methods AI operates, one is symbolic based, and another is data based. For the data base side called ML, we need to feed the machine lots of data before it can learn. Machine can learn in many more dimensions. Machine can look at lot of high dimensional data and determine patterns. Once these models are learned, they can create forecasts that people cannot even approach. (Takyar 2018.)

Subfields of Artificial Intelligence

FIGURE 1. Subfields of AI (Adapted from Takyar 2018.)

The objective of AI research includes reasoning, knowledge representation, planning, learning, NLP, perception and the ability to move and manipulate them. General intelligence is one of the long-term objectives of AI. Statistical methods, machine intelligence and typical symbolic AI are included in the approaches. Many tools in AI are used, including search optimization, artificial neural networks and statistical, probable and economical approaches. The field of AI is based on information technology, mathematics, linguistics, psychology, philosophy as well as many other areas.

Researchers in the fields of statistics and computing have created advanced techniques for obtaining insights from large data sets that are disparate. Data may be categorized into various kinds and could be structured or unstructured data. With these techniques, it becomes possible to leverage the capacity of

machines to accomplish tasks, like NLP and recognizing images, by experiential learning. The application of cognitive tools to perform duties that traditionally involve human sophistication is widely referred to as AI. (Financial Stability Board 2017.)

AI is constantly developing for many distinct sectors. There are endless applications for AI. The technology could be used in various industries and sectors. In healthcare, AI is being tested and used for dosing medicines and various treatments in patients and operating surgery. AI is also used to identify and mark banking and finance activities, such as uncommon use of debit cards and big account deposits, all of which assist a bank's fraud unit. Applications of AI are also used to simplify and facilitate trading. This is achieved by facilitating the estimation of production, request and price of stocks. (Investopedia 2019.)

2.2 Types of artificial intelligence

In spite of the point that AI is without a doubt multifaceted, there are specific types of AI under which extended categories fall. There are many terms and definitions in AI that makes it hard to explore the difference between categories, subsets, or variety of AI and each one of them are different ideas. Some subsets of AI incorporate ML, big data and NLP. However, in this segment, we cover the four main types of AI: reactive machines, restricted memory, mind theory, and self-awareness.
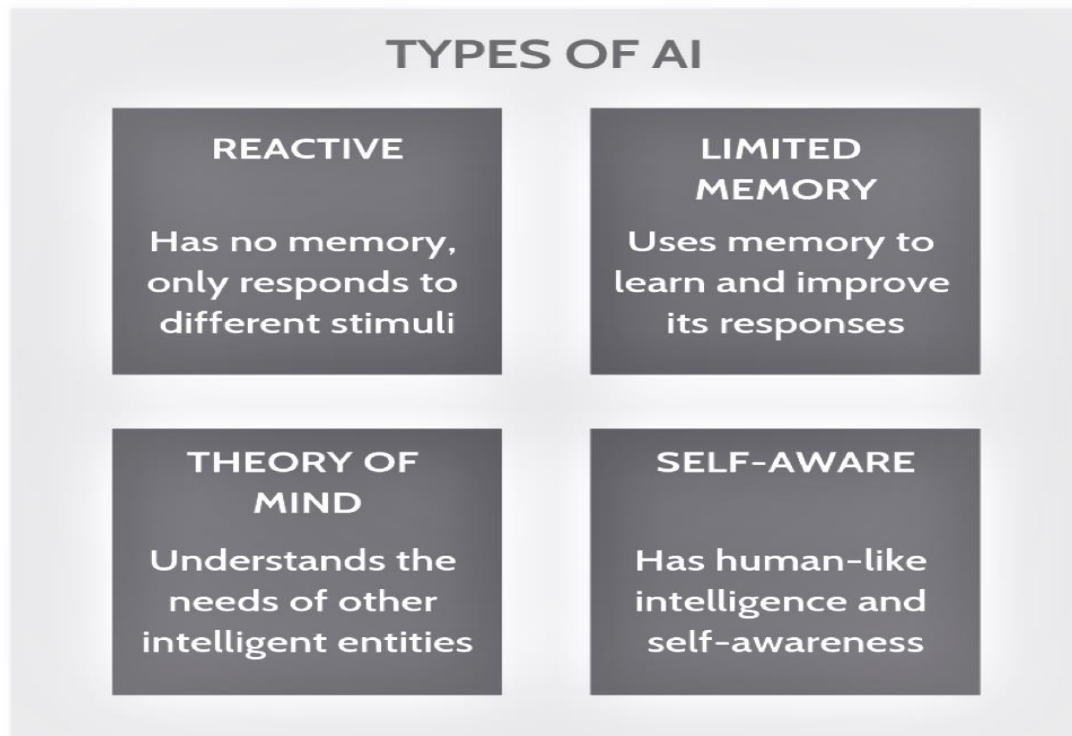
FIGURE 2. Types of AI (Adapted from Joshi 2019.)

These four types of AI involve smaller aspects of the general domain of AI.

Reactive machines are fundamental since they do not store 'memories' or use past encounters to decide future activities. They basically look at the world and respond to it. IBM's Deep Blue, which won against chess grandmaster Kasporov, is a reactive machine that sees the pawns on a chess board and responds to them. It cannot allude to any of its prior experiences and cannot improve with training. Google AlphaGo which won against human Go champion is another example of reactive machine. (Ray 2018.)

Limited memory consists of ML designs that draw understanding from information, stored data or activities that have already been learnt. Unlike reactive machines, restricted memory learns from the past by watching activities or information that have been given to it in order to create experience. Almost all apps we know are in this AI class. Limited memory computers can maintain information for a brief time period. Many vehicles, chatbots and digital private assistants use Limited Memory technology. (Reynoso 2019.)

Theory of mind has the capability to understand thoughts and emotions which affect human behavior. This type of AI can comprehend feelings, motives, intentions, expectations and can interact socially. Sophia is a humanoid bot invented by Hanson Robotics. (Yaninen 2017.)

Self-aware machine can make depictions about itself. They are conscious of their inner states, can forecast the emotions of others, and can produce abstractions and inferences. They are the future generation of machine: super intelligent, sentiment and conscious. The question whether a device can really be self-conscious or "aware" is better to leave for philosophers. (Yaninen 2017.)

2.3 Evolution of artificial intelligence

The world has seen four significant revolutions that have altered its whole face. The very first revolution happened in 1784 when the world's first steam engine was launched. The second was when electricity was founded in 1870. The third was in 1969 when IT was introduced to the world and the fourth is the AI revolution we're currently witnessing. The current revolutionary age is rooted in intense automation and worldwide connectivity which requires AI. (Jenner 2017.)
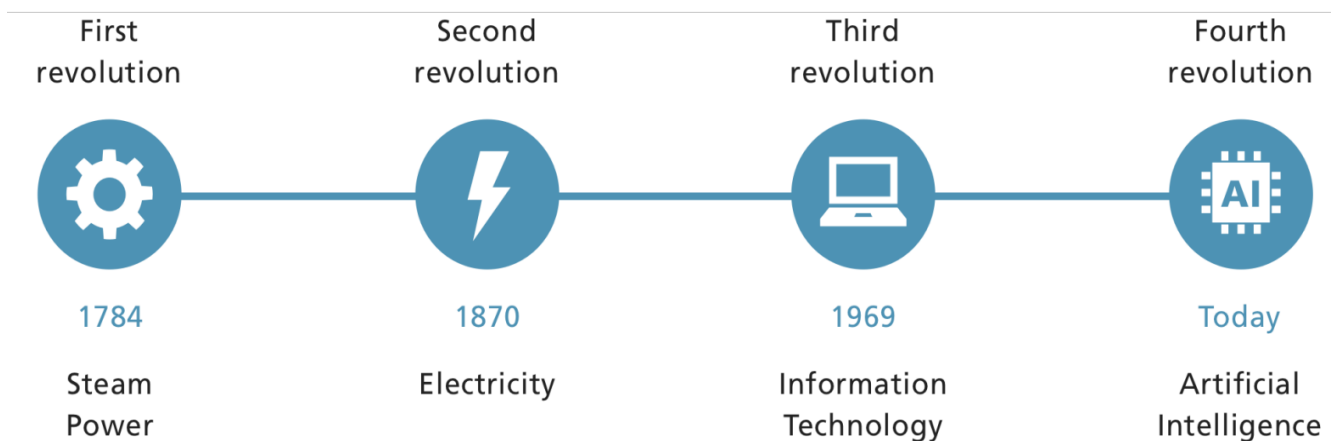
FIGURE 3. The fourth industrial revolution (Adapted from UBS 2018.)

The First Industrial Revolution utilized water and steam capacity to automate production. The Second utilized electric capacity to make large scale manufacturing. The Third utilized electronics and data innovation to computerize generation. Presently a Fourth Industrial Revolution is expanding on the third, the computerized revolution that was happening from the middle of the last century. It is portrayed by a

combination of advancements that blurs the borderlines between the physical, computerized, and bio-logical circles. (Schwab 2016.)

AI is certainly not a new innovation; its narrating roots go far back to Greek artifacts. But it was not exactly a century back that the technological revolution began, and AI went from fiction to entirely conceivable reality. Alan Turing, mathematician and WWII code-breaker, is generally credited as being one of the main individuals to spring up machines that "think" in 1950. He even invented the Turing test, which is used today, as a guideline to decide a machine's capability to "think" as a human. Despite the fact that his thoughts were disparaged at that time, they set the wheels in movement, and the expression "AI" became popular in the mid-1950s after Turing died. (Shani 2018.)

Alan Turing proposed that if people utilize data and reason to resolve issues and take choices, why can computers not do the same? Despite the fact that Turing described machines and how to test their knowledge in his paper Computing Machinery and Intelligence in 1950, his discoveries did not progress. The fundamental problem in development was the issue of PCs. Before any further development could occur, machines could perform orders, yet they could not save them. AI was in trouble in the early 1970s. Millions were invested, with little to demonstrate. The industry's funding has been reduced, leading to the so-called AI winter. Financing was likewise an issue up until 1974. By 1974 PCs thrived. They were presently quicker, inexpensive and ready to store more data. During the 1980s AI study backs up with an extension of funds and algorithmic instruments. John Hopfield and David Rumelhart promoted "deep learning" systems which enabled PCs to acquire knowledge from experience. Then again, Edward Feigenbaum presented master frameworks that mirrored the basic leadership procedures of a human expert. It was not until the 2000's that many of the milestone objectives were accomplished, and AI flourished despite of the government support and public recognition. (Aguis 2019.)

As the fourth industrial revolution plainly emerged in the 21st century, so did the approach of AI. Around 2,000 new businesses worldwide now have AI as a centerpiece of their plan of action. The basis has been laid to move forward with headline-grabbing news like Google's AlphaGo overcoming the Go world champion or Baidu's personal assistant Duer receiving orders at KFC restaurants in China. (UBS 2018.)

In the present day, AI study is continuous and keeps on developing. China is expected to become the largest worldwide source of AI in the next four years, assuming control over the United States' second lead in 2004 and it is rapidly surrounding Europe's main spot. Europe is the biggest and most varied

region in terms of global cooperation in AI studies. India is the third biggest in the field of AI research after China and the United States. AI is so essential and developed that a Japanese Venture Capital company has gained its own reputation by being the first company to appoint an AI board member to forecast market trends quicker than humans. (Aguis 2019.)

The Fourth Industrial Revolution "describes the changes to the way we live, go to work and relate each other due to the implementation of cyber-physical systems, Internet of Things and the Internet of Systems." In near future individuals can identify and design personalized products and facilities they demand for industries from transport, banking, investment and insurance. Technology will probably be implemented across all governmental organizations and legal systems with just the most complicated cases involving a human judge and complete trial cases. Autonomous vehicles will begin showing up in numerous urban areas over the world. (Aguis 2019.)

It took a few decades for individuals to perceive the genuine power of AI. High profile investors and physicists, as Elon Musk, founder of Tesla, and Stephen Hawking, are proceeding with the discussion about the potential for AI innovation. While the discussion goes to potential doomsday situations, there is an agreement that when utilized for good, AI could fundamentally change the course of human kind history. Furthermore, that is particularly true with regard to big data. (Shani 2018.)

3 ARTIFICIAL INTELLIGENCE ANALYSIS

AI is not a fiction or something from the movie or books, it's the technology that experts, businesses, and the average individuals are using every day. Utilizing AI opens door for many opportunities that could be used for businesses and economy to boost innovation and productivity. Besides having benefits AI can have some challenges.

There are plenty of hang-ups concerning AI, despite shifting from fiction to everyday fact. Some fear AI whereas other discuss what wonders AI can bring in coming years. Many professions and demand for certain skills will decline and others will grow as machines will be the tool that worked along people. AI and other contemporary techniques have the ability to empower and improve our community, but they also pose obstacles to our principles and standards. This briefing puts together challenges and opportunities of AI in all sectors.

3.1 Artificial Intelligence opportunities

Through the different accomplishments AI has made during the last decade, it is evident how AI has affected the way that we believe and shape future advancements. Businesses integrate AI rapidly into their daily routines. This has brought rise to a more streamlined method for leading business and eventually enables the firm to procure most financial rewards, as well as improving their general profile and the organizational practices of their workers.

AI is currently utilized in different field, from financial service sector to the health sector. The sort and type of the AI required rely upon the task. AI can improve business performance in sectors consisting of predictive maintenance, where AI ability to analyze large number of data from images to audio can efficiently uncover abnormalities in airplane engines or mistakes made in assembling lines. In logistics, it can adjust delivery traffic, improving fuel efficiency and reducing delivery times. Applications like voice recognition is an effective tool in customer service management. In sales, customer demographic and transaction data with social media can help produce personalized recommendations for customers, which many retailers use to their advantage. (Manyika & Bughin 2018.) In the coming years, financial institutions can achieve substantial benefit by using AI to develop new competitive policies across their value chains. AI enables for immediate analysis and decisions (e.g. credit adjudication), enabling loans

to be delivered in actual moment. AI can improve underwriting effectiveness by decreasing mistake rates, integrating new data sets and automating risk modeling.

In the time of aging problems and falling birth rates for long term economy wellbeing, productivity is important. Lately many developed countries economies have been declining production wise. Therefore, AI could fill this gap by enhancing production. AI can increase innovation, enabling businesses to enhance their economies by using existing products more effectively and have more time to produce innovative products and services in the long term. In addition, AI can simplify more efficient e-commerce features by enabling the use of data flows across borders (minimizing trade boundaries). Practices mentioned above thus increase growth in economy and capital can be relocated by investing in other sectors and enhancing production in economy. (Manyika & Bughin 2018.) AI can anticipate and prevent adverse effects from predatory policies, stock quote instability, and illegal operations in the finance industry. (World Economic Forum 2018.)

The biggest benefits that AI will provide will be noticed probably in labor market by enhancing production through substitution, increasing contributions. AI will increase capabilities in labor market by giving workers time to focus in more challenging tasks instead of tedious tasks and by so creating new jobs associated with AI. Utilizing AI technologies activities where workers could make mistakes or are working in unsafe conditions could not only make working environment safer but enabling workers to become more capable as well. According to some research, replacements of human drivers by automatic AI drivers could reduce crashes by saving millions of lives every year. Utilizing AI can also replace workers working in oil fields and different mines which is unsafe environment for humans. By using AI technologies in these kind of industries more human lives could be in safe. (Manyika & Bughin 2018.)

Computers can process data more rapidly than people. This is the reason that IBM's Watson beat the Jeopardy candidates with faultless precision and speed. While the human mind has a wide range of capabilities, machines are intended to process data rapidly and precisely. The human mind basically cannot process data like the cutting-edge developments of the present computer chip industry. Therefore, organizations are hoping to integrate these advancements into their present frameworks. This demonstrates the requirement for AI and its processing capabilities by the magnitude of quality and quantitative information that companies handle daily. (Jaslove 2017.)

Benefit	Explanation	Examples
Innovation	New products and services.	• Autonomous vehicles • Voice-controlled devices
Efficacy	Perform tasks more effectively.	• Fraud detection • Customer segmentation
Velocity	Complete tasks more rapidly.	• Legal document processing • Manufacturing process optimisation
Scalability	Extend capabilities to additional market participants.	• Automated medical diagnosis • Automated executive assistants

FIGURE 4. AI benefits (Adapted from MMC Ventures 2019.)

The advantages of AI can be summarized in terms of innovation, efficacy, velocity and scalability. These advantages will have a major impact on economic systems, employees, consumers and community. (MMC Ventures 2019.)

3.2 Artificial Intelligence challenges

AI without a doubt has changed the business world. However, in spite of the exceptional ways that machines are changing the business, there are some parts of the business world that essentially cannot work without human cooperation. AI could possibly harm the reputation of the firm in the event that it is not utilized in the best possible way.

Despite the progress AI has made during recent years, still many problems lay ahead. Still more scientific breakthroughs are needed. Progress so far has been many times referred as "narrow AI" where techniques are made to solve certain types of problems for example for language processing. AI is facing many challenges, although many solutions have been provided to deal with them. AI needs large amounts of human effort to obtain data needed for supervised learning in which data and other techniques could be used to tackle different issues. Organizations will need plenty of data capture and governance

practices and up to date technological capabilities to be prepared to create the necessary infrastructure. Overcoming issues such as making sure that perspectives from AI are based on behavior of people and procedures of the firm is barrier itself. (Manyika & Bughin 2018.) Because of their complexity, intelligent systems can be costly, and it can incur additional repair and maintenance costs. The computer costs for training data designs etc. can also be an extra cost. (Frue 2019.)

It is also challenging to get enough and wide amount of data for training, for example creating or getting enough data from clinical trials to forecast treatment in healthcare. These deep learning techniques create challenge as the initiative is for the technique to show which circumstances led to certain decisions or prediction and how. Another challenge is creating generalized learning techniques, because AI is facing difficulties taking their experience from one level of condition to another. Many industries and firms lag in adopting AI into their systems. Investing in AI could also bring some negative factors into the play that could downgrade positive economic impacts. This could mean increasing competition moves market share from nonadopters to front runners, managing labor market shifts could be costly and loss of consumption for citizen during times of unemployment and foremost the implementation costs associated with using AI. On talent point of view, building and optimizing profound networks remains an art that requires expertise. Demand for these skills surpasses supply, according to some researches, less than 10 000 individuals have skills required to solve serious issues posed by AI and competition for them is intense. Organizations considering options of building their own AI solutions will need to think about whether they possess the requirements to attract and keep people with these special skills. (Manyika & Bughin 2018.)

Organizations strive to provide big amounts of high-quality information needed to train AI effectively across their own and unused datasets. Many useful AI apps need complicated, profound and broad-based incorporation into the company and not just easy "bolt on" implementations. AI essentially redefines the position of talent in financial organizations and regularly requires human capital to change at a pace that surpasses any past changes. Current legislative structures were established on the basis of a progressively outdated financial ecosystem, generating major uncertainties for organizations wishing to implement AI. (World Economic Forum 2018.)

AI will have other ethical and societal problems arising, among these are misuse, unplanned consequences and questions regarding data privacy. This could be in form of surveillance and military practices used in social media and politics which could lead to consequences such as criminal activity. Problems are also rising regarding users with malicious purposes for example cybersecurity. Some issues are

directly linked to how algorithms can be introduced or implemented by the way information are trained. Privacy of personal information is also raising some questions if AI will be implemented heavily in some industries. This has led to general data protection regulations in some countries which means more strict requirements to be able to collect data and allows people right to want their data to be forgotten and object the collection of data and for organizations to strengthen supervision regarding collection, control and processing data by fines if rules are not met. Not to mention cybersecurity threats that could manipulate election results and uses of big scale frauds raises concerns as well. (Manyika & Bughin 2018.)

So, it is found that the cost, availability of data, skills shortage and ethical issues are some of the main challenges of AI which can be faced by any field or sector.

4 ARTIFICIAL INTELLIGENCE ADOPTION GLOBALLY

As organization in every industry are starting to think about whether they need AI in their products, how to go about integrating it and what it means for the future of their business. So, in this chapter we will study about the adoption of AI by different business and sector globally. We also discuss briefly about the AI startups in Europe and the investment on AI.

AI may be technology's largest paradigm shift. Over the span of three years, the extent of companies with AI projects will have increased from one of every twenty-five to one out of three. Adoption of AI-based plug-and-play facilities from worldwide technology vendors and a flourishing community of AI-led software providers has been facilitated by the previous paradigm shifts into cloud computing. Large businesses are increasingly embracing AI. In 12 months, AI adoption has tripled. One out of seven large firms have embraced AI; in two years, 66% of enormous firms will have live AI initiatives. (MMC Ventures 2019a.) The adoption of AI is not fully established yet but is very much in progress.

Enterprise plans to deploy AI

| 9% | 29% | 25% | 23% | 14% |
| No interest | Plan to deploy in 2 to 3 years | Will deploy in 12 to 24 months | Will deploy in next 12 months | Have already deployed |

Base: All answering, n = 2,882. What are your organisation's plans in terms of artificial intelligence?
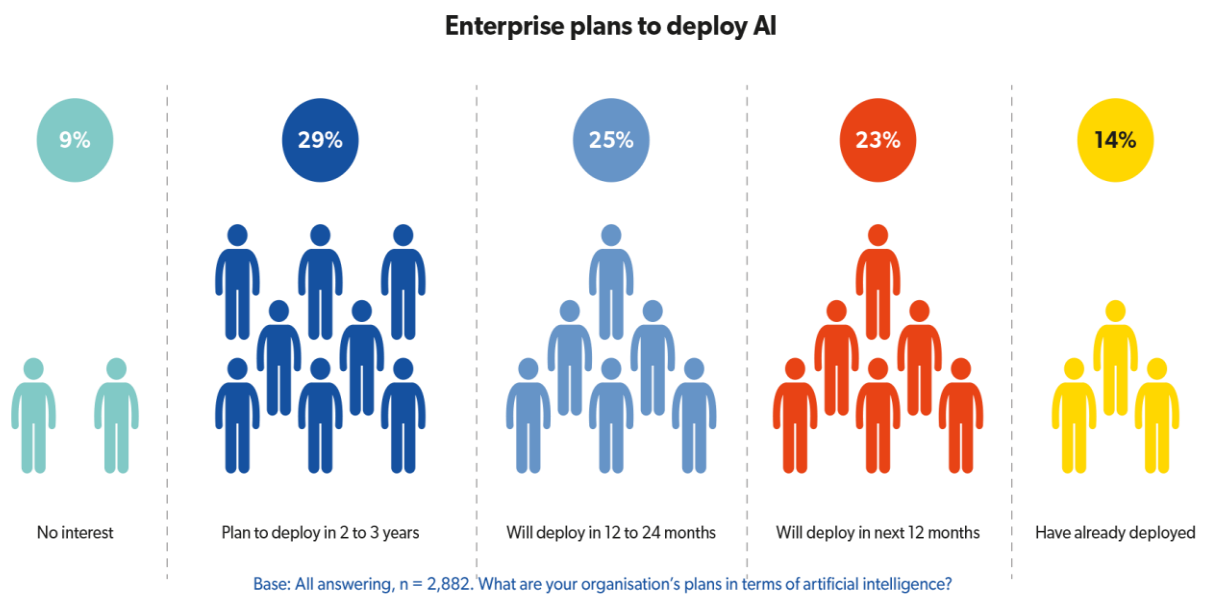
FIGURE 5. Enterprise plans to deploy AI as of January 2019 (Adapted from MMC Ventures 2019a.)

While AI implementation has risen in every region, Asia / Pacific businesses are the most proactive in AI implementation. Chinese businesses are leading AI adoption in Asia / Pacific. The main hubs are

Beijing, Shanghai, Guangdong, Zhejiang and Jiangsu. China released its "Next Generation AI Development Plan" in 2017. A three-step plan for being leader in AI by China and Chinese companies, the roadmap looks out to: building Chinese competitiveness in AI by 2020; bringing AI breakthroughs by 2025; and strengthening global AI management by 2030. (MMC Ventures 2019a.) As AI is adopted, the abilities that businesses and companies organizational structure have will alter. Creating strategy for AI with clear benefits, finding people with matching skills, overcoming variety of challenges posed by end-to-end deployment and lack of commitment and ownership towards AI in case of leaders are some of the challenges to adopting AI.
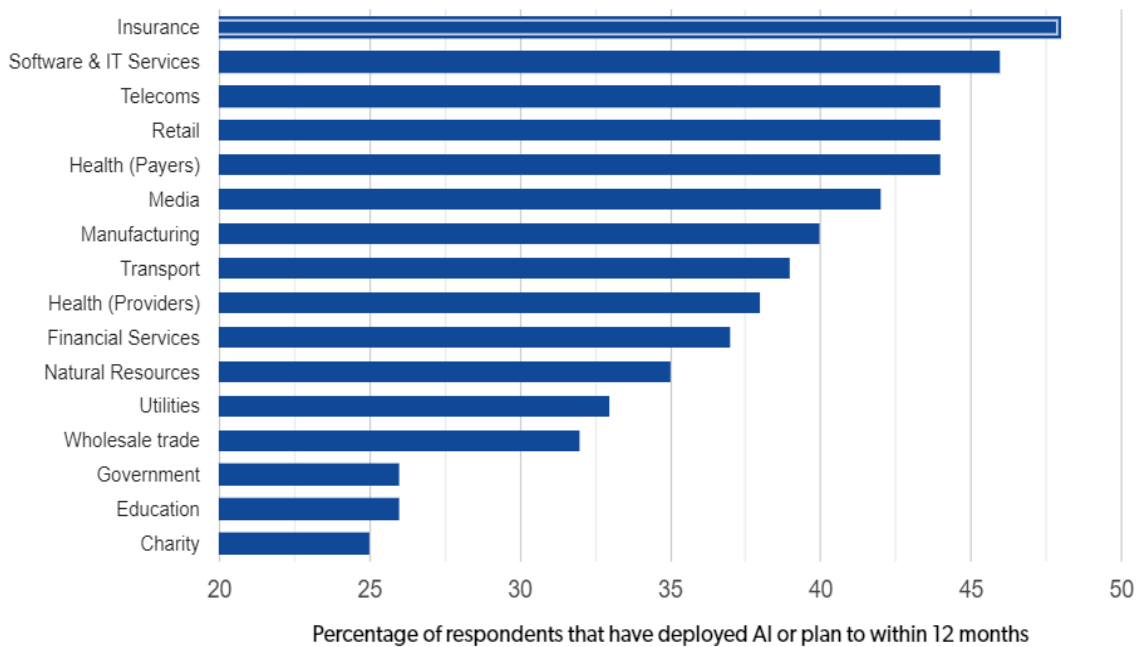
FIGURE 6. Sector adoption of AI as of January 2019 (Adapted from MMC Ventures 2019.)

The high adoption rates for finance, technology & telecommunications, retail, healthcare and media reflect the convergence of opportunities and commitment. AI provides comprehensive value creation capacity in these sectors. Members in the above sector are additionally, regularly, open to connecting with AI. (MMC Ventures 2019a.)

Government offices, education and charitable organizations fall behind in AI adoption. The percentage of insurance firms that have taken or plan to take up AI within next year is 10 percent greater than that

of many financial service firms. In the health industry, payers are more involved with AI than suppliers. AI-based fraud analysis is more effective in detecting dishonest activity than traditional, rules-based systems, is now the third most popular AI app and catalyzes adoption among insurers and healthcare payers.

Europe has 1,600 software companies in the early stages of AI. Entrepreneurship on AI is growing mainstream. In 2013, one out of fifty new start-ups grasped AI. Today, one out of twelve put it at the core of their value proposition. Nine out of ten of Europe's 1,600 AI new start-ups are business-to-business (B2B) merchants, creating and offering solutions for different organizations. Only one out of ten sells directly to buyers (B2C). Many organizations like to buy AI rather than build. (MMC Ventures 2019b.)

Companies that pro-actively deploy AI are increasing their competitive advantage by investing in AI more rapidly than laggards. Nine out of ten AI pioneers on the front lines of AI implementation in the previous year have boosted their investment in AI. Almost two-thirds of companies which investigate or experiment with technology have done this as well. Among businesses without adoption or much comprehension of AI, only one of every five has expanded spending on AI. (MMC Ventures 2019b.) Challenges such as fear of failure and regulatory compliance have been identified for those companies that do not adopt AI. For many financial firms, another main difficulty is that there is no definite internal ownership of new techniques. Financial services businesses need to know how AI can fit into their strategies because the competition and innovation pace is accelerating across their business environment. (Narrative Science 2018.)

5 ARTIFICIAL INTELLIGENCE IN FINLAND

An increasing number of nations have acknowledged the possibilities AI offers and have developed a domestic plan for AI. AI is of significant value for Finland. Finland is acknowledged as one of the world's most highly developed nations with technological as well as digital capacities and has been appointed one of seven nations with a strong financial and digital effect on technology. (Microsoft and PwC 2018.) Finland is a major applicant to leverage AI to improve well-being through economical effect and job satisfaction, with a variety of classifications, such as schooling, expertise and access to the recent techniques. (Finnish Center for Artificial Intelligence 2018.)

In 2017, the Finnish government really took a solid, proactive job in sustaining AI improvement in Finland. A 160 million euros AI investment program was introduced by Finnish government. Mika Lintilä, the Minister of Economic Affairs, authorized a directing gathering to set up a suggestion for Finland's AI project. The minister outlines that AI has turned into a center component of digitalization, and Finland means to be at the cutting edge of this advancement in accordance with its Government Program. Finland was one of the first nations to initiate an AI Program in 2017. The program's aim was to make Finland a pioneer in the use of AI. (Microsoft and PwC 2018.)

Finland have extensive training and schooling in the field of AI (i.e. ML, profound neural networks and machine vision). This is particularly the situation at universities of technology and departments of computer sciences at universities. Some studies are also present that concentrate on AI history and ethics. Then again, there are less education and preparing alternatives accessible on the use of AI and for planning individuals for the progressions this will cause. Voluntary fundamental trials of AI are accessible for applicants, but these tests are not systemic in nature. This has a clear shortcoming, as the field wherein the application of AI is most rapid will involve only different specialist positions and it would be preferable if the basics of AI and other technology were provided for the future, which will change the work of these people in particular. In the case of vocational education and training, too, the lack of applied training is apparent, a field in which AI will probably change work tasks in the future. (Ministry of Economic Affairs and Employment of Finland 2017.)

Helsinki University has been providing an AI course for few years already. The organization cooperated with Reaktor to develop an online course to satisfy increasing demand because of the expanded interest in this topic. The online course ' Elements of AI ' is completely in English and is given to individuals

who would like to learn more about AI. The course has no requirements, is free and accessible to anyone worldwide. Helsinki University and technology strategy company Reaktor provide the course with the initiative to make Finland the world's most educated country in the field of AI. (Yle 2018.)

Finnish Center for Artificial Intelligence (FCAI), which is launched by Aalto University, University of Helsinki and VTT Technical Research Centre, is the core of Finnish AI. The FCAI Flagship works closely with AI-interested businesses, organizations and communities. This interest can include cutting-edge studies, information sharing or training of staff, student cooperation, teenage talent hiring and technology transfer. FCAI holds a list of key AI organizations, networks and projects that are in Finland. Helsinki Center for Data Science, Finland's AI Accelerator, AI Helsinki, AI Monday, AI hub Tampere are some of them. (Finnish Center for Artificial Intelligence 2018.)

AlphaSense is one of the leading AI companies in Finland. In 2010 AlphaSense introduced a smart search engine that provides a new standard for discovering data using a combination of AI, sophisticated linguistic research and NLP algorithms. (FAIA 2019.) AlphaSense improves AI technology to help deliver outstanding insights for financial sector of company helping teams make better strategic decisions and obtain a competitive edge. AlphaSense is able to, for example, to help pick right stocks before others do by the tool they use to monitor and analyze data helping to stay informed and to make data driven decisions. (AlphaSense.)

Finnish companies and organizations are presently experiencing an early test in the modern age of AI. AI can provide drivers and shifted a range of apps into manufacturing for organizations with basic knowledge of company advantages. Based on the general technology, development, and R&D spending within businesses, the availability for creating significant economic savings in AI development is still comparatively small. AI projects are very often distributed across the whole business and are likely to succeed in isolated organizations. Often, feedback mechanisms to the greatest degree of the business are lacking. (Microsoft and PwC 2018.)

6 RESEARCH PROCESS

Research involves characterizing and redefining problems, formulating hypothesis or recommended solutions; gathering, organizing and evaluating information; making rationalizations and reaching conclusions; and finally testing the conclusions to make a decision if they fit the presumption. (Kothari 2004.) The methodology of the research defines the road map to the research and identifies the primary activities that the researcher is involved in the course of the research. The objective of this research is to identify the effects of AI on the financial service industry.

6.1 Research Methodology

A research method is a comprehensive study scheme. Sociologists use a range of qualitative and quantitative techniques of studies, including experiments, study surveys, participant observations, document analysis, and secondary data. Research methodology relates to the discussion of the techniques selected and used in a research document. This discussion also includes theoretical concepts that provide additional data on the choice and implementation of techniques. (Expert Journals 2017.)

The qualitative research method was used for this research by studying the application and impact of AI in finance in addition to investigating how artificial intelligence is changing the financial service industry. The qualitative method was used as materials to be estimated with further detail. The aim of this approach is to study about AI in finance in a broader and detailed way.

Qualitative research deals with quality factors, i.e. phenomena reacting to or involving quality. Qualitative study is aimed at analyzing certain methods or activities and then demonstrating how they can be combined and clustered to produce observable results. This type of study is more selective and calls for the factors to be carefully interpreted. (Expert Journals 2017.) The advantage of this set of method is that it is flexible and easy to adapt to changes in the research environment and often at low cost. While quantitative data defines, the qualitative data is described.

6.2 Document analysis

Document analysis is a systematic process in which documents can be examined or evaluated, which can be both printed and electronic (computer-based and Internet) content. (Bowen 2009.) Selection of ' document analysis ' as a method of research can have several benefits: it helps the researcher to reach "inaccessible persons or subjects." Many materials in "public domain" are prepared by experts and contain very valuable information and insights and documentary sources which are accessible to the highest standards and very economical. In addition, such documents can be an extremely reliable source of data, since they are developed for national or international purposes. (Amonashvili 2011.)

For this research, document analysis for qualitative method of collecting data has been selected, as it provides the chance to evaluate the data collected by professional groups, which can almost never be obtained by any other research method, and these records are also very accessible. For example, reports by various international institutions are based on long-term studies that one researcher cannot perform. These kinds of documents have therefore been very helpful for this study and most are accessible through the official web pages of particular organizations.

6.3 Articles and publication used in the study

Like in any analytical methods in qualitative research, document analysis needs data to be checked and analyzed in order to interpret meaning, gain understanding, and develop knowledge. (Bowen 2009.)

This research explores several online documents chosen under the following keywords: "AI and Finance" "Impact of AI in Finance" "Application of AI in Finance" "Future of Finance" "AI strategy priorities". During the research, it was taken into consideration that the articles and publications used for the study are reliable. The articles and publications used for the research are listed in the table below:

TABLE 1. List of articles and publications used for the research

1.	The Growing Impact of AI in Financial Services. Bachinskiy, A. 2019.
2.	Artificial intelligence in finance. Buchanan, B.G. 2019.
3.	Five benefits AI Chatbots bring to the Banking & Financial Companies. ChatbotNews. 2019.
4.	The economics of artificial intelligence: Implications for the future of work. Ernst, E., Merola, R. & Samaan, D. 2018.
5.	The Current and Future Impact of Artificial Intelligence on Business. Geisel, A. 2018.
6.	AI in banking and finance. Goudarzi, S., Hickok, E. & Sinha, A. 2018.
7.	Industrial Robot Statistics. International federation of robotics (IFR). 2015.
8.	Applications of artificial intelligence in e-commerce and finance. Jiao, Y. 2018.
9.	Implementing a Corporate AI Strategy. Lemay, M. 2019.
10.	The promise and challenge of the age of artificial intelligence. Manyika, J. & Bughin, J. 2018.
11.	Uncovering AI in Finland. Microsoft and PwC. 2018.
12.	The State of AI 2019: Divergence. MMC Ventures. 2019.
13.	AI as an investment. Moritz, R. 2018.
14.	How Artificial Intelligence (AI) Impacts Accounting. MTI College. 2018.
15.	Alarming Influence of AI and Chatbot in the Banking and Finance Industry. Mubarak. 2019.
16.	How is the accountancy and finance world using artificial intelligence? O'Neill, E. 2016.
17.	Bots, algorithms, and the future of the finance function. Plaschke, F., Seth, I. & Whiteman, R. 2018.
18.	Financial Services Technology 2020 and Beyond: Embracing disruption. PwC. 2016.
19.	The evolution of artificial intelligence. UBS. 2018a.
20.	The New Physics of Financial Services. World Economic Forum. 2018.

7 RESULTS OF THE STUDY- ARTIFICIAL INTELLIGENCE IN FINANCE

The finance industry has shown to be an early adopter of AI compared with other industries. For this reason, there are myriads of the applications of AI and ML in finance. Traders, wealth managers, bankers, and insurers could be quite familiar with these applications in some form. Business owners and executive managers, who are forward-thinking, explore new AI use in finance and other areas, actively, with a view to getting a competitive edge on the market.

This chapter discusses how AI is impacting the financial service industry as a result of document analysis qualitative research method.

7.1 How artificial intelligence is changing the financial service industry?

In the 1980s, AI became prominent in the financial world. This is when Expert Systems has become more a commercial item in the sector of finance. The 90s were much more concerned with the detection of fraud. The FinCEN Artificial Intelligence System (FAIS) was one of the applications that began in 1993. It was able to look at over 200 000 transactions per week, over two years it contributed to the identification of 400 prospective instances of money laundering that would amount to 1 billion dollars. Although Expert Systems did not last in the world of finance, it helped to boost the use of AI and to achieve what it is today. (International federation of robotics 2015.)

Financial organizations have since used artificial neural network system to identify charges or claims outside of the norm, marking these for human inquiry. The use of AI in banking can be traced back to 1987 when Security Pacific National Bank in US set-up a Fraud Prevention Task power to counter the unapproved use of debit cards. Projects such as Kasisto and Moneystream are using AI in financial services. Banks are currently using AI technologies to arrange activities, maintain records, spend in stocks, and manage properties. In August 2001, robots defeated human beings in an imitated financial trading competition. In addition, AI has lowered fraud and financial crimes by tracking user behavior patterns in the event of any unusual modifications or abnormalities. For the audit of financial statements, AI provides continuous auditing. AI tools could quickly evaluate many collections of different data. The prospective advantage would be to reduce the general audit risk, increase the security rate and reduce the audit time. (Buchanan 2019.)

AI advances have recently attracted the attention of professionals and stock market researchers. The artificial neural network is one of the most promising models used by researchers in the prediction and analysis of stock movement, since theoretically artificial neural networks can selectively determine any nonlinear function with an appropriate number of hidden units. (Jiao 2018.)

Financial reporting companies already use AI to cut their analysts ' time on complicated audits and property assessments. Auditors at Deloitte can interpret thousands of agreements or acts using AI resources. The programs may obtain important definitions as well as compile and evaluate risk assessment data and other features. AI utilizes several methods to evaluate present information in order to create future predictions. The AI searches identification theft and fake claims for insurance. Predictive analytics are used in insurance, bank, financial institutions and other sectors. In relation to saving time and energy for each department, predictive analytics can offer a more precise future image by exposing data straight to the management team. Since people are more likely to create errors, financial firms adopt AI at an incredible pace. Repeated, resource-intensive activities are well adapted to AI program. AI provide the managers with the required data to create the right choices, but those choices are still taken by a human being. The day will arrive when the manager does not need to take the decision, it will be done through the program. As these techniques progress, they will accomplish increasingly complex duties. (Geisel 2018.)

7.2 Application of artificial intelligence on financial service industry

AI has been a topic for decades, and it is finally starting to impact our daily lives. AI is being used in so many applications nowadays from language translators, face recognitions to assisting applications such as Siri that we barely pay attention to it. Besides these applications, several firms operating in different sectors are increasing their AI use in their systems.

There is a various factor which has contributed to the sector of finance by the use of AI. The use of AI in the financial sector took place in various activities like chats bots and instant message replying solving the Customer Service problem, the fraud detection by analyzing the fraud, underwriting, Robo – advisory, prediction, regularity compliance and many more.
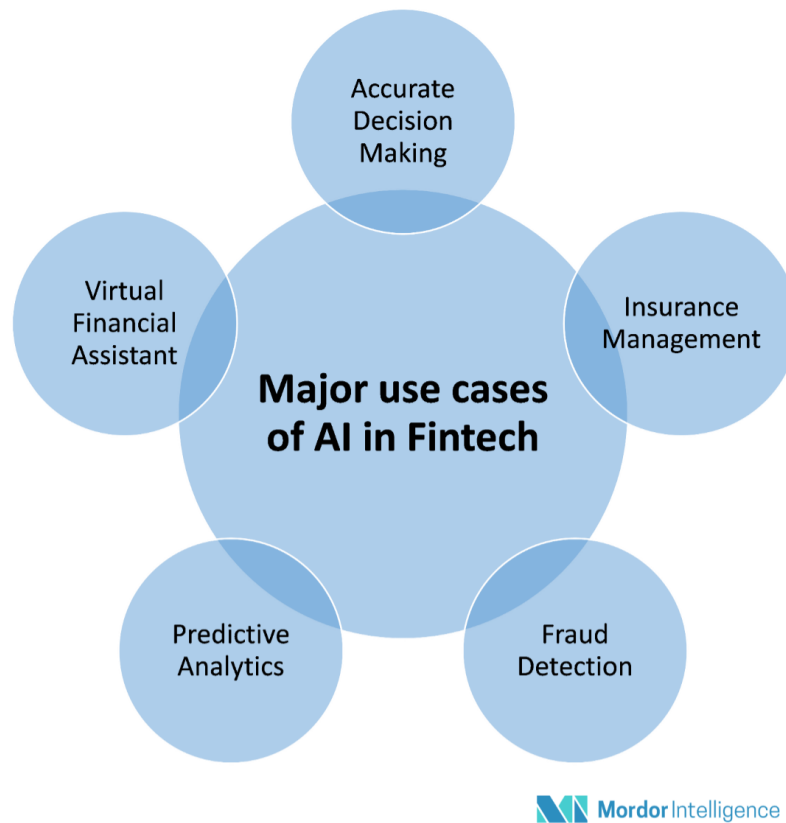
FIGURE 7. Major use cases of AI in Fintech (Adapted from Moritz 2018.)

AI and in specific ML and deep learning can be used for financial services very efficiently. In the following chapters, we will explore various uses such as the avoidance of transaction fraud and the use of AI and machine-learning technologies.

7.2.1 Fraud detection and Risk Management

AI is being used to proactively screen and avoid different occasions of misrepresentation, illegal tax avoidance, negligence and the identification of potential dangers. For example, companies use the data and behavior of the individual to recognize patterns and detect irregular transactions. As part of their monetary service network, Mastercard has also been working to incorporate AI technology in the "identification" of individuals frauds. Similar techniques have been utilized to decide trade misconduct. (Goudarzi, Hickok & Sinha 2018.)

The AI system is a strong ally in evaluating real-time operations in any specified industry or environment. It's estimates of accuracy and comprehensive forecasts are focused on various factors and are

essential for corporate planning. The algorithms explore risks background and recognize early indications of potential future problems. Crest Financial, a U.S. leasing company, used AI on the Amazon Web Service platform and instantly noticed substantial improvements in risk analysis without delays connected with conventional data science methods. (Bachinskiy 2019.)

AI has solved the problem of cheating and fraud. The financial data are the most crucial factor which the organization should protect for their customer. So, the AI can detect the fraud by analyzing the past data and history. Feedzai, for instance, uses ML to assess operations in real time. The organization maintains operational model and a challenger model that develops as threats move continuously. Another firm, ThetaRay, provides a platform for financial institutions to identify such risks as loan fraud, ATM hacks, money laundering and cyber-attacks. (Narrative Science 2018.)

7.2.2 Credit Decisions

AI offers a quicker, more precise evaluation at lower costs of a prospective borrower and reflects a broader range of variables leading to a better-informed, data-backed decision. AI's credit scoring is based on more complicated and advanced rules opposed to traditional loan scoring schemes. It enables lenders to differentiate between high-default risk candidates and those who are worthy of credit but lacks a credit record history. Objectivity is a further advantage of the AI system. Contrary to a person, a machine is unlikely to be partial. Digital banks and loan-issuing apps use machine-learning algorithms to analyze credit status with optional information (e.g. smartphone data) to check loan eligibility and to offer customized options. (Bachinskiy 2019.)

7.2.3 Algorithmic Trading

Also known as "Automated Trading Systems," has become a dominant force in financial market worldwide. Algorithmic trading includes the use of complicated AI systems to create trading choices at rates of more than any human being is able to do and frequently create millions of trades in one day with no human interference. This type of trade is known as high-frequency trading and is one of the fastest increasing financial trading area. Many banks, equity and proprietary trading companies now have complete portfolios managed by AI systems solely. Automated trading schemes are usually used by big

corporate shareholders, but larger proprietary companies have also traded with their own IT technologies in latest years.

Algorithmic trading utilizes high-speed and volume trading software programs depending upon a range of pre-established requirements such as inventories rates and certain business circumstances. One important benefit of algorithmic trading is its automation of trading and its execution at circumstances considered optimum to purchase or sell. Since orders are put immediately, investors can be ensured that significant opportunities are not missed. In contrast, manual orders cannot approach the velocity of algorithmic trading. Moreover, as everything is performed automatically by machine, the human error is almost removed from the equation. In addition, algorithmic trading usually restricts or decreases transaction costs, enabling shareholders to maintain even more of their earnings. Finally, algorithmic trading minimizes the risks associated with emotion rather than the logic that shareholders are known to face. (Motley Fool 2019.)

7.2.4 Chatbots

The financial and banking sectors incorporate AI-based alternatives to their present financial issues. Big Fintech companies have a large client base and therefore require automated client service alternatives such as chatbots. These chatbots offer immediate, real-time response; almost 64% of individuals think AI chatbots are useful because they deliver a 24-hour service that makes company function more secure and effective. To satisfy clients ' ever changing demands, banks have used intelligent AI alternatives to provide the highest possible user experience and to improve their accessibility. These conversational interfaces lead to smart discussions with millions of customers at low cost. According to the recent Juniper Research study, banks now save around 4 mins of their representative in the handling of a request through AI chatbots, saving billions every year in the coming years. So, companies use AI alternatives to generate value in their financial facilities. (ChatbotNews 2019.)

With the need to implement a competitive edge in technology, banks and financial firms are now progressively beginning to embrace chatbots in their system. The impact is so much that chatbots are now regarded as an ' industry standard. ' For businesses, chatbots are the starting point of AI. They are primarily used for their customer service purposes as a ' virtual assistant. ' Some studies found that millennial generation clients are very happy using the AI to remain in contact with their bank, rather than

interacting with a real person. Only 12% prefer to use the phone out of this group, whereas many choose to chat, social media or message. (Mubarak 2019.)

Lemonade is a B2C website that offers homeowners and renters with property and casualty insurance. ML and chatbots are being used by it to provide chatbots service to its customers. It takes on around 90 seconds to get insured, and three minutes to get paid. Dialog robots are an AI technology presently being used in the peer-to-peer (P2P) sector in China. (Buchanan 2019.)

7.3 Impact of Artificial Intelligence on financial sector

At first, economic development is anticipated primarily because of enhanced labor productivity. AI will also affect and impact jobs in the future which depends on several factors. These include utilization and adoption costs of AI, workforce dynamics, among these are quantity of labor supply, quality and wages.

AI and the cloud work together to calculate massive data in a very short time. This service simplifies activities through time savings, expenses reduction, increased productivity and more precise outcomes. People in financial sector have become extremely tech-savvy and use AI instruments to tediously function for them so that they invest their time reviewing accounts, speculating about potential results, handling the equipment and responding if something gets wrong. (MTI College 2018.)

The motivations behind the AI installation in business processes seem to be the speed, accuracy and volume of computers in comparison with the existing human counterparts. Many companies already use robotic process automation devices to shift daily information and to crunch figures. Kensho for instance is a smart computer system usually used by stock traders and shareholders to asses portfolio efficiency automatically and to forecast transitions in the economy. The software is defined as the world's first computer science tool for the financial sector. KPMG has been using McLaren Applied Technologies (MAT) innovations since 2015 in its audit process. Predictive analytics permit the automation of the collection of data and the output of complicated information records which saves time and improves customer service. (O'Neill 2016.)
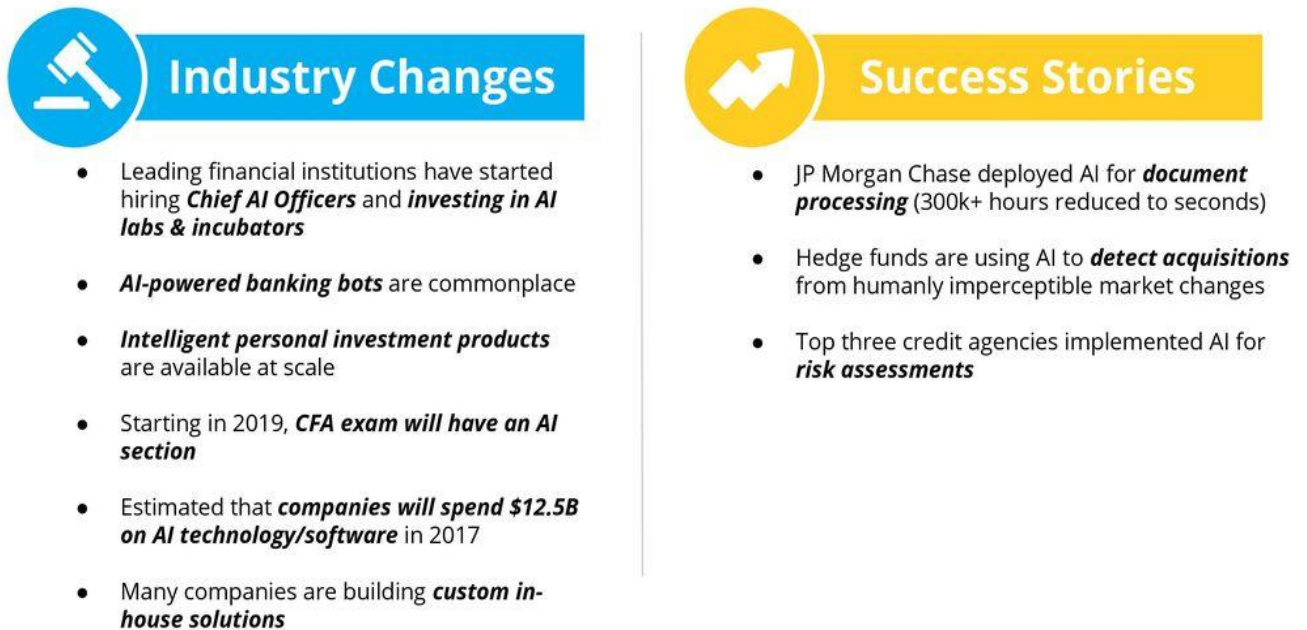
Current Impact

Industry Changes

- Leading financial institutions have started hiring **Chief AI Officers** and **investing in AI labs & incubators**
- **AI-powered banking bots** are commonplace
- **Intelligent personal investment products** are available at scale
- Starting in 2019, **CFA exam will have an AI section**
- Estimated that **companies will spend $12.5B on AI technology/software** in 2017
- Many companies are building **custom in-house solutions**

Success Stories

- JP Morgan Chase deployed AI for **document processing** (300k+ hours reduced to seconds)
- Hedge funds are using AI to **detect acquisitions** from humanly imperceptible market changes
- Top three credit agencies implemented AI for **risk assessments**

FIGURE 8. Current impact of AI in financial sector (Adapted from FEI Canada 2017.)

7.3.1 Finance jobs and functions

Automation and AI have and will undoubtedly continue to have an effect on human jobs. Even within digitally-adapted nations, it is currently projected that 6% of jobs can be almost fully automated using ready-to-adopt technology. In fact, 60 percent of workers spend 30 percent of their hours on automated duties. All staff and job function will certainly be influenced by automation and AI. Recent figures show that 1 in 3 employment is at danger of automation. On the other side, Gartner assumes that AI could generate more employment by 2020 than it can eliminate. The alleviating impact of new job creation will probably even eliminate losses in some industries, with the health industry having the best prospects of ongoing supply for more jobs. Since there are very few jobs in which all duties could be done to machines, the automation of worldly repeated duties will often have only beneficial impacts: it provides staff with moment to focus on the exciting problems of their employment, discover latest skills and reform their present job description to focus on more rewarding operations. (Microsoft and PwC 2018.)

As organizations follow effectiveness and price saving policies, low- and medium-scale functions (e.g. back office) are probable to be shifted. As these positions represent a substantial proportion of employment in financial services, there is a danger that general roles, in particular, will decrease significantly in near future. Institutions need to create more technical skills in developing AI alternatives and higher quality skills (e.g., creativity, ingenuity and knowledge). To realize the complete capacity of the employees, organizations must efficiently reassign current talent and create new internal talents. The function that third parties (for example, big technology companies, fintech, start-ups) play outside the environment in providing services to financial organizations will increase and these functions will probably be radically distinct. It requires fresh skills (e.g. technical backgrounds), distinct cultures and distinct designs of reward. (World Economic Forum 2018.)

Workers would need to expand their skill to qualify into job market in future. Demand for social and emotional skills will grow as well as many technological skills. People with cognitive skills, critical thinking, creativity will be in demand. Jobs requiring physical and manual abilities will decline over the years. Eventually skill shifting in the future could mean surplus demand and supply in some skills creating uneven balance. Also work environment might change for example cashier could go from handling merchandise to answer questions and troubleshoot machines as self-checkouts are introduced to stores. As these transitions emerge many countries face skill shortage and educational systems are challenged as well as rising costs for training workers for transition. Ultimately many countries have already been experiencing these issues and it shows in wage inequality and polarization. (Plaschke, Seth & Whiteman 2018.)

Workers ' opinions differ greatly about AI's probable effect on their day-to-day operations – whether AI will boost or reduce customer time, for instance, or work with peers. As AI grows, employees expect AI to improve the security, performance and speed of their work while reducing employment loss. Workers are likely to meet expectations of the beneficial effect of AI on their tasks. By enhancing current workflows with latest machines and features, and boosting automation, production quality and productivity rate will improve. With regard to employees ' worries about security, AI is probable to enable the automation of specific routine and repeated tasks, like those of telemarketing. In other positions, AI will ultimately increase workforce operations but move a larger percentage of its operations over time or reduce the need for new recruitment. (Plaschke, Seth & Whiteman 2018.)

7.3.2 Future of financial service technology

Predictions of the AI apps for financial services that are coming soon are a hot subject in recent years, but it is clear that AI is quickly reshaping financial sector company landscape. There are high prospects that transactional and account security will be improved, particularly as blockchains and cryptocurrency acceptance expand. As a result, transaction charges could be drastically reduced or eliminated leading to the absence of an intermediary. Through cognitive computing, all types of digital assistants and applications remain to improve themselves. This makes personal finance management exponentially easier, as intelligent machines can plan and carry out brief and long-term activities, from the payment of bills to the preparation of tax filings. We can also predict stronger customer care using advanced auto-help VR technologies, as NLP progresses and learns more from the expansion of previous experiences. A greater level of transparency will result from more detailed, accurate client reporting and more comprehensive due diligence checks, which would take too many hours if performed by humans. (Bachinskiy 2019.)

In the latest years, there have been drastic technological changes in the financial services industry. Many managers look at their IT agencies for effectiveness and development while also reducing expenses and still supporting legacy systems in some ways. There are many large forces overflowing society, from demographic and social changes to global economic power shifts. But one force, namely technological breakthroughs, affects financial services disproportionately. According to PwC, fintech will drive the new business model and digital becomes mainstream. It also states that blockchain will shake things up and 'customer intelligence' will be the most important predictor of revenue growth and profitability. (PwC 2016.)

Till this stage, humans have shaped AI technology to satisfy human needs. Its tasks were very particular: predicting economic patterns, managing family tasks, managing public transport facilities, etc. Future generations will develop familiarity with the radical progress of their time and become extremely dependent on the facilities AI offers just as we have become internet-reliant for communication, studies and jobs. AI would eventually pull from individuals the reins of its own destiny, and it will have transcended its makers in many respects at this time. Therefore, would have come the age of artificial super-intelligence (ASI). (UBS 2018.)

7.4 AI strategy recommendation for financial sector

Today, leaders and early adopters experience various difficulties in the implementation of AI. Early adopters struggle to obtain AI management assistance and identify instances of use. The leader's issues have moved from ' if ' to ' how. ' Leaders seek to solve talent recruiting difficulties and solve cultural resistance to AI. (MMC Ventures 2019.)

Finance institutions carry out a variety of activities, ranging from gathering basic data to making complex decisions and advising business leaders. Today, financial function procedures are purposely intended to harness many people's collective brain power and understanding. Managers must be prepared to reengineer their processes to unlock AI's complete capability. (Plaschke, Seth & Whiteman 2018.)

To establish and maintain a dynamic atmosphere for AI to profit the economy more widely, adequate preparation and policy is required. Investing in digital infrastructure is a main metric to guarantee that businesses can compete effectively across different sector and places. AI is a primary set of methods to be used in a specific business case. (Ernst, Merola & Samaan 2018.)

Leaders throughout the organization require to be aware of the staff increase focus, not replacement. In addition, having an information and analytics culture is more crucial than having AI capacities. If results and outcomes are not collected, then no predictive or explanatory system can be obtained. ML requires to learn from available data, and data originated from processes. There are a lot of considerations at the employee level to support all involved. An AI project structure will help executives make a choice. A start-up culture in-house will enable individuals to discover distinct solutions to a difficult issue. An ongoing learning workplace holds everybody up to date. Having a single representative for AI related issues can be harmful to company if they leave the job, thus it is vital to ensure the transfer of expertise within the organizations. (Lemay 2019.)

According to PwC report, financial institution should update their IT working model to prepare for the new standard. Firms should build the technology capabilities to get more intelligent about their customers' needs. Institution should pay more attention to cyber-security before it becomes urgent. It is vital for organization to make sure that they have access to the talent and skills necessary to execute and win. (PwC 2016.)

To summarize, it is found that there is no other business sector that is as focused as the financial industry on developing and implementing AI for speed, accuracy, and efficiency. AI is going to be crucial to transforming and shaping the future of job and productivity, and there is a huge opportunity. The present wave of AI-based apps promises to be the biggest and most widespread technological change found in the earlier times. Its general-purpose nature, which enables the application of this latest technology in various industries and occupations, regardless of the ability level of the workers concerned, generates a widely mutual fear of work loss and control over people's life.

Any business can use AI applications for financial and accounting decisions. AI's advantages remain to develop, ensuring the technology is going to be with us here. It will be vital for businesses and community as a whole to learn to use the latest technology and make changes. In order to stay competitive, companies will need to integrate AI, and employees may need to alter their skill set to maintain jobs.

8 CONCLUSION

This thesis was aimed at examining the influence of AI on modern world, particularly in the field of financial sector. This thesis was also aimed at identifying the application of AI, its challenges, opportunities and its impact on jobs and functions. The document analysis of qualitative method was used for this research to gather information on the application and impact of AI as well as recommendation for financial sector adopting AI.

As a result of the research, it is found that AI is moving across a large front in recent years. Regardless of industry, AI offers financial institutions possibilities across their value chains, through significant changes ranging from traditional procedures to radical, industry-changing practice. AI has countless, real use examples that enable the development of corporate revenue growth and cost savings in current industries. Multiple kinds of AI applications are used by companies in their daily operations. Chatbots, process automation tools and fraud analytics are the most common usage instances. Moreover, this research also shows that AI-based technologies offer significant opportunities. In the financial sector, AI is transforming business operations and customer service. It is also used for complying with regulations, fraud detection and personal creditworthiness assessment. Whereas, it is found that businesses are having concerns about the use of AI. The obstacles with AI worry that reliability of (master) data is not mature enough yet, the workforce lacks the skills needed to implement and manage AI solutions and not certain return on investment. This study also shows that people with cognitive skills, critical thinking, creativity will be in demand while professions requiring physical and manual skills will decline over the years.

To study and to better understand the topic, this research treated the following research questions: What are the opportunities and challenges that comes with AI? What are the uses of AI in financial sector? How is AI adopted globally and in Finland? What impact will AI have in the jobs and functions of finance profession? How does the future of AI look like? What steps should organizations take to succeed in the competitive era of technology? Based on the findings of this thesis, AI is probable to affect the global financial system in a transformative way. AI's application like fraud detection and risk management, credit decision, algorithmic trading and chatbots has the ability to obtain more effective business processes, provide personalized services, and help with broader objectives such as financial inclusion. AI opportunities includes (but not limited to) innovation, efficacy, velocity and scalability. Despite these advantages, the growth of AI in the finance sector still faces a range of problems - a few being the

absence of qualified workforce and availability of data. One way in which financial institutions are overcoming difficulties and pursuing AI development is through cooperation with startups and fintech firms.

AI adoption has been rising globally while Asia / Pacific businesses are the most proactive in AI implementation. Finland has been a pioneer in adopting AI as a result of continuous government investment and extensive training and schooling in the field of AI. The study shows that automation and AI will inevitably have effect on human jobs. Finance profession will spend more time in insight and action rather than on transaction processing. The future generation will become extremely dependent on AI. Fintech will drive the new business model and digital becomes mainstream. This thesis suggests that financial sectors need to adjust their procedures to these techniques of transformation. Finance professional needs to adopt to the changing environment of technology.

It can be concluded that any business can use AI applications for financial and accounting decisions. AI's advantages remain to develop, ensuring the technology is going to be with us here. It will be vital for businesses and community as a whole to learn to use the latest technology and make changes. In order to stay competitive, companies will need to integrate AI, and employees may need to alter their skill set to maintain jobs. In my view, AI implementation is and will positively impact financial function efficiency. AI can enhance communication with employees and clients, evaluate information in various differing places to identify patterns or links that a person could not discover, and answer questions about real-time investment. With the beneficial effect of AI, many decision-making roles will be taken over by intelligent systems from individuals in the coming years. However, I think that data privacy is going to be one of the biggest challenges AI could face. Utilization of AI can boost global economy and increase prosperity.

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