How is AI influencing industry competition?

An exploration of online retailing using Porter’s Five Forces Framework

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by

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Abstract

This master thesis critically examines how new technology, AI, is influencing industry competition as viewed through the Porter’s Five Forces Framework for online retailers. It does this through a qualitative inquiry with seven expert interviews and a literature review focused on foundational papers, as well as more recent critiques of the Porter’s Five Forces Framework. Recent reports on the impact of AI is also examined. The thesis finds that several of Porter’s suggestions for the Five Framework are echoed by the interviewees, and the Forces appear to be relevant to consider for an online retailer considering the impact of AI. However, interviewees suggest the potential impact of network effects and fluidity between industries goes beyond what Porter indicated in his original study, thereby potentially influencing the extent to which one can solely rely on the Porter’s Five Forces Framework to support strategic decision making.

Key-words

Keywords: AI, Industry competition, Porter’s Five Forces, Online retail

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Glossary

Active Data - Data generated by the effort of a user. Active data may be generated by a user tweeting. Olsson, F (2018, May 25, Personal Interview)

Artificial Intelligence - In part refers to the ability of machines to work with foresight in their environment. Nils J. Nilsson (2009, via Teigland et al. 2018)


Classification - To identify a group membership for example if a firm is profitable or unprofitable. Teigland et al. (2018, P14)

Content Management System - Systems for managing digital content such as that on a website. “CMS” Oxford Dictionaries (2018)

Economy Of Scale - The need of massive amount of products to enter the market. Porter, M, E(1979)

First Mover Advantage - The advantage an organisation may gain from introducing a product or service first. “First Mover Advantage” Cambridge Business English Dictionary (2018)

General Data Protection Regulation - An EU computer protection act to preserve personal information. Datainspektionen (2018)


Machine Learning - The process by which computers learn from experience. Teigland et al. (2018, P14)

Narrow AI - AI that handles specified problems and limited tasks. Aeppel, T(2017)

Natural Language Programming - a machine learning type focused on written or verbal information. The Royal Society (2017)

Network Effect - The value increase derived from more people using a product. “Network Effect” Oxford Dictionaries (2018)

Passive Data - Data generated without effort from the user. Passive data may be generated by a user passing movement tracking sensors. Olsson, F (2018, May 25, Personal Interview)

Porter’s Five Forces Framework - A framework with five forces that captures the relation between many of the major actors that affect a business and can help identify paths to competitive advantage supporting forecasting and decision making. Porter, M, E(1979)
Regression - To predict a response for example to which degree several factors contributes to profitability. Teigland et al.(2018, P14)

Search Engine Optimisation - The process of improving the ranking of a webpage in internet search results for example by leveraging keywords. “Search Engine Optimisation” American Marketing Association (2018)

Search Engine Marketing - The process of improving a webpage ranking in search results for example by search engine optimisation and online advertising. “Search Engine Marketing” American Marketing Association (2018)

Servification - The shift from buying products to purchasing products as part of a service offering. Porter, M. E., & Heppelmann, J. E. (2014)

Shared Value - An approach where the activities of the firm would generate economic value for the firm while creating value for society. Porter, M, E et Kramer, M, R (2011)

Strong AI - AI that handles unspecified problems and can complete almost any task. Copeland, B.J(2018)


Switching Cost - Cost related to switching to another product or service. Porter (1979)


**Abbreviations**

Artificial Intelligence (AI)
Content Management System (CMS)
General Data Protection Regulation (GDPR)
Machine Learning (ML)
Natural Language Programming (NLP)
Porter’s Five Forces Framework (P3F)
Structure Conduct Performance (SCP)
Search Engine Optimization (SEO)
Search Engine Marketing (SEM)
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1 Introduction

1. Introduction

Just as electricity transformed almost everything 100 years ago, today I actually have a hard time thinking of an industry that I don’t think AI will transform in the next several years. - Andrew Ng (via Stanford Graduate School of Business 2017)

If artificial intelligence (AI) is about to transform almost every industry, we must ask ourselves how this change is happening today and what it means for our industry. There is a lot of discussion on the impact of automation and which types of skills that machines can replace, but it is hard to find academic papers on how AI is transforming specific industries today and what it means for the actors in those industries. To develop an understanding for this, we must look first look into the origins of AI and how we got to where we are today.

McKinsey (2018) suggested AI was driven by algorithmic advances, the explosion of data and an exponential increase in computation power and data storage. Below is a short summary of how the three forces developed until 2009 where McKinsey (2018) stated they converged to enforce each other.

Algorithm improvements
Frank Rosenblatt creates algorithm that learns by itself, that is without being explicitly programmed. Arthur Samuel develops a checkers program that surpasses his own checkers' skill and reaches an intermediate level. 1992 improvements help machines classify general opinions in texts and understand human speech. Sepp Hochreiter develops a new algorithm than can subdivide problems and create much more complex models which greatly help computers understand speech.

Computation Power and decrease in storage cost
Nvidia Launches a graphics card that performs computations significantly faster than other chips 1999. Amazon launches Amazon Web Services (AWS) making cloud computing massively cheaper and broadly accessible 2002. Disc storage cost drops to $158 per gigabyte (from +$31,000 ten years earlier) 2005.

Data explosion
In the early 2000s, Broadband becomes commercially available for home internet users. 2004 Web 2.0 shift consumers from passive viewers to contributors on social media and blogs for example. The numbers of internet users pass 1 billion in 2005 and Facebook reaches 6 million users (1 year after being launched).

AI in Sweden
Today the interest in AI in Sweden is very high. It is evident by looking at recent publications suggesting the growing Swedish interest in AI. In January 2018 Teigland et al. (2018) find that in many cases AI will support human augmentation (enhancing human performance) and automation will likely be concentrated to specific routine tasks. Vinnova(2018) reviewed the potential of AI to
the Swedish government and conducted a portfolio analysis which showed a steep increase in financed innovation projects that includes an AI component.

The Impact of AI
Now that we know how AI developed and the growing Swedish interest we take a look at which industries that may be influenced the most by AI.

Chui, M et al. (2018) compared the potential impact of AI across sectors and found retail is the sector where AI has the potential to create the most annual value. Chui, M et al. (2018) also looked at how AI could generate impact in relation to the impact derived from analytics across sectors. Here they also found AI in retail to be promising, delivering the third most impact (above 45%) of total impact from analytics.

This promise of AI creating a sizeable annual value for retailers paired with AI contributing much compared to other types of analytics investments makes the retail sector particularly interesting to examine.

Bradlow et al. (2017) identified retailers had access to four types of data, customer and household data (loyalty programs/website forms) as well as social and location-based details (mobile apps).

The retailers best prepared to take advantage of AI looking at the data they can access and the driving forces of AI McKinsey (2018) suggested would be online retailers.

1.1 Background
Porter’s Five Forces Framework (P3F) was one of the first theoretical frameworks models I encountered and inspired me to write my bachelors and master thesis. The Master thesis focus is: How is AI influencing industry competition - An exploration of online retailing using Porter’s Five Forces Framework.

For my literature review, I invested two years attending seminars, watching webinars, reading scientific articles and trying to keep up to date. In addition to this, I was the external master thesis supervisor for a paper exploring a Machine Learning (ML) application at a startup.

Even though extensive industry analysis has been carried out by researchers and technological change has been analyzed using P3F there has according to the authors findings, not been a study on the impact of AI on online retail using the P3F.

1.2 Research Aims and Objectives
The thesis consists of a literature review of P3F and 7 semi-structured interviews. Exploring the opinions of researchers in speech and language understanding, as well as consultants and researchers advising and teaching businesses to cope with new technologies such as AI. The focus will be on online retail for the vast potential of AI to disrupt the industry.
The purpose of the thesis is to explore patterns of how AI is influence industry competition in online retailing. In particular looking at examples of how Natural Language Programming (NLP) a type of speech and language technology may affect online retailing.

1.3 Research Question(s)

An exploration of how AI could transform online retailing

**Topic:** Industry Competition - Impact of new Technology  
**Research problem:** Effect of Artificial Intelligence on online retailers ability to compete  
**Research Question:** How Is AI influencing industry competition? An exploration of online retailing using Porter’s Five Forces Framework

1.4 Delimitations

The thesis will focus on the Market-based view and in particular the P3F. The Market-based view focuses on the impact of market forces and movements from actors in the industry. The Resource-based view focuses on the internal resources within the company. There have been several studies on how AI affect internal resources in the company, but the author did not find a scientific paper investigating the effect on industry structure in the e-commerce sector, in particular how the P3F was affected.

There are several frameworks by Porter, M, E that may be valuable to analyze the impact of AI on online retail, but the P3F has previously been used to illustrate the effects of technology on industry competition. Both the effect of the internet by Porter, M, E (2001) and the impact of smart and connected products by Porter, M. E., & Heppelmann, J. E. (2014).

The thesis will focus on seven in-depth interviews with experts that are studying and working with AI in connection to business strategy and not focus on the opinions and views of managers. The interviews are conducted with people based in Sweden and may thus be colored by the local context. The companies are based in Sweden to secure personal interviews. Another case for the focus is the access to experts within the Natural Language Programming (NLP) community via a recommendation of Jussi Karlsgren the founder of Gavagai. For this thesis, the attention on supervised learning as most current applications are found there.

The research deep-dives into the impact on online retail. This is with respect to the author's academic background in retail management. Online retail has also been more readily structured to adopt new technology than for example bricks and mortar stores thus often having more advanced applications leveraging AI. The thesis focus on current and near-future applications due to the complexity of foreseeing future applications in an uncertain landscape.
1.5 Definitions

**Artificial Intelligence**
In the Substitution of Labor, a report by Teigland et al. (2018, the difficulty of defining AI is addressed, perhaps in part due to its study across multiple disciplines and applications. One definition that has been cited in several papers is the attempt below:

“Artificial intelligence is that activity devoted to making machines intelligent, and intelligence is that quality that enables an entity to function appropriately and with foresight in its environment”. Nils J. Nilsson (2009, via Teigland et al. (2018))

Another way to classify AI is distinguishing between narrow AI which Aeppel (2017) define as the problem is specified and task is limited and strong AI that Copeland, B.J(2018) define as the system is not specifically programmed for a task and can almost perform any task you throw at it.

**Machine Learning**
Teigland et al.(2018) further define that ML is the process by which computers learn from experience and may be seen as a cornerstone of AI. ML can be separated into supervised learning, whereby a labeled dataset is used to make predictions on future datasets and unsupervised learning whereby unlabelled data is used to make inferences. Supervised learning algorithms can be subdivided to classification and regression. A classification problem may be to distinguish if a company is profitable reviewing an annual report, whereas a regression problem may be to define the underlying factors contributing to profitability within an industry.

**Natural Language Programming**
The Royal Society (2017) define NLP as a type of ML that is detecting patterns, categorizing, or classifying written or verbal information and may be used for extracting information.

**Online Retail**
Online retail within this thesis refers to organizations primarily focused on selling products or/and services via a web-based interface directly to an end consumer. Thus online retail caters for a wide range of different products and services. However, the activities and relationships between the online retailers and other actors within the P3F share similarities regardless of the product range. The type of data and relative power balance within for the particular online retailer varies greatly depending on the product and service though.

**Porter’s Five Forces Framework**
P3F refers to the original framework as suggested by Porter (1979) with five forces affecting industry structure, namely the power of rivals, suppliers, buyers, entrants, and substitutes. Within this thesis, the online retailer (see above definition) is defined as the organization competing with other online retailers. The suppliers are defined as the distributors to the online retailer. The buyers are defined as the end consumers. The entrants can, for example, be suppliers that forward integrate to sell straight to the end consumer or international actors that enter the market. The substitutes can for example, subscriptions or other products that fulfill the need of the end consumer.
2 Literature Review

In this section theories of competitive advantage are reviewed followed by an investigation into strategy and competition. This supports shaping an understanding of how the research question may be explored. Thereafter follows a study of Porter’s Five forces framework and an analysis of each force separately. The deep dive into the five forces is supplemented by critiques to P3F. Finally, recent findings from online retailing are investigated to seek support for how online retail is being affected by AI in particular within the P3F.

2.1 Theories for competitive Advantage

Wang, H. (2014) argues that there are two major classical theories of competitive advantage mainly the Resource-based view (RBV) that focus on core competencies and the Market-based view (MBV) that focus on industry factors.

**Market based view**

Wang, H. (2014) argues Porter view firm performance from industry factors in a P3F that was developed from Bains (1968) Structure Conduct Performance framework (SCP). Wang, H. (2014) notes that several of the factors in SCP carry similarities to Porter’s(1980) P3F. Both Porter’s ideas and the P3F will be elaborated in a further section 2.3.

**Resource Based View**

However, Prahalad and Hamel (1990, 79-91 via Wang, H. 2014) argued firm-specific factors such as resources and capabilities carry greater impact to sustaining competitive advantage. There are several different perspectives on how resources and capabilities can be analysed, but a common distinction is between the intangible and tangible resources of the firm. Hooley et al. (1996 683-709, via Wang, H. 2014) critiqued RBV for the exclusive focus on resources inside the firm.

For this thesis, the author early found reports suggesting managers view on the value of AI on productivity and the impact of AI on labor but little to be written about the impact of AI on different markets. Thus it became natural to focus on the Market-based view.

2.2.1 What is strategy?

A central aspect of Porter, M. E (1996) theories is the idea of attaining a competitive advantage through operational effectiveness. That is being able to create, produce, sell and deliver a product or service faster or with fewer inputs than your competitors. Porter argues that strategic positioning comes from having a different set of activities than competitors that reinforce each other and cleverly choosing what not to do. However, Porter, M. E (1996) cautions that companies fearing trade-offs can avoid making choices creating a heard like behavior.

“A company can outperform rivals only if it can establish a difference that it can preserve.” Porter, M. E (1996).
In Porter, M. E (1996) view strategy is at the heart of management and has three components defining a company's position, making trade-offs, and forging fit among activities.

2.2.2 Competition

The notion of competition is often referenced, but there are many different views on what the term may entail. Pulaj, E., & Kume, V. (2014) attempted to identify the characteristics of competition through an investigation of the different ways researchers have defined it. Some aspects that are referenced are the impact of time and context, the scope of the notion (example firm vs. nation as the unit of analysis) and that various metrics may be used (perhaps a lacking standard).

2.3 Porter’s Five Forces

P3F captures the relation between many of the major actors that affect a business and can help identify paths to competitive advantage supporting forecasting and decision making. Thus, potentially being a tool for evaluating the impact of new technology as Porter, M. E (2001) did with the internet and Porter, M. E., & Heppelmann, J. E. (2014) did with smart and connected products.

One of the interesting aspects in the context of AI is that all the actors (suppliers, buyers, entrants, rivals, substitutes) are holding different types of information and need to analyze the moves of each other to find strategic alliances to improve their position. The suppliers, for example, stand a lot to gain from being better at predicting the future demand of their partners. The buyers can gain tremendous value by comparing various businesses and having their demand aggregated. The substitute products become particularly dangerous if they can copy the features and imitate the current market offering, here a greater understanding of consumers may be valuable. The rivalry between existing competitors may be more fierce if know how is easy to acquire through market intelligence tools.

![Diagram of Porter's Five Forces](image-url)
2.3.1 Why Porter?

In a Harvard Business Review webinar Porter, M and Heppelmann, J (2015), Porter were noted as the leading authority on competitive strategy and the founder of the modern strategy field. Porter is recognized as one of the leading researchers in the world, and his contributions to strategy have been noted by many.

“Harvard Business School professor Michael Porter is the single most important strategist working today, and maybe of all time” Kevin Coyne McKinsey & Co (via Kinicki A, Williams, B 2008).

However, as Magretta (2012) noted Porter is often misunderstood, especially the P3F. Michael Porter (1980), defined a company’s strategic position through competitiveness in the industry. This broad view encompassed both social and economic forces (broadly PESTEL forces), and a key aspect was the industry/industries in which one competed. The outside forces were seen as a mold influencing all companies and industry competition came from the underlying economic structure. From this line of thinking Porter (1980) derived the P3F.

2.3.2 Competitive Rivalry

In Porter (1979) view competitive rivalry is high when competitors are equally matched offering products that are not differentiated while growth is slow.

However, Porter (1980) contended that there are examples of industries where competitors influence each other is limited as they pursue varying goals and leverage different strategies. An example was whereby producers targeted different segments, and the focus became to leverage relations with suppliers to fulfill orders faster/cheaper than other competitors even though the end customer was different. Another instance Porter mentions is that there may be other strategic reasons or there may be “high strategic stakes” for sacrificing profit (Porter 1980).

Porter (1980) also suggests the impact of high exit barriers, taking high capital investments in manufacturing as an example of a factor risking to decrease the profitability in the industry.

Porter, M. E., & Heppelmann, J. E. (2014) argues the effect on rivalry may depend on the cost-structure of a firm. As suggested earlier avenues for differentiation increase, but this may come at an increased fixed cost such as more expensive software development. The increased market intelligence may decrease variable costs as it becomes easier to predict when customers need to purchase new units. It can be hard for actors to estimate what consumers value in the latest technology and to counter this firms may hedge by adding unnecessary features. Both factors may come at the cost of firms profitability.

2.3.3 Threat of Entrants

Porter (1979) defined 7 major barriers to entry:
Economies of Scale - an entrant might need a massive amount of products to enter the market. Product differentiation - when current players have successfully developed affinity and loyalty amongst customers the potential need of marketing investments increases for an entrant.

Capital requirements - to enter the market an entrant might need to upfront take on massive investments in both marketing and product development.

Switching costs - actors have created high costs to switch to another provider, an example might be software standards where current systems already function and a new vendor have a hard time switching only one part of a system due to the large costs in integrating current systems.

Access to distribution channels - actors can lock out entrants by restricting the access to distribution channels making it harder to reach customers.

Cost disadvantages independent to scale - new entrants may find it hard to access informal networks, particular facilities or new materials and thus incur additional costs.

Government policy - regulation by the government can induce higher costs of entry to protect domestic production.

In Porter’s, M, E (2001) view the first mover advantage is likely to be lower with the internet due to the limited switching costs of choosing another supplier. He argues networks effects are difficult for one company to capture (the internet is open) and often meet diminishing returns. Though he elaborates that in some cases such as email and chat rooms there is evidence of a winner take all effect. Porter, M, E (2001) suggests many internet brands have found it difficult to raise barriers to entry and create deeper loyalty even under massive investments and found it hard to build their brands perhaps in due to the lack of physical presence.

According to Porter, M. E., & Heppelmann, J. E. (2014) the increased software development costs, increased intelligence of suppliers and lock-in to specific providers mentioned earlier may make the market entry costlier (requires building a more substantial it infrastructure) and customers may be harder to sway after having made investments (time and capital) in a specific provider. However, the case may be the opposite for fast-moving technology firms that sacrifice profit and build more open solutions that do not lock in the consumer and interoperate with different solutions on the market. The shift to profit from after-sales and servification may be more suitable for actors that specialize in software development and have little overhead for the hardware production.

2.3.4 Threat of Substitutes

In Porter’s (1980) view substitutes are products or services that have an equal functionality (it can do the same thing) to the primary product. In Porter’s (1980) view substitutes relation to competition depends on their price/performance ratio and the switching costs for users. In short, buyers seek products with the best price/performance ratio.

Porter, M, E (2001) also posits that complements, whereby actors partner to create new products and services might increase the threat of entry as companies become increasingly similar.

In Porter, M. E., & Heppelmann, J. E. (2014) view the vastly improved capabilities of connected
products may be a threat to connected products serving niche needs with fewer features or current
the products the market currently offers that are not possible to connect. Servification may create
new business models where you rent a product, and fewer products can serve the market.

2.3.5 Bargaining Power of Buyers

Porter (1979) argued retailers buying power over manufacturers increased significantly if they
could influence consumers purchasing decision.

In Porter’s (1980) view buyers pit competitors against each other and try to reduce prices to gain
more extensive service. Some other factors Porter (1980) defined as essential for the strength of the
buyers was that buyers face little switching costs, could backward integrate and had perfect
information.

Porter, M, E (2001) argues differentiation may increase as it becomes easier to offer other values for
sellers than price. However, the technology will typically shift power to the consumers.

Porter, M. E., & Heppelmann, J. E. (2014) suggests internet-enabled products creates a direct link
between the company and customer, reducing the need to rely on intermediaries for intelligence and
decrease the power of buyers. Customisation can support to create a lock-in by increasing switching
costs. In short, a differentiation strategy becomes easier as other values than prices can more readily
be offered to the customer.

2.3.6 Bargaining Power of Suppliers

Porter (1979) suggested suppliers were particularly powerful when few actors dominate, products
are differentiated, switching costs (choosing another supplier is costly) and suppliers may credibly
threaten to forward integrate.

Porter, M, E (2001) argue that within the supply chain intermediation becomes more
straightforward as the internet allows consumers to find and negotiate with suppliers easier. Porter,
M, E (2001) also argued that outsourcing would increase and companies would forego developing
own capabilities making them more vulnerable to suppliers and making it easier for new firms to
enter.

Porter, M. E., & Heppelmann, J. E. (2014) suggests old suppliers may find that smart components
may be akin to Swiss army knives reducing the need for unwieldy tools. Newer suppliers may see
the need for specialized Swiss army components but also digital services such as data services and
analytics. The bargaining power of new suppliers can be high at the expense of the old suppliers.
2.4 Critiques to Porter’s Five Forces?

In this section, different views on the P3F are raised illustrating possible pitfalls with the P3F. The purpose is to illustrate how researchers recommend working with the P3F.

P3F has been widely discussed and Pulaj, E., & Kume, V. (2014) find that many researchers agree the model can help identify paths to competitive advantage supporting forecasting and decision making. Further they suggest many agree that the framework accounts for the market structure demand and supply of rivals and relationship between cost and production volume. Pulaj, E., & Kume, V. (2014) argue researchers disagree whether the P3F is useful for analysing complicated structures such as company relations. They add many researchers contend the P3F ignores government actions and the labor market, nor does it take electronic connections and strategic alliances into account.

According to Grundy, T. (2006) the P3F has several downfalls. In summary, one could state that his critique mainly comes down to the model being too static and disregarding several influential factors. More specifically Grundy, T. (2006) says the P3F shy away from microeconomic analysis, hides complexity in value chains by not clearly differentiating between intermediate buyers and the end consumers and does not consider PEST and market growth enough. Grundy, T. (2006) also adds that it has become harder to identify the boundaries of industries as companies have become more fluid. To overcome the shortcomings of P3F Grundy, T. (2006) proposes adding a from-to analysis to account for significant industry changes making the framework more flexible to sudden market shift. Grundy, T. (2006) states this would make it easier to adapt the model to substantial variations in PEST factors. Further Grundy, T. (2006) proposed illustrating the dependencies between the forces in P3F.

Historic deregulation, globalization, and technology advances may have blurred or shifted industry boundaries but Porter, M (via Magretta, J. (2012, P167) argues it did not change that the configuration of five forces drives industry competition, not even in information-intensive industries that were very successful at adapting internet technology. According to Wang, F. & Zhang, X. P. (2015), the internet appears to increase industry concentration and profitability, but the effect seems to vary across industries. In the retail internet, adoption was higher than other sectors examined, and the impact (increase in industry concentration) was therefore lower.

McGrath, R who wrote the book “the end of the competitive advantage” question P3F arguing competition is about arenas not industry. McGrath, R (2013) suggest competition is often coming from other industries not other firms in your industry.

Reeves, M, et al. (2015) argued strategy can be viewed from several different perspectives. Suggesting managers faced a challenge in defining if the P3F is a relevant framework or perhaps the environment called for addressing other questions such as those proposed by McGrath, R (2013).

Overall Dälken. F (2014) considers the P3F important and its basic idea is valid both today and in the future regardless of discussing the new or old economy. He argues that globalisation, deregulation or digitalisation all have an impact on industry structure but in line with Porter agrees
they do not constitute independent forces.

Porter, M, E et Kramer, M, R (2011) suggested businesses could not merely focus on creating competitive advantage through the positioning in the P3F but also had to address the impact the firm had on society. In essence arguing firms would benefit from a shared value approach where the activities of the firm would generate economic value for the firm while creating value for society. This thought was more deeply outlined by the Institute for Strategy & Competitiveness (2018).

2.5 Suggestions on how AI might affect retail

The previous section with an analysis of the separate forces was supported with views on how the internet and smart and connected products might influence P3F. This section seek patterns of how online retail is being affected by AI.

Kumar, V et al. (2017) suggests data-driven strategies may be critical to offer customized promotions and product pricing across channels in the future. Another critical shift he suggests is the need to measure customer satisfaction through the entire customer journey, instead of focusing on the overall satisfaction. This 360 view will make it easier to improve the customer experience. Few retailers leverage insights from their data on customer purchases to identify profitable customers and optimize their targeting. This is of particular importance in referral programs where personalized deals can be leveraged to maximize the profitability of individual customers. Kumar, V et al. (2017) suggest that perhaps in the future retailers might even need to share data to evaluate the value of individual customers.

“Innovations are likely to help customers make good decisions, feel less time pressure, or even increase their confidence and satisfaction with their decisions.” Dhruv, G et al(2016)

Chui, M, et al. (2018) suggested five limitations organizations would encounter when working with AI. Data labeling is most often required to be manual to prepare training data for supervised learning(unsupervised labeling may become easier in the future). Massive datasets for specific business cases are often hard to come by as many organizations may have the data but not structured it. The outcome may be hard to explain due to the complexity of the models, and legal constraints may complicate a model that by and of itself may be valid. Applying an AI model to a new domain or use case may be complicated, and often the model needs to be retrained to the new setting. A final limitation that is more complex to deal with rather than resource intensive is the risk of bias. In the sense that biases in the input data are perpetuated and reinforced unintentionally.
3 Methodology

3.1 Introduction

The methodology section is inspired by the books “Business Research Methods” (Bryman et al 2011), “Vad, hur och varför?”(Dag, Ingvar, J 2002) “Att skriva en bra uppsats” (Lotta Rienecker, L et Stray, Jørgensen, P 2014). The study was also informed by the book Business research: A practical guide for undergraduate & postgraduate students (Collins, J. and Hussey, R 2013). The book was recommended course literature for the master's thesis at the KTH innovation and Entrepreneurship Master program. This section covers the research process from selection of research paradigm to the approach and data collection. But also the challenges with the selected method, the interview profiles of the thesis and the ethics and sustainability Issues.

3.2 Research Paradigm

The research paradigm is critical to properly elaborate as it is key to the method and informs the research strategy. There are two main paradigms defined by (Collins, J. and Hussey, R 2013), interpretivism and positivism. The positivistic paradigm often leverages a quantitative approach to determine a single and specific outcome where the researcher keeps a distance to the object of study. The interpretivistic often leverage a qualitative approach and where the researcher observes, but also add commentary, and elaborate subjective opinions to complement the study. The author noted several reports of qualitative nature investigating the impact of AI. More qualitative efforts suggesting perspectives from different experts was something the author did not find. This lack of qualitative inquiry and the possibility of being open to new information and many different views from the expert interviews made the author favor an interpretivistic approach.

3.3 Inductive vs Deductive Approach

An in-depth literature review is done on P3F searching for an analogous case or paper, and expert interviews are conducted adding different perspectives to form a hypothesis of how a potential effect on the respective force in the P3F would look.

The purpose of the research is to explain a new phenomenon/type of technology, (AI) that has little coverage in management literature from the Porter’s view. To allow a broad variety of answers and explore different avenues open questions are used, and the qualitative approach is favored. Large-scale quantitative studies of managers and employees expectations of AI has been conducted previously in no small extent by management consultancy firms such as Deloitte, Accenture, and McKinsey. For this thesis experts were interviewed to add commentary and insight to the P3F and the views were compared with previous papers by Porter on how new technology influence the P3F
and studies on the impact of technology in e-commerce.

A deductive approach could have been favorable to address the specific value AI may bring to a firm looking at how it would affect a particular capability of the firm for example. A challenge with that approach could have been getting data access something the author previously faced seeking to interview consultancy firms advising retailers.

Thus an inductive approach was favored whereby a smaller question was asked, and various frameworks were investigated searching for patterns or analogous cases that may be relevant to form the theory. The interviews then added further insight and developed the ideas found from the secondary research. This approach means the focus was on analyzing secondary data studying the phenomenon through interviews and then using the patterns and insights from the data collection to build up a theory.

### 3.4 Qualitative Approach

Research can either be quantitative, qualitative or a mix of the two. With respect to the length of the thesis a mixed approach was not feasible and not recommended by the thesis supervisor. As elaborated earlier, the interpretivistic paradigm often relies on a qualitative approach. Since there were no previous papers written where the phenomenon was studied from P3F (to my knowledge), the research would be exploratory by nature. The qualitative approach would lend itself well to

In a qualitative inquiry there tend to be substantial variation in the answers. Bryman et al (2011) argues that this may be countered for by adhering to a consistency in the structure of conducting the interviews. By systematically presenting the questions and follow up questions you minimise the risk of misrepresentation and misunderstandings, which benefit the quality of the enquiry. Since the ambition of the investigation was to choose a method that would be open for the discovery of new knowledge through the research process the qualitative research method appeared a good choice. It allowed the interviewees to great degree contribute with their opinion of what they thought was relevant for each question. This opened for interviewees making an own interpretation which consequently would increase the likelihood for a variation in the answers without an external influence.

**Interviews**
A critical aspect of the selected method was the openness to new information. This focus was reflected in using open questions whereby the interviewees where open to elaborate their answer and if not would be prompted to do so.

Examples where used to refresh/connect the interviewee with the P3F. But they were not suggested to the interviewee unless requested. The purpose was to not restrict the interviewee and let them expand their thoughts. The term AI was not narrowly defined to leave room for application areas and not limit the interviewee to a small technology application. The aim was for the expert to express a broad perspective where the different backgrounds would complement each other in creating a more holistic view.
The interview questions were sent before the interview to give the interviewee a chance to ask for further information regarding the P3F. And to collect their thoughts and ideas on the topic. This was done to make the interviewees feel more comfortable and get an understanding of the structure of the interview and method of the thesis. The first questions were simple where the interviewee described their gender, age, professional experience in the subject and short background.

The following questions began with a request for the interviewee to put further consideration on what they thought the implications would be based on their experience. This with the purpose of having them focus on the answer based on their experience. The interviewees got to answer the same questions, and they were asked identically. The support comments regarding Porter’s five forces and follow up questions were used to make the interviewees develop their answers. These were designed not to be charged with emotional language but prepared to make the interviewee wish to describe or develop their thoughts on the subject matter.

During the interview, notes were taken to capture the tone of voice, body language, and gestures that would not be possible to catch in an audio recording. These notes were appended to the transcribed interviews to support a more nuanced analysis of the interviewee's answers.

The interview length varied from 23-71 minutes with an average duration of more than 30 minutes. The interviews were conducted at the office of the interviewee when possible to decrease the stress and need to leave early. All interviews were made in person (but the interview with Krakowski that was conducted over Skype) to create a closeness between the interviewer and the interviewee. Secondly, one video interview where conducted. The disadvantage of the Skype interviews is that the interviewer might have harder to comprehend body language and other visual cues from the interviewee. By organizing the meetings separately the risk that interviewees affected each other answers decreased. The closeness was chosen to increase the interviewer's ability to create empathy and trust with the interview. The benefit of the selected method was that it increases the chance that the interviewee develops the answers deeper. The disadvantage was the considerable time investment.

To affirm the findings, interviews were complemented with secondary sources of data mainly reports and academic papers on the impact of AI. The academic papers from P3F, cover original ideas as well as more recent critiques and adaptations. The academic papers thus span a long period, but reports and academic papers covering the impact of the new technology are published mostly in 2017 and 2018 to include the most recent findings to date. Using secondary data from different periods of time is a type of data triangulation that Easterby-Smith, Thorpe, and Jackson (Collins, J. and Hussey, R 2013) may give greater reliability had only new materials or one single method been used.

### 3.5 Data Collection

The interviews were captured both on notes during the interview and audio. The supportive notes were then added to the transcription of the interview to ensure that visual cues and other vital details were captured. During the semi-structured interview the role of the interviewer is to open the interviewee to elaborate their answers further while not pushing the interview subject down a
predetermined path. One crucial aspect is not to inject bias to the interviewee by for example using a language that includes emotional words laden with values. Or giving one-sided examples that suggest a direction for the interviewee to follow. Another critical aspect is not to force an answer, the interviewee might not know of a specific effect, or example and a forced response may be more representative of the interests of the interviewer than the opinions of the interviewee. Further, it is essential to distinguish between interviewees using emotional words, i.e., I feel, or have a sense that this may lead to x vs. my research has found that these are some typical applications of y. Another critical factor is the interview length. To short interviews may mean that the interviewee cannot elaborate or have time to express the range of their opinions on the topic. However, having interviews of very uneven length may mean that other interviewees did not have a chance to add as much commentary or insight to the discussion. Each interview is denoted with its duration to give a sensation of the variance in length and the total length of each interview.

Each interviewee presents their findings and observations, using their experiences to frame the answers. This means the responses are representative of the experts being interviewed, but the interviews are complemented with other evidence from the literature.

Transcribing the interviews decrease the risk of data loss during the annotation, and decoding the answers help identify key trends. However, decoding the responses creates a critical imperative for the researcher to carefully examine the commonalities of the answers to group the answers correctly.

3.6 Challenges Qualitative Interview Technique

The qualitative interview technique relies on the ability of the interviewer to capture the answers of the respondents. Having one interviewer means there are fewer risks of variation in the interpretation of the responses. However, it also means that the interview is conducted by one person that simultaneously need to capture notes.

Reliability
In qualitative interviews it may be more challenging than for quantitative interviews to replicate the results of the study. Interpretivism and qualitative inquiries tend to more subjective by nature and thus replicating the results may be complicated.

A problem that may arise is the participant being biased to specific questions or the purpose of the interview. To account for this possible bias, the answer to each question was compared mutually for all interviews. (Leung, L. 2015). Another potential hazard is external factors. To avoid bias being introduced by external individuals, each participant was met in person and interviewed exclusively. (Collins, J. and Hussey, R. 2013). To open for the full range of opinions amongst the participants a semistructured approach was used where participants were encouraged to elaborate and exemplify their views. Interviews in person also allowed for note taking to note if participants felt uncomfortable at specific questions.

Validity
Reflect the degree to which the researchers were able to achieve their goal and how suitable the tools methods and processes supported the inquiry.

For the study, several research questions were considered and discussed with the supervisor before arriving at the focus. A range of methods was considered, but a qualitative study was chosen after the literature review identified several large-scale surveys had already been conducted investigating employees and management views on the technological change. The interview questions were discussed in detail with the supervisor, and a key challenge was establishing a set of questions that was relatable for the experts that had varying backgrounds. The participants provided valuable feedback during the study suggesting additional sources to investigate as well as providing insight on the topic that went beyond the scope of the research but contributed to a deeper understanding for the researcher.

**Generalisability**
Reflects the applicability of the findings to other research (Collins, J. and Hussey, R 2013). The limited number of interviews and focus on Sweden and online retail may reduce the possibility to generalize the findings. But to increase the probability of extending the research, careful consideration was taken to investigate Porter’s original theories. Further, critiques on the P3F, suggested expansions of the P3F, examples of how the internet changes P3F was analyzed. An example of how smart and connected products change the P3F and several papers examining the future of retail was also studied. The attempt was to embed the inquiry in previous research while adding new perspectives on what a technological shift, in this case, AI might mean to competition. Recent reports on the impact of AI across sectors and functions were investigated seeking to confirm findings in the literature review and support findings from the interviews.

This triangulation of academic papers on P3F, the future of retail + expert interviews + reports on the impact of AI was designed to create an informed understanding of the phenomena in the online retail sector but could also provide insights that may be relevant to other sectors. Thus the chosen method and depth of inquiry may contribute to making the paper possible to generalize in a broader context.

### 3.7 Interview Profiles

In the following section, each of the interview profiles are presented. The presentation includes the academic and professional background of the interviewees. The interview profiles range from researchers with deep knowledge of language technology and its applications such as Gustafson, Dalianis, and Espinoza, to forward thinkers advising companies on how they can embrace the new technology such as Teigland, Gradin, and Jansson. It also features Krakowski a PhD candidate currently investigating how business leaders can take advantage of the technology for decision support.

**Sebastian Krakowski PhD candidate Geneva School of Economics and Management**
Krakowski, S (2018, Linkedin) has a CEMS Master in International Management as Stockholm School of Economics. Krakowski worked as a consultant at EY and was a research intern at Zurich

**Joakim Jansson Author of Leading Digital Transformation and Founder DigJourney**

Jansson, J (2018, Linkedin) has a background from Marketing and Management at Uppsala University and KEDGE Business School. He is a lecturer at Stockholm School of Economics Executive Education. Jansson is the co-author of the book Leading Digital Transformation and founder of Dig Journey, a company that developed the Digital Maturity index a method for digitally transforming a company.

**Hercules Dalianis PhD and professor in Computer Systems Sciences at Stockholm University**

Dalianis has a background from Electrotechnical Engineering at KTH, The Royal Institute of Technology, and is a professor in Computer and Systems Sciences at Stockholm University since 2011. Dalianis, H(2018, Stockholm University) focus on clinical text mining to extract and present information for patients and clinical researchers. Previously Dalianis, H(2018, Linkedin) worked at SISU, Ellemtel, Ericsson and Cap Gemini. He co-founded Euroling and developed the commercial search engine SiteSeeker. Currently, he is leading a course in Language Technology, and Internet search techniques and Business Intelligence at Stockholm University, Department of computer and system sciences.

**Robin Teigland PhD and Professor in Business Administration, Strategic Information Systems Management Stockholm School of Economics (SSE)**

Teigland, R(2018, Linkedin) has a Bachelor’s in Economics from Stanford University and an MBA in Multinational Management at the Wharton School. She has written several books and reports on new technologies including the report, The Substitution of Labor – From technological feasibility to other factors influencing the potential of job automation. Teigland, R (2018, LinkedIn) has been listed amongst Global Top 50 business professors on Twitter and Sweden’s most influential women 207 and 2018 by Veckans Affärer. Teigland’s research focus includes technology-based strategy, digital entrepreneurial ecosystems and the impact of digitalization. Teigland, R (2018, Stockholm School of Economics) has spoken for various organizations across industries including the Swedish Ministry of Finance, Central Bank, Microsoft, Google, and H&M.

**Henrik Gradin PhD and Founder HAJ Enterprise,**

Gradin, H (2018, Linkedin) have a background in Economics from Stockholm School of Economics, Engineering and Physics at KTH and a PhD in Microsystem Technology and Electrical Measurements at KTH, The Royal Institute of Technology. He is a serial entrepreneur and the Co-Founder of PromikBook, Mavschack, EQ Accelerator, Magnea, and OpenRatio. At Exponential Gradin, H(2018, Linkedin) is an expert advisor in AI, ML, and Data Science.

**Joakim Gustafson PhD and Professor at Department of Speech and Music at KTH, The Royal Institute of Technology**

Gustafson, J (2018, Personal profile) has a background creating dialogue systems in the 90s and for example worked on a solution for browsing apartments via spoken dialogue. He worked with speech applications at Telia and has been an advisor for commercial launches of speech applications. Since returning to KTH Gustafson has been working on several dialogue projects with
human-computer interactions and the work with the social robot "Furhat" being a notable startup from his team. Gustafson, J (2018, Personal Profile) is a lecturer at a course in Speech Technology and member of the editorial board of the journal Speech Communication.

Fredrik Olsson PhD Research Scientist FOI and Partner Gavagai
Olsson, F (2018, Linkedin) have a background in Computational Linguistics at Uppsala University and a PhD in computational linguistics at University of Gothenburg. He was a Research Scientist at RISE where he studied information access and refinement and Software developer at recorded future where he facilitated extraction of facts from text. Currently, Olsson, F (2018, Linkedin) is researching NLP at FOI.

3.8 Data Analysis

Initially, data is collected by attending seminars from various consulting firms and leading organizations such as Google and IBM on the impact of AI on companies ability to compete. Further adding to the research a wide literature review is conducted. The literature review focus on core theories of Michael Porter and analyzing Porter’s original papers. Then expands the attention to include examples of Porter, M, E (2001) view on internet competition and Porter, M. E., & Heppelmann, J. E. (2014) evaluation of how smart connected products transforms competition. Further papers are investigating the impact of the internet on competition and expanding as well as critiquing the P3F are examined. These views are complemented with insights from experts adding their perspective on what the current impact of the technology is, especially within the online retail sector. Each interview is transcribed and examined first independently and then together with all interviews to seek recurring patterns and lines of thought. Answers are coded into specific effects on the P3F and references to related concepts and theories found earlier in the literature review.

To further analyze the impact on retail, recent papers on the impact of technology on retail are included in the discussion. All papers previously mentioned are supported by recently published reports on the impact of AI.

3.9 Ethics and Sustainability Issues

An important factor to consider while conducting research is the ethics and sustainability issues that may arise as a consequence of the study. Bryman et al (2011) argue that there are four main groups of concerns in a study. Harming, forcing or subduing consent, invading the privacy, being deceptive towards the participants. In clinical trials for example it may be important to consider the potential harms to participants being part of the study. Here one may need to weigh the benefits with the costs of the study carefully. For this study such physical harm was unlikely and to ensure no harms were made to career prospects or similar each participant received a copy of the specific statements and insights that would be included in the study from their interview. Each participant was asked if they would accept being featured by name, and title within the study. The description of the participants was also sent to them for approval prior to publication. Each participant was
asked if they approved a recording to be used for transcribing the interview. The recordings were then guaranteed to be destroyed after the content had been transcribed, respecting the participants right to privacy. In the cases, interviewees mentioned information that might be sensitive they were asked if the information may be sensitive before publication and the specific information was highlighted for their approval. To reassure the participants, the questions were sent a-forehand and focused on their particular experience(s) within the subject. The purpose of the study was explained just prior to the interview to again reassure the participants and avoid any risk of being interpreted as deceptive.

An important ethical consideration to take into account within the scope of the research is the potential use of the findings of the study. In this study there may be a risk concerning the possible impact of automation on labor. To carefully give attention to the subject, Robin Teigland one of the authors of: The Substitution of Labor: From Technological Feasibility to Other Factors Influencing Job Automation was interviewed. Teigland’s research is also included in the literature review and discussion. Sustainability issues are also to take into account for a researcher. For this research, there may be limited immediate harmful effects on natural and environmental factors since the discussion is centered around leveraging AI for online retailers and not mainly producers (where the case could have looked differently). General Data Protection Regulation (GDPR) and questions regarding the right to privacy are addressed but not the primary focus for the enquiry.
4 Findings and Discussion

In the following section, the Ai potential for online retail is discussed followed by each of the five forces in P3F with commentary from each of the interviewees. Further commentary is added with Porter, M. E (2001) insights on the impact of the internet on P3F and Porter, M. E., & Heppelmann, J. E. (2014) analysis of the impact of smart connected products on P3F.

4.1 Where does the potential lie for online retail?

Looking into past transformations, we find Porter, M, E (2001) argues the internet improve operational effectiveness due to faster information transfer and lower investment requirements. However, these benefits can be adopted by all actors. Porter, M. E., & Heppelmann, J. E. (2014) argue that the most significant risks with smart and connected products are to develop unwanted product features, individuals being concerned about their privacy, and failing to capture technology shift, being stranded with an outdated business model or product.

More recent reports such as Vinnova (2018) argue it would perhaps be extensive encompassing automation, innovation, and transformation.

Kumar, V et al. (2017) further suggest that perhaps in the future retailers might even need to share data to evaluate the value of individual customers. Kumar, V et al. (2017) argues that today few retailers leverage insights from their data on customer purchases to identify profitable customers and optimize their targeting. He suggests data-driven strategies may be critical to offer customized promotions and product pricing across channels in the future.

“Today many focus on optimizing current (value)chains. Ex H&M has had a poor online presence. They will probably optimise their stores. Zara has been skilled at lowering lead times and can quite fast see what works in the store. This may be a basis for redefining how they work” Olsson, F(2018)

Olsson, F(2018) suggested a case that may also be applicable for an online retailer that wish to compete using AI and more specifically NLP. Say you are a bank and have a lot of customer conversations (internal data). Maybe customers suddenly start speaking about the customer service in negative terms. Then you can quantify it to see if it is connected to a specific topic… Perhaps a new product has just been launched, and the ones organizing the campaign have not alerted customer service. Customer service has not increased the staff, so many customers calling about the new service are met with an occupied line. Olsson, F(2018). Gustafson, J (2018) developed the value of conversations further suggesting that via the speech enabled customer care line could tap into consumers needs that are unknown by the company. These needs may become visible when the consumers are not as clearly restricted by menu choices but rather engage in a dialogue.

In Krakowski, S(2017) view human judgment plus data is the most potent combination. According to him, big data does not mean your information is objective and reflect peoples true opinions. However, he argues that in some cases it may be useful for product development to be data-driven/data-informed (which AI/NLP can support). Krakowski, S(2017) argues that you may be able to
improve a product but probably not reach perfection with data.

“Data is not objective... it's similar to what Ronald Coase once said, that if you torture the data long enough it will confess” Krakowski, S(2017)

Jansson, J(2018) suggested AI would be integrated in three phases in online retail (and other businesses) during the interview. Outlining the three phases in figure 2 Jansson, J(2018) elaborated that in phase 1: current operations are the lion part of your activities, and there is an emerging AI component on an experimental level. Phase 2: the AI component increases and the current operations might even decrease slightly. Internally you may discuss what AI should complement or replace and what processes that should be left untouched (co-ordination phase). Phase 3: AI and current operations are integrated, and you don’t think in terms of AI or not. Jansson, J(2018)

Figure 2: The three phases of maturity in digital transformation, Jansson, J et Andervin, M (2018)

4.2 Competitive Rivalry

Competitive Rivalry is one of the forces previously discussed in the literature review and a force several authors noted as key. Here follows a summary of the participant's suggestions on how the force may be affected by AI in the retail sector. Krakowski, S (2017), Teigland, R(2018) and Jansson, J(2018) suggests both co-operation and competition may increase. Dalianis, H(2018) suggest technical aspects of online retailers such as Search Engine Optimization (SEO) and Search Engine Marketing (SEM) may become more complex with AI and recommendations may evolve to be more dynamic using AI.

According to Krakowski, S(2017) the direction of the effect depends on how the industry actors operate, retail electronics being very different from computer/it development firms. Further, he elaborates that organizations may believe data is where their competitive advantage lies. And that research partnerships may in part be conducted due to the risk of being regulated.

“AI and ML research is not as affected by competition as you may find within computers and software. Within ML and AI there is both competition and co-operation.” Krakowski, S(2017)
Teigland, R(2018) mentions how people discuss common problems on boards and forums in open source software, even for firms such as Automattic (the firm that enables Wordpress) which has a 25% market share in content management systems (CMS). There AI can be leveraged to predict areas where development is needed (leveraging economies of scale and scope). Further Teigland, R(2018) elaborates that Alibaba does this too, where they identify problems related to distribution, payment or marketing for example.

"AI can help through the whole process, from identifying the need to developing the product and how it should be refined" Teigland, R(2018).

Jansson, J(2018) thinks AI will make it more competitive and increase collaboration (in retail), however, Amazon is the actor Swedish retailers fear. He elaborates that if an industry experience an outside threat co-operation tend to increase and actors try to find ways to partner to remain competitive. An example was the actions in the media industry from news magazines trying to fend off Google.

Large firms are probably not as swift and will probably acquire AI firms to access technology, know-how and talent. Sometimes in alignment with a grand strategy and other times less driven by their strategy. Jansson, J(2018)

Dalianis, H(2018) argue that data may be used to develop new services and products something already happening. He elaborates that this, in turn, may make advertising more targeted and AI could be leveraged more within SEO and SEM, making it easier for customers to find your website (thereby increasing competition). On sites, content can be displayed according to the users' preferences, similarly to how news websites surface content based on preferences. Dalianis, H(2018) mentions a case where a student looked at headline classification and found headlines often not to be descriptive of the content of the article.

According to Olsson, F(2018) smaller firms must probably partner with large actors, perhaps exchanging knowledge to analyze data.

The value in firms and business is increasingly being connected to the data you own. Execution is important but without the data there is not too much (leverage) - Olsson, F(2018)

Porter, M, E (2001) argued that the first mover advantage with the internet would be lower due to limited switching costs to another supplier and the network effects would be difficult to capture. He suggested barriers to entry would be hard to raise and brands being challenging to establish. Porter, M. E., & Heppelmann, J. E. (2014) indicated that the cost structure of the firm would determine the impact on the rivalry. Further adding that overspending may occur as firms struggle to anticipate features consumers value adding unnecessary features, but variable costs may decrease as it becomes easier to predict when consumers need to make a new purchase.

4.3 Threat of New Entrants

The threat of entrants is one of the forces previously discussed in the literature review. Here the

Krakowski, S(2017) suggests two separate lines of thought. Barriers to entry may increase as the value of data is self-reinforcing. The monopolist gets the upper hand and having more information yields a compounded value over time. However, he also notes the open source movement and limited compute power to create for example new financial algorithms. According to Krakowski, S(2017) network effects are vital to understanding AI, and it can be very hard for other firms when a company dominates a vertical (may increase first mover advantage).

“The tool is not the barrier to entry but the data is and the one who owns the data has the competitive advantage” - Krakowski, S(2017)

This view of the open source movement is also reflected by Teigland, R(2018) who notes that barriers to entry have dropped significantly (in particular capital requirements), partially due to cloud services. She suggests that it is easier to access the resources you need, but cautions one to think of all data Airbnb, for example, has, questioning if that market is desirable to enter.

Many companies today are asset light, not asset heavy - Teigland, R(2018)

Gradin, H(2018) suggests decisions such as where to allocate a store may be complicated due to lacking data for a large number of parameters involved but certain types of predictions such as forecasting next seasons fashion trends may become more straightforward.

Teigland, R(2018) elaborates that the trick is getting a critical mass of users, but the challenge is to get enough users to continuously interact with the platform. She suggests that scraping the web or hooking up with free datasets can be very valuable. Teigland, R(2018) argues for a demand-side economy of scale vs. supply side economy of scale based on network effects.

In strategy you should never fight someone head on, think about how you can differentiate - Teigland, R(2018)

Teigland, R(2018), thinks it is imperative to find strategic partnerships and open data sources. It's important to identify which data you want and need, while not creating a garbage pool of data. There are many ways to get data; you might engage customers in competitions for example. The first question is which data you need and why.

Dalianis, H(2018) lines of echoes Teigland and argues local actors should fight for a niche and thus keep an advantage to foreign competition. He gives an example of working with a firm in search that would win clients in competition with Google perhaps in part due to customers preferring a local provider. Dalianis, H(2018) cautions that publicly available data is quite restricted and (smaller) firms would typically not have access to too much data.
Olsson, F (2018) elaborates and distinguishes between passive and active data. Passive data is created when sensors track consumers movements for example. It is quite simple and doesn't require much energy or attention from the user. Active data can be created when a user tweet for instance. It requires much more effort.

The active data is quite scarce, if you segment demographic data, man aged 25-30 etc then the data become scarce very fast. Olsson, F (2018)

Porter, M, E (2001) argued outsourcing would increase with the internet and make firms more vulnerable to suppliers and new entrants taking advantage of their limited capabilities. Porter, M. E., & Heppelmann, J. E. (2014) suggested market entry would become more costly due to products being more advanced, and customers might be more deeply attached to a supplier (switching costs increase). Porter, M. E., & Heppelmann, J. E. (2014) also argue for the case of open solutions that focus on servification and interoperating with multiple systems among new actors that specialize in software development.

4.4 The Bargaining Power of Suppliers

The Power of Suppliers is one of the forces previously discussed in the literature review. Here the participants provide their suggestions on how the force may be affected by AI in the retail sector. A long tail effect is discussed by Teigland, R (2018), whereby the global market becomes more accessible. Gradin, H (2018) consider the potential advantage of having better data. Jansson, J (2018) further the discussion and suggests the value chain will have fewer actors, which touch upon Krakowski, S (2017) reasoning on the effect of optimization on logistics.

According to Krakowski, S (2017) traditional industries especially logistics is one of the five forces in P3F that will be most affected. This due to constant optimization, and a decrease in negotiation power. He suggests buyers (not end consumers) have more control of the entire value chain and can track particular things via more and upgraded sensors.

"Visibility is simpler and transparency is also increasing which may not be to the advantage of the firms (suppliers)" Krakowski, S (2017)

Teigland, R (2018) argues there is already a shift being discussed namely a third industrial shift from global chains to small-medium sized players selling through global platforms. In Teigland’s, R (2018) opinion AI could make it easier for suppliers to find customers with aligned values and producers that were previously hard to access. She gives the example of a woman in Holland who order supplies from Alibaba - obtaining plastic filament from a Chinese firm and acquiring small motors from another company.

"It becomes much easier to find niche demand and capture the long tail" Teigland, R (2018)
Gradin, H(2018) argues for a situation in which the organization with best data on user behavior makes the best recommendations. He suggests a case where power is centralized as smaller actors have less good access to data. However, Gradin, H(2018) suggests blockchain may decentralize information and widen access to data. Further, he elaborates that it is unclear how long consumers will allow unfettered access to their behavior.

Jansson, J(2018) suggests technology shifts which AI is an example of, often provide subcontractors get an opportunity if suppliers don’t act. He elaborates that the number of actors in the supply chain has decreased and the tendency is to supply the consumer straight away, building an ecosystem supporting the strategy.

Porter, M, E (2001) argue supplier becomes more easy to find and supply chain intermediation increasing with the internet. Porter, M. E., & Heppelmann, J. E. (2014) states that internet-enabled products to connect customers and the firm thereby decreasing the power of buyers and intermediaries. Further suggesting that customization can increase switching costs (easier to use default suppliers with stored settings).

4.5 The Bargaining Power of Customers

The Power of Customers is one of the forces previously discussed in the literature review. Here the participants provide their suggestions on how the force may be affected by AI in the retail sector. Krakowski, S(2017) argues network effects probably will shift the advantage to retailers or suppliers, Teigland, R(2018) argues network effects on the opposite end of the scale might be leveraged by consumers coming together. Both Gradin, H(2018) and Jansson, J(2018) look at how technology advancements such as personalized AI or home assistants might give more leverage to large actors (shifting power from the customers).

Krakowski, S(2017) suggests the increased transparency via price comparison sites decrease margins (over time). However, he posits that salespeople might just as well get more influence as they can track the decision-making process and analyze consumer behaviors online. Krakowski, S(2017) thinks AI marks the shift from looking at clicks to attribution tools that allow organizations to analyze the customer journey over time. He states that the more online retailers know about customers, the greater the advantage is for them.

“Network effects are a part of the basis for the disruption of industry structures... In this perspective the customer power (leverage) decrease” Krakowski, S(2017)

Teigland, R(2018) suggests consumer power depends on bargaining power. In her view collectively joining resources, for example, partnering with industry associations, governmental organizations or students may help create leverage. Teigland, R(2018) gives an example with bitcoin, a bottom-up initiative, where many had different motives but shared a common purpose.

“If you can gather people under a common purpose you can start developing things together” Teigland, R(2018)
Gradin, H(2018) argues that customers already have powerful tools such as Prisjakt (Swedish price comparison site) and would not need AI. He suggests that when AI becomes personalized, there may be more powerful filters that allow you to automate purchasing decisions and strong players like Facebook may take advantage of the more customized algorithms. However, Gradin, H(2018) argue that the problem with personalized AI is the sparsity of data.

“Even actors such as Netflix that generalise movie content use a manual process” Gradin, H(2018)

Olsson, F(2018) suggest AI will be more personified and mentions the segment of one. Taking the Spotify recommendation lists as an example of recommendations particular to an individual. However, he cautions that transparency must increase when the recommendation is personal and not for a group. Adding that users might desire a reset feature if the recommendation becomes out of line with their preference.

“Perhaps in finance, recommendations absent of the intuition, have a hard time convincing the human operator that the algorithm is sound” Olsson, F(2018)

Jansson, J(2018) argues that home assistants such as Amazon Alexa may allow consumers to order straight via the device and could perhaps in the future predict the need of repeat purchases such as milk. He foresees a shift from transaction to subscription models for example always paying to have milk in the fridge. From Jansson, J(2018) perspective an actor like Amazon with the logistics, marketing, and communication power via Alexa installed seamlessly in (almost) every home will change things.

Gustafson, J (2018) discussed that speech technology was often thought of as providing access to customers, however there were other possible end goals such as entertainment. He gave example of this with the Alexa prize, a speech technology competition to create an engaging conversation that lasts longer than 20 minutes. The two visions for speech suggested by Jansson, J (2018) and Gustafson, J (2018) points to the two main reasons Gustafson, J (2018) suggested for considering speech technology.

“Is the aim cost reduction or some other customer value?” Gustafson, J (2018)

Porter, M, E (2001) argues differentiation may increase as it becomes easier to offer other values than price, but most likely power shifts to the consumer (increase access to options).

4.6 The Power of Substitutes

The Power of Substitutes is one of the forces previously discussed in the literature review. Here the participants provide their suggestions on how the force may be affected by AI in the retail sector. Krakowski, S(2017) suggests the substitutes may be easier to find, Teigland, R(2018) and Jansson, J(2018) argues for the challenge of defining your competitors and which industry you are in.
According to Krakowski, S(2017) the information asymmetry is reduced, and it becomes easier to be aware of substitutes. He posits that substitutes probably are one of the forces in the P3F least affected by the technology shift. Krakowski, S(2017)

Teigland, R(2018) gives an example of the auto-industry, previously there were few options to get from a to b. You could buy/rent a car, or order a taxi. Now you can rent from your neighbor, rent a driver, be the driver, order Uber or perhaps use VR instead of taking the car.

“Substitution is a force that is increasing in most industries, especially the variety of substitutes” Teigland, R(2018)

In Teigland’s, R(2018) view it is about solving customer needs, perhaps not through your product(only), but by becoming a destination (full provider) for a consumer. Teigland, R(2018) gives a travel example. A hotel is not just one problem it is also about finding activities and perhaps renting a car. Teigland, R(2018) argues companies must go beyond thinking of the product or service and consider how an ecosystem of partners can create a portfolio of offers to become a destination.

“Lines between industries are diffusing and many basic assumptions of strategy are questioned. How the definition of industry changes throw the P3F in a new light” Teigland, R(2018)

Jansson, J(2018) argues that industries will shift and be redefined with AI. In his view, one of the hardest things to know today is who you are competing with. Jansson, J(2018) elaborates that the faster an industry is being transformed, the harder it is to define your competition. While it may be hard to understand the competition Jansson, J(2018) argue that you should understand the customer and how you can satisfy their needs.

“Substitutes are likely to increasingly steal market share or create direct substitutes” Jansson, J(2018)

Porter, M. E (2001) argues copycat behavior might emerge as companies increasingly partner to create new products and services. Porter, M. E., & Heppelmann, J. E. (2014) suggests improved capabilities of connected products might out-crowd niche products with few features or current non-connected products. Servification may create new business models for renting instead of buying with fewer products in total being demanded.
5. Conclusion

5.1 Conclusions

A thorough analysis has been made to investigate How is AI influencing industry competition? An exploration of online retailing using Porter’s Five Forces Framework. The literature has been deeply examined to find similar cases, mainly from Porter, M, E (2001) paper on the internet and strategy as well as Porter, M. E., & Heppelmann, J. E. (2014) perspective on smart and connected products. Further interviews and commentary have been added to each of the five forces within the P3F. In the following section each of the forces is addressed more in detail. Then the author attempt to illustrate How Artificial Intelligence affect Porter’s Five Forces for online retailers with cues taken from the interviews in figure 3.

The effect of AI on competitive rivalry for online retailers seem to be that it both increases competition and collaboration Teigland, R(2018) and Jansson, J(2018). Porter (1980) similarly proposed industry actors may pursue varying goals and leverage different strategies. Dalianis, H(2018) suggested competitive rivalry may increase due to retailers working more with SEO and SEM strategies. However, it may just as well increase partnerships due to data sharing as Kumar, V et al. (2017) proposed. A driving factor for the influence of the force is the type of data a retailer may have access to and Chui, M, et al. (2018) raised the challenge that many retailers might not have access to the massive datasets needed to fully leverage the technology.

For larger competitors fighting their rivals on the market, interviewees saw great potential in applications using existing active data streams. Interviewees suggested current applications of AI seemed to focus on optimizing existing value chains but indicated that in the future AI and NLP would perhaps increasingly be used to redefine how organizations work. This aligns well with the insight from Porter, M, E (2001) on how the internet, the new technology would improve operational effectiveness. The difference here is that the key to leveraging the operational effectiveness often is the access to data and in particular active data, whereas the internet was a technology all actors could more readily leverage. For larger actors, a suggestion was to consider acquiring smaller and more nimble actors that were prone to experimentation.

The effect of AI on threat of entry for online retailers seem to be that it both may increase and decrease Krakowski, S(2017) and Teigland, R(2018). Data access becomes the critical factor for the direction of the effect as suggested by Krakowski, S(2017) and Dalianis, H(2018). It may also become more important to differentiate from competitors as Dalianis, H(2018) in line with Teigland, R(2018) proposes. Porter, M. E., & Heppelmann, J. E. (2014) argued for how servification would increase with smart and connected products and increased intelligence of suppliers would make entry harder. For smaller actors either trying to enter the market or offering substitute products, the interviewees suggested using various techniques to build a sufficient user base where the insights could be operationalized. Porter, M, E (2001) argued outsourcing would increase with the internet making firms more vulnerable to suppliers. In a similar fashion outsourcing of analytics may make online retailers more vulnerable to their suppliers.
The effect of AI on the power of suppliers for online retailers seem to be that it mostly decrease but future advancements in blockchain technology may decentralize power. Teigland, R(2018) argues for a long tail effect whereby the global market becomes more accessible, however, Jansson, J(2018) proposes a value chain with fewer actors where suppliers directly supply consumers. This aligns well with Porter, M, E (2001) who argue suppliers becomes more easy to find and supply chain intermediation increasing with the internet. Krakowski, S(2017) suggest constant optimization of logistics and a decrease in negotiation and power of suppliers. Gradin, H(2018) suggests blockchain may decentralize information and widen access to data.

The effect of AI on the power of customers for online retailers seem to be that it decrease customer influence, but privacy laws such as GDPR may have a large effect. Krakowski, S(2017) argues network effects probably will shift the advantage to retailers or suppliers but Teigland, R(2018) argues network effects on the opposite end of the scale might be leveraged by consumers coming together. Gradin, H(2018) and Jansson, J(2018) argue advancements such as personalized AI or home assistants might give more leverage to large actors (shifting power from the customers). Interviewees suggested the impact of regulation referencing GDPR, but the specific outcome of the law for various forces was still not clear except that it had a significant effect on actors ability to gather active data without explicit user consent. This sentiment was echoed by Porter, M. E., & Heppelmann, J. E. (2014) who suggested users fearing their privacy may have an impact on the technology adoption.

The effect of AI on the power of substitutes for online retailers seem to be that it increases the influence of substitutes but overall interviewees find the effect hard to discern. Teigland, R(2018) and Jansson, J(2018) argue for the challenge of defining your competitors and which industry you are in and Krakowski, S(2017) suggests the substitutes may be easier to find. Krakowski, S(2017) suggest it is the force that is least affected by AI.

The interviewees agree several of the forces in P3F are likely to be affected by the usage of AI in online retail. One of the driving factors several interviewees single out affecting several of the forces is who controls the access of the data. Depending on the power balance between the forces in the P3F, active data may be owned by rivals, suppliers, buyers or substitutes. Thus it becomes harder to generalize the effect on the respective forces. However, all interviewees seemed to agree on the transformational potential and echoing Porter, M. E., & Heppelmann, J. E. (2014) insight that failing to capture the technology shift might leave firms being stuck with an outdated business model or product.

In summary AI may have a deep effect on several of Porter’s forces for online retailers, however the effect for a particular online retailer largely depends on who controls the access of data. Figure 3 which follows, further detail the effects on P3F that was elaborated more in detail in the previous sections.
5.2 Recommendations

If an online retailer considers implementing an AI solution perhaps involving NLP, there are some things worth considering. According to Olsson, F(2018) a challenge is that while language is natural for humans, it may be hard for machines to know how to handle things. A word can simultaneously be positive, negative, a verb and a noun. This leads to difficulties in managing expectations of users since the answers are often not exact. The second challenge is the access to data. Olsson, F(2018) elaborates that it is particularly hard after GDPR to collect data without limits.

People don't understand how to formulate the problem... and people seldom understand that you as an operator need to do things, you can't just take a component and use it. Olsson, F(2018)

For managers considering exploring AI within their organisation it may be useful to regard the three phases suggested by Jansson, J(2018).

5.3 Implications and Contributions to Relevant Fields of Study

AI is in an early phase and it is important to keep in mind as one interviewee raised. AI is often misused as a buzzword and many products claiming to leverage AI was in reality not. In retail
some companies may have started to experiment with online-based customer chatbots (customer service), overall retailers probably leverage AI to test the customer interface, presentation of goods in stores, and customer data analysis (prediction and identifying patterns). When we access new technology, a general tendency is to try doing the same things as before but slightly different because we have not figured out how to full advantage of the new technology. Traditional companies are probably adding some AI to what they already do, while new firms particularly startups look at the pains and how they can think different, and perhaps being more apt to finding disruptive solutions. Jansson, J(2018)

The findings from the interviews aligns well with the effects that Porter, M, E (2001) mentioned in his work on the internet and strategy as well as Porter, M. E., & Heppelmann, J. E. (2014) work on smart and connected products. However, as some of the interviewees noted, AI is currently mostly focused on improving operational excellence, while in the future it may support to redefine how companies operate. One fundamental difference that interviewees highlight is the challenge of defining in which industry one competes and the importance of being a part of a broader solution to a customer problem. These network effects have been discussed previously by other authors, but AI might further push the importance of considering its impact on the model.

The study has suggested ways in which AI is affecting industry competition within the P3F. In particular by illustrating the effects that was found in the interviews in Figure 3 illustrating How AI affect P3F for online retailers, as well as addressing the effect on each of the force separately. Many of the aspects of the P3F has proven to be valuable for identifying ways in which competition may change. However, when the data a firm owns is to a significant degree the basis of its valuation one may question how this affects the depth of which one considers industry position.

5.4 Limitations

The thesis examined the Swedish market and interviews were conducted in Sweden. A more global outlook would have been preferable, especially to contribute with an understanding of how different market may evolve. Online retail was the sector in focus but having investigated and compared different types of online retail could have contributed to an understanding of how digital maturity may look different within the sector. Examining the impact of AI on online retail with another sector could also have provided a benchmark for how the forces may affect sectors differently. The interviews were conducted with researchers with a background in NLP/ML and researchers advising organizations on the impact of new technology. It could have been valuable to include firms explicitly working with AI technology applications in retail. The thesis did not investigate the impact of AI on generic strategies. This was with respect to the significant time investment made by interviewees to discuss the topic.
5.5 Future Research

So how does one continue the research based on the implications from this study? Three avenues are suggested following perspectives addressed in the critique to P3F and insights from the interviews. To look at the question from the perspective of McGraph, another strategist. To look further at the question with more recent thinking from Porter. Finally to look at the question through a range of strategy perspectives as suggested by Reeves.

One approach is to follow the path suggested by Teigland, R (2018) to look beyond industries and focus on creating destinations. This view is quite well aligned with the McGrath, R (2013) who argues competition is about arenas. Here an interesting area of research could be to review recommendations based on an P3F analysis for a group of online retailers considering to work with AI. Compared with recommendations from looking at the same group of online retailers from the perspective of transient advantage and McGrath, R (2013).

A second approach would be to analyse the relationship between AI and Porter, M, E et Kramer, M, R (2011) theory on shared value that was outlined by the Institute for Strategy & Competitiveness (2018). Here it could be advantageous to investigate how firms may leverage AI in shifting from their traditional strategic positioning (industry) to their new purpose based strategic positioning (purpose).

A third approach would be to follow the different approaches to strategy by Reeves, M, et al. (2015). Who propose that many firms cannot only have one strategy but may need to take multiple types of strategy philosophies into account. Here it could be valuable to analyse a group of online retailers considering to work with AI to see if the classical framework of strategy is sufficient to analyse their positioning.
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7. Appendix

7.1 Interviews

Introduction

Please describe your background

Please describe Artificial Intelligence to a non technical audience in one sentence

Have you worked with NLP before if yes - please give example(s) i.e creating recommendation engines or prediction models

Industry Competition (main discussion questions)
How do you think Artificial Intelligence will affect industry competition in retail in the short (1 year) and medium term (3 years)?

Threat of entry (if prompted give further explanation)
Please give an example of how you think Artificial Intelligence will affect this force

Industry rivalry (if prompted give further explanation)
Please give an example of how you think Artificial Intelligence will affect this force

Supplier leverage (if prompted give further explanation)
Please give an example of how you think Artificial Intelligence will affect this force

Customer leverage (if prompted give further explanation)
Please give an example of how you think Artificial Intelligence will affect this force

Substitute goods (if prompted give further explanation)
Please give an example of how you think Artificial Intelligence will affect this force

Generic strategies (secondary discussion questions)
How do you primarily think Artificial Intelligence can contribute to make existing products and services 1: better, 2: cheaper 3: create new products and services.

Optional questions (further support prior questions)
How do you think Artificial Intelligence will be used to 1: ANALYSE 2: PREDICT customer behaviour in 5 years from now?

How do you think Artificial Intelligence will be used to 1: ANALYSE 2: PREDICT competitor behaviour in 5 years from now?