THE NEW DIGITAL AGE OF MARKETING

A PILOT STUDY ABOUT CHALLENGES ASSOCIATED WITH DIGITALIZATION IN MARKETING

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Abstract:

This thesis examines Swedish marketers' digital transformation and how they utilize data and heuristics in decision making. Digitalization has developed rapidly, and affected many business functions, not least marketing. As technological advancements proceed continuously, there is a need to increase the understanding and implications this has on marketers. The authors do this through a pilot study of a quantitative study of marketers in Sweden.

The results from the pilot study indicated that the areas of research were of relevance to marketers and with some changes could be conducted in a large-scale quantitative study. However the research area of this pilot study has a large scope and the format should not be directly copied. Instead, future studies need to use the questionnaire where it makes sense to study the phenomenon.

Keywords:

Digital transformation, Big Data, Digitalization

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Definitions

Algorithm: The definition of algorithm used in this thesis is a set of rules or computational instructions that in fixed order calculate numerical data, often in order to solve a mathematical problem (Cambridge Dictionary, 2020).

Machine Learning: In this thesis, machine learning is defined as algorithms that improve autonomously and automatically, building their own experience (Carnegie Mellon University, 2020).

Digitalization: Digitalization is an ambiguous term, with several interpretations. In the business framework, one way of interpreting it is as the use of digital technologies to change a business model and provide new revenue and value-producing opportunities (Gartner Glossary, 2020).

Big data: The use of advanced techniques to analyze large and diverse data sets.

Contents

1. INTRODUCTION

1.1. Opening

Digitalization has been developing rapidly and businesses are adopting new ways of working with marketing. There are significant benefits to these improvements, but many organizations have difficulty transforming the way they do things to new standards (Andersson et al., 2018). A part of the problem is gaining the momentum and support to move organizational members into new ways of doing things. There is an extensive increase in use of data and advanced analytical methods (Almqvist, 2018; Andersson et al., 2018). Thus, there needs to be further understanding regarding where digital change processes fail, and what are the implications of the increasingly data driven and digitized marketing activities.

1.2. Background

1.2.1. Successes and failures in business digitalization

Early on in digitalization of businesses, there was a belief that so-called expert systems would be able to greatly improve operational performance. When fully developed, these would be able to use data input and based on the designed algorithm be able to produce an answer. It was found however, that it was too optimistic to believe they could produce quality answers, as the phenomenon they analyzed were too complex to design an algorithm for (Bell, 1985). Instead, artificial intelligence emerged as a superior alternative, where the system would use sensory input to teach itself how to solve problems, then use this to make predictions. The system reasons to interpret perceptions, draw inferences, solve problems, and determine actions based on a given set of goals or tasks which it should achieve. The more data that is processed, the better this analysis becomes (Tecuci, 2011).

Managing digital transformation is an important area for business performance. Andersson et al. say that digitalization has reached all sectors in society (Andersson et al, 2018). This has led to a transition process where the future is more unpredictable than previously and a threatened competitive position. A challenge that is presented to incumbents is that they need to transform while simultaneously remaining profitable on a quarter-by-quarter basis (Andersson et al., 2018).

The need for digital transformation thus becomes obvious and a successful digital transformation may be a key component in sustaining a company's competitiveness.

Further Andersson et al. (2018) found that managers they interviewed encountered strategic issues regarding Big Data. One issue is whether they should build internal capabilities to handle big data or if they should outsource it. Another issue is about if

the analysis only includes data from the company's own product. Such an analysis is of less usefulness compared to one where information about competitors' products are analyzed (Andersson, et al., 2018).

1.3. Big Data

A popular and common term often used in business today is Big Data. First appearing as a business term during the 90's (Diebold, 2012), today it often refers to data sets of large and varying volume that are easily accessible and can be used in analysis. A popular definition for this are the three V's, namely Volume, Variety and Velocity that demand large scale information processing. (Gadomi & Haider, 2015; Gartner IT Glossary, 2020). The utilization of big data is diverse, since it isn't inherently limited by any characteristics but those previously stated. Common types of data within marketing are those generated from search engines, social media platforms and other digital channels (Almqvist, 2018).

1.3.1. Development of Big Data within Marketing

Digital development has allowed the possibility of collecting diversified digital information. Various digital channels, such as social platforms and applications produce great quantities of data. For organizations, and marketers especially, data has brought the possibility to better design services, advertising and taking more precise actions. There is no doubt about the possibilities that exist within effective data analysis (Andersson et al., 2018). However, it is not clear exactly when or to what extent the best path lies for marketers and big data. In some cases, it seems to be more effective to apply heuristics and experience rather than complex data driven models (Almqvist, 2018; Kannan & Wede, 2016).

1.4. Problem formulation

Digitalization has changed the way marketers operate. New ways of data collection and digital tools pose both opportunities and challenges for managers and employees alike within businesses. On one hand, greater utilization of digital tools and data can make marketers take more precise operative actions. On the other hand, it brings up questions such as to what extent these tools and the increased amount of available data should be utilized (Almqvist, 2018). As technological development is a continuous process, there is a need for actors on the Swedish market to gain new insights in the process and the development among peers. Furthermore, the digital era is novel and companies seek support in understanding the digital transformation process (Andersson et al. 2018).

In conclusion, the authors have identified two main problem areas for market operations related to digitalization:

- The utilization of big data and how it affects decision making
- Problems that may occur in the process of increased digitalization

1.5. Research Question and Purpose

Based on the challenges marketers face based on Andersson et al.'s (2018) and Almqvist's (2018) research, the purpose of this study is to develop a framework for quantitative studies that can be used to investigate different challenges encountered by marketers due to digitalization, but also explore and describe the utilization of data within the profession. Specifically, the aim is to create the framework, test it, evaluate the framework and discuss improvements to it that can be used in a future larger study. To address this purpose a pilot study is conducted. The framework analyzes three major areas of digitalization that affect marketing operations:

The research questions this study aims to answer are if:

- *Can a quantitative method for evaluating how digital transformation processes fail within marketing operations be developed?*
- *Can a quantitative method for evaluating how common it is to apply managerial heuristics or data based decision making in marketing operations be developed?*
- *Can a quantitative method for evaluating the usage of big data in marketing operations be developed?*

1.6. Delimitations

The intention of the study is to analyze a broad scope of issues faced by marketers. Due to the broad scope of the study, the depth is limited to developing and illustrating how a full-scale study could be conducted. Thus, the aim is not to arrive at any specific conclusions. Since the aim is to create an illustrative study, the sample is purposefully small, and cannot be used to reach statistically significant results. Furthermore, this study is geographically limited to Sweden. It will also only include marketers working for profit-driven organizations. The time-frame of the thesis limits the time during which the data-collection is made. Furthermore, the number of questions asked to respondents are limited due to willingness of the respondents. However, some open questions are asked in the survey to generate more general knowledge about how marketers use digital tools, although it is not the main focus of the study.

1.7. Expected contribution

This study aims to gather the theoretical background and illustrate how to conduct various studies about digitalization in marketing. It is expected that this will contribute to more knowledge about how to perform studies on the process of digital transformation processes from a management perspective, the extent to which managers use heuristics over complex data analysis and the utilization of Marketing information systems in companies.

1.8. Thesis disposition

To answer the research questions, the thesis will have the following disposition; first, there is a review of existing literature. Second, the research method for the study is presented. Third, the results from the study are presented. Fourth, there is a discussion about the interpretations and implications of the results.

2. Previous research and literature

In this thesis, theories about digital transformation, The Marketing Information System and research about marketing heuristics are used as the basis of the theoretical framework. The purpose of the chosen theory and research are to form the framework answering the research question.

2.1. Kotter's 8 step model of why transformations fail

In Kotter's 8 step model of why transformations fail (Kotter, 1995), it's outlined how organizations fail in transforming the organization due to not succeeding in any of the 8 steps outlined in the model. The eight steps are chronological and the failure of achieving any of the steps will, according to Kotter, lead to the failure in achieving organizational change or at the very least hamper it (Kotter, 1995).

The eight failures consist in:
1. Not Establishing a Great Enough Sense of Urgency
2. Not Creating a Powerful Enough Guiding Coalition
3. Lacking a Vision
4. Under-communicating the Vision by a Factor of Ten
5. Not Removing Obstacles to the New Vision
6. Not Systematically Planning For and Creating Short-Term Wins
7. Declaring Victory Too Soon
8. Not Anchoring Changes in the Corporation's Culture

Figure 1.

To best achieve organizational change, it's necessary that companies make sure to not skip over any of the steps and that they take sufficient time on each step. If an organization moves on to another step too quickly, it may not achieve the intended change.

When *establishing a sense of urgency*, it's important that organizations realize the necessity in implementing a new technology, way of working, etc. But this not only needs to be identified, it also needs to be communicated to the entire organization and the organization needs to realize the sense of urgency in acting on this knowledge (Kotter, 1995). Furthermore, business success can lead to a feeling that there isn't any urgency in improving competitiveness, eventually leaving the organization without the ability to do so once it becomes necessary. To avoid this situation, it's advised that organizations establish routines to make sure organizational members are aware of what is happening in the external environment (Kaut, 2009).

When *creating a powerful coalition*, there needs to be sufficient support from people with influence, relationships, titles and reputation. The coalition is a core group of people who will drive the change process forward. The failure to gather such a coalition, may lead to opposition later on or never achieving a critical mass to even begin the change process (Kotter, 1995).

In *creating a vision*, the organization's guiding coalition must create a strong proposal for the direction the organization needs to move, that is appealing to all or most stakeholders. The lack of a clear vision risks leading to a situation where the organization fails to understand what exactly is to be done and different messages might be perceived across the organization, with contradictory and over detailed instructions (Kotter, 1995). Further insight is provided by Cartwright and Baldwin (Cartwright & Baldwin, 2007), who outline eight key considerations in the communication and creation of a vision, six of which pertain to the creation of it. The vision should be simple and easy to remember, it should be easily tied to specific and obvious organizational values, it should build meaning by giving individuals a personal connection to the vision, customize benefits from the vision to all stakeholder groups relevant to the organization, involve people in the vision and allow it to change and grow over time, as well as making the vision attractive and motivating (Cartwright & Baldwin, 2007).

When *communicating the vision,* the guiding coalition needs to make sure to spend enough time informing organizational members about the change. Commonly, three errors may occur at this step. Firstly, the vision is not communicated enough, sometimes with as little as a single meeting. Secondly, sufficient time may be spent communicating the vision, but the organizational members still don't get it. Thirdly, senior executives may be visibly acting antithetical to the proposed vision, making the recipients of communication disenfranchised with the message. Kotter suggests successful communication incorporates the message in day-to-day communication, using every reasonable avenue for communicating the vision (Kotter, 1995). Cartwright and Baldwin (2007) underlines that in communicating the vision, it's important that managers 'walk the talk', showing in action that they embody the outlined vision. Managers should also demonstrate their belief in the vision, in the sense that they make

it clear in everyday actions and communication that they have belief in it (Cartwright & Baldwin, 2007).

In *removing obstacles to the vision*, it's important that organizational members easily can get involved in the adoption of the new way of doing things. But it's equally important that blockers of the vision are dealt with. If for example senior executives undermine the vision, it may thwart the entire transformation (Kotter 1995). In dealing with resistance, Cartwright and Baldwin (2007) claim leaders may reiterate the vision to the audience, over time turning resistors to the vision over to embracing it. This communication should be done in a patient way, while staying passionate about the ideals of the vision. They say that usually the resistance to the new vision stems from alternate priorities and that it is key that this alternate priority is addressed (Cartwright & Baldwin, 2007).

In *systematically planning for and creating short-term wins*, the organization needs to show significant results after a period of usually 1 to 2 years. Kotter says this needs to be a clear and unambiguous win, if relevant supported by underlying numbers. If the organization fails to do this, supporters of the change may switch sides and opponents will gain traction (Kotter, 1995). It's important to plan for short-term wins, since it increases faith in the change effort, emotionally rewards workers, weakens the case of critics and builds momentum. In order to achieve these wins in practice, four steps should be followed. First, visible improvements in performance need to be outlined. Second, those goals need to be met. Third, those achievements need to be communicated visibly and convincingly as a win. Fourth, learnings need to be embedded in the plan going forward (Cohen, 2005).

In *declaring victory too soon*, an organization may be too eager to show that it's achieved wins, but mistakes that for permanent organizational change. Changes are fragile and subject to regression. Without reaffirming them, it's natural for organizations to revert to their traditional ways of working. The momentum of minor victories should instead be used as springboards to tackle larger issues, further solidifying the transformation (Kotter, 1995). Lessons from the short-term wins should be used going forward, incorporated in a revised direction. A key consideration is to observe which change agents have been successful and motivated in carrying out the vision, which are now becoming exhausted and ensuring that they sustain their efforts in carrying out the vision (Cohen, 2005).

Finally, *change needs to be institutionalized*, becoming a part of the organization's identity and culture. Two factors are particularly important in doing so. Firstly, it needs to be shown how the new way of doing things has improved performance. Secondly, the next generation of managers need to champion the new approach, otherwise change is often reverted, even without the new manager being a resistor of change (Kotter, 1995).

2.2. Modern perspective on Kotter's 8 step model of why transformations fail

John Kotter released an updated version of his 8 step model from 2014, the book Accelerated. The author lists some noticeable changes from the 1995 version (Kotter, 2014).

In the first version, Kotter believes that the steps need to more or less follow a chronological order, while he in the later version argues the steps should be worked on concurrently and continuously (Kotter, 2014).

Kotter also argued that there should be a strong, core group leading the change in his old version, but believes change should also be achieved through a large volunteer army, recruited from across the organization. In his new version, Kotter believes that in addition to working from within the traditional hierarchy, the change effort should cooperate in a flexible and agile network. These two aspects are both important though and the traditional hierarchy is not to be ignored (Kotter, 2014).

Also, a new idea is that set change goals should not be achieved in a linear fashion, with one goal in focus at a time. Instead, opportunities should be sought out and initiatives taken continuously as they appear naturally. They should then be completed as efficiently and quickly as possible (Kotter, 2014).

Overall, Kotter's 8 step model (Kotter, 1995) seems to have held strong through scrutiny, but it should be noted that the model is not an unquestionable truth. Instead, it's more reasonable to regard it as a model that has gained its popularity through its frequent usage and applicability, while pointing out it isn't a scientifically proven framework. It's also acknowledged that Kotter's framework has seen little formal scrutiny, Appelbaum's study being the first formal review of the framework since its inception 15 years prior. In it they review all 8 steps individually (Appelbaum, 2012).

In creating a guiding coalition, the organization should have several key figures with influence, in terms of position power, expertise, credibility and leadership. However, all change agents have a positive impact on the success of the change initiative and there is a risk in only having people with strong characteristics for leading change, if they decide to adopt a monarchical attitude. Instead, change should be effected via facilitative management and visible support from the top, rather than top-down management forcing a solution upon the organization (Appelbaum, 2012).

In creating a vision, a key perspective put forward is the importance of managers adopting a long-term vision that addresses future challenges and looks beyond incremental performance-improvements. It's underlined that the vision should be clear, consistent and well-articulated, while also presenting an appealing future to organizational members (Appelbaum, 2012).

In communicating the change vision, it's been found that communication is a key determinant to employee satisfaction. In a case of organizational restructuring and downsizing, it was found that employees who felt that management had communicated

well were more positive to the organizational change. These employees were also more confident that the change process would be a success and the employees who felt the survival of the company depended on the organizational change believed that management's communication was of high quality. Another study also found that weekly team meetings improved trust and openness, while employees who became frustrated tended to not be involved in the process and felt that they did not get to take part in information (Appelbaum, 2012).

In removing obstacles to the vision and facilitating the adoption of the new way of working, it's been found that training facilitates for employees since it instills a sense of responsibility and empowerment. Furthermore, communication and coaching are also effective tools to use in order to facilitate changing habits. Empowerment of employees should encompass all hierarchies in the organization and bottom-up empowerment as well as team-ownership were two important aspects of successful change initiatives (Appelbaum, 2012).

In generating short-term wins, there should be an emphasis on achieving some early wins, even if they are very small, as quickly as possible in order to build self-confidence and instilling a belief that bigger successes are possible, which builds the momentum for achieving long-term goals. By focusing on short-term gains, the organization can increase the frequency with which change initiatives are undertaken, but there needs to be a balance between the short-term gains and actual long-term effects from the employees' perspective, in order to stay credible (Appelbaum, 2012).

In not declaring victory too soon, Pfeifer et al. claims management needs to use the initial successes achieved by the company and use it to further the change process. They need to credibly show the organizational members how changes have led to measurable results (Pfeifer et al., 2005).

2.2.1. Criticism against Kotter

In 2015, Hughes examined the validity of Kotter's model (Hughes, 2016). He found that the study made by Kotter is a landmark study that is frequently used by practitioners of transformational leadership. Hughes says that Kotter himself doesn't claim that the model is academic in nature, admitting that the model is based on his own experience rather than published sources. Despite this, Kotter's publications about transformational leadership are the two most cited in the area, which Hughes describes as 'perverse'. The reality that it is so commonly used in academia and taught in universities still persists, but among practitioners it is especially preferred (Hughes, 2016).

Thus, its common usage may be criticized, but the fact is that the model is highly relevant in terms of its common usage and multitude of research based on Kotter's experiences as a consultant. But the underlying validity of his experiences are not built on substantial academic discourse, so any findings based on his publications should be treated cautiously. But its popularity (Hughes, 2016) motivates the use of Kotter's model regardless.

2.3. Big Data usage in the Marketing Information System

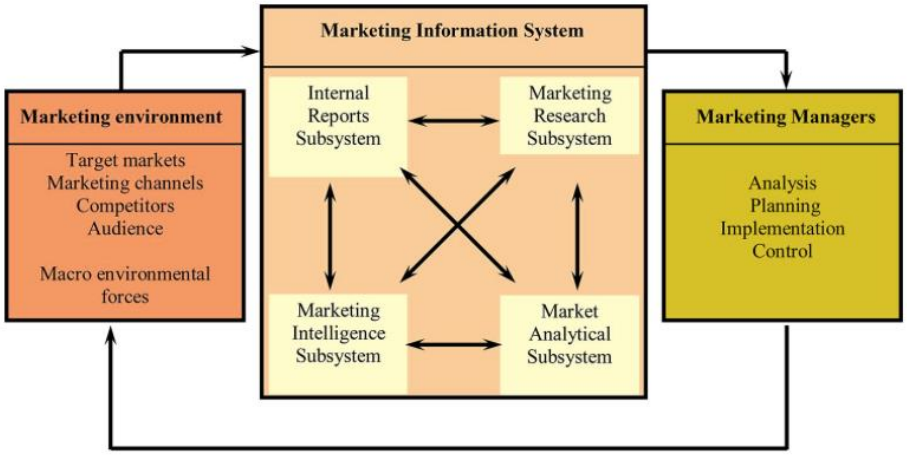

Figure 2.[1]

2.4. Marketing information system

A marketing information system is an interaction of people, equipment, routines and procedures that gather, analyze and sort information through a shared structure. The information is used for making marketing related decisions such as implementation and control. In essence, a marketing information system can be divided into four major subsystems related to one another, as illustrated in picture 1.1. Those are The Internal Reports Subsystem, Marketing Research Subsystem, Marketing Intelligence Subsystem and Marketing Decision Support System (Kotler & Keller, 2006; Ikeda & Salvador, 2014)

[1] Pessoa de Queiroz, J. & Oliveira, B. (2014). Benefits of the marketing information system in the clothing retail business. *JISTEM J.Inf.Syst. Technol. Manage. 11* (1). Doi: https://doi.org/10.4301/S1807-17752014000100009. Retrieved from: https://www.scielo.br/scielo.php?script=sci_arttext&pid=S1807-17752014000100153

2.4.1. Sub-Systems

2.4.1.1. Internal Reports Subsystem

Organizations hold information about different activities in hold systems spread over areas such as sales, marketing or logistics. These systems have the information about an organization's marketing operations. Their main function is to gather information, but also analyze given data. Some examples of the data collected and analyzed are information about orders, sales, accounts receivables - and payables, but also information about current inventory. (Kotler & Keller, 2006)

Large amounts of data about consumers is available to organizations through its digital properties such as websites, applications and other social media platforms. The generated Data can be used for different kinds of analysis about consumers and markets (Ikeda & Salvador, 2014; Erevelles, Nobuyuki & Swayne, 2015).

2.4.1.2 Marketing Intelligence Subsystem

The Marketing Intelligence Subsystem are those procedures and sources of information that are used by marketing managers to gather information about the market that is to be used in decision making. They collect data from the external environment, not the internal records of the organization. The purpose of the MIS (Marketing Intelligence Subsystem) is to make managers aware about developments in the external environment and then take appropriate actions. Examples of external changes are changes in customer preferences, and therefore demand. Another example is competitor actions on the market (Ikeda & Salvador, 2014).

There are different approaches to how information about the business environment can be gathered. However, digital tools reading large data sets allow for deeper analysis of the market, and insights about the own brand but also competitors actions (Ikeda & Salvador, 2014)

2.4.1.3 Marketing Research Subsystem

Marketing research is a focused search intended to gather information to address a certain topic or problem. Compared to the Marketing Intelligence Subsystem, the Marketing Research Subsystem has a much narrower approach in the collection of data. Data, both primary and secondary, is often collected and analyzed via statistical tools. (Kotler & Keller, 2006)

Social communities and other online-hubs has become a new, increasingly important source of new insights on behavior among customers. Also the purchase of data from external business intelligence providers has increased. Content analysis is one of these,

giving companies insights about future trends, and online-shopping behavior (Ikeda & Salvador, 2014).

2.4.1.4 Market Analytical Subsystem

The fourth subsystem is the Market Analytical Subsystem. The subsystem's primary role is the computation of data. In a sense, it is the support system of the three previously described subsystems. It helps with data-collection and statistics through various software and hardware (Ikeda & Salvador, 2014).

2.4.2. Positioning and Segmentation

Building a strategy for segmentation consists of market analysis, identification of the market and how it should be divided into different segments (Cravens & Piercy, 2008). Research and using online tools to analyze behaviors within consumer groups can be used to capture behavioral traits. Predictive algorithms can be used to capture consumer behavior, beliefs and attitudes. This can help organizations and companies' alike information about how to position brands and products (Ikeda & Salvador, 2014).

2.4.3. Product

Information about customer preferences gathered on for instance online-forums or digital surveys is information that can be used to develop a product in order to fit a certain segment (Gobble, 2013). Also, information about previous products can be combined with newly gathered information in order to form a fitting product or service (Ikeda & Salvador, 2014).

2.4.4. Distribution

Data collection about metrics about geolocation such as "exit rate" and "time per page" gives the possibility of tracking the physical location of consumers and their transportation routines. Big Data sets enables a more in-depth analysis of the different metrics that drives these consumer decisions (Ikeda & Salvador, 2014). Furthermore, geographic data can be used to analyze the product distribution, and predict future sales (Dortyolb, Kitapcib & Turka, 2014).

2.4.5. Communication

Analysis of information on consumer interactions online gives information about personal preferences, which can be used as a basis for campaigns (Ikeda & Salvador, 2014).

2.4.6. Price

Information about pricing is becoming increasingly useful as online information grows larger. Google Shopper Marketing Council (Google Shopper Marketing Council, 2013)

concluded in a study that 54% of consumers in the United States checks prices online through their smartphones while in physical stores. A combination of factors about "stated opinions, comments on experiences, browsing history, family composition, period since last purchase and purchase behavior is analyzed by algorithms and can be used as a way of generating customized prices for consumers (Ikeda & Salvador, 2014).

2.5. Limitations in the use of Big Data

A limiting factor and a barrier to using Big Data is the lack of trained and qualified personnel performing analyses. Even though algorithms can analyze large data sets, cunning personnel is still required to analyze the results, but also building statistical models. Essentially, there are three main factors that limit the use of Big Data. The first is the lack of proper data to analyze in order to make significant predictions. The second one is inconsistency in the data. The third one is making correct and significant calculations. Another significant risk in the use of Big Data is fully automated systems. This requires very precise systems, since it in the end only produces a "binary model" of a "...theoretical situation." (Ikeda & Salvador, 2014).

2.6. Managerial Heuristics vs Big Data

In the article, Uncertainty and Complexity in Predictions from Big Data: Why Managerial Heuristics Will Survive Datafication (Almqvist, 2018), the implications of using Big Data models for statistical predictions are presented. As the author proposes, Big Data can be used as a basis for decisions in a business environment. Due to the complexity of these models, which often include the utilization of many variables, they are inherently complicated to apply correctly. More specifically, two main problems are presented regarding the utilization of big data: The Variance dilemma and the curse of dimensionality. The bias or variance dilemma relates to the fact that there are sources of prediction error when forecasting, "...bias, variance and residual". The second one is that the larger the volume of data that is used as a basis, the more complex the model becomes, the higher the number of correlations between independent variables occur due to the number of dimensions of each sample. Another issue present in statistical and computational aspects of using big data for analysis that is often present, and which the risk of increases often the larger the data sets are those of measurement errors, values that are missing or outliers (Fan, Han, & Liu, 2014).

Given the context of a regressions analysis, Big Data predictions and forecasts therefore by themselves have problems with uncertainty in prediction, and will not necessarily give a better analytical ground than smaller sets of data. The use of Big Data requires well-built models. A study by Wübben and Wangenheimat (2008) referred to in Almqvist (2018) examined the matter, where heuristics was compared to the more complex models in the form of the Pareto/NBD model and the BG/NBD model. The

Pareto/NBD is a statistical model designed to predict a customer's life-time value. The beta-geometric/NBD or BG/NBD - model is a similar model to the Pareto/NBD, with the difference that instead of assuming that a dropout of a customer can occur at any moment, not dependent on the occurrence of actual purchases. The BG/NBD instead assumes that dropout occurs after a purchase is made (Fader, Hardie & Ka Lok, 2005)

The findings were that the NPD/Pareto model does not perform better than heuristically based decision making, and is described by the researchers as devastating for the NPD/Pareto model. (Wübben and Wangenheimat, 2014), thus supporting the thesis of Almqvist.

The conclusion of the study was that the findings did not support the superiority of mentioned models "...for managerially relevant decisions in customer management..." in the comparison to simpler means of decision making. Rather, experience-based heuristics were quite effective. Studies done of Nordic retail banks showed results of a widespread use of managerial heuristics of customer management, and successful banks, showing proof of the success of heuristics (Persson & Ryals, 2014).

There are some researchers arguing that not enough decisions are based on data-analysis (McAfee & Brynjolfsson, 2012). Indeed, according to a study conducted on 330 North American companies, a significant finding was made, namely that the more companies identified themselves as data-driven, the better their performance in terms of financial and operational results were. These results were adjusted for the contribution of capital, purchased services, and other relevant factors. But, as long as there are issues related to the empirical significance of big data models, "...managerial heuristics cannot be rejected a priori." (Almqvist, 2018)

Thus, managerial heuristics and the efficiency is not to be rejected, as they evidently can perform as well as statistical models in certain settings. But, the increasing availability of data due to digitalization should not be ignored, as it presents opportunities to gain competitive advantages (Hagiu & Wright, 2020). An increased awareness about the issues related to different statistical computations and model building, there are measures that increase the likelihood reducing errors, and to gain the benefits that are presented. Almqvist suggests the following measure in order optimize the use of big data, and to avoid errors: To distinguish between the learning and target population, to define and operationalise predictors and predictands, to be clear about the difference of deterministic and probabilistic forecasts. But not the least to assure prediction quality and to know about the bias & variance dilemma and the curse of dimensionality. Almqvist (2018) also recommends to not use overly complex models, which is supported by the findings of the study of Wübben and Wangenheimat (2014).

Another conclusion that should be drawn from the study of Wübben & Wangenheimat is that the results of a not optimal statistical stochastic model can be impactful. This also applies for the data used in statistical models, that the consequences can be dire, and in

essence render the model ineffective if the data used is not correct, or of quality (Redman, 2018).

3. Method

3.1. Research Approach

This study is conducted as a pilot study where a deductive approach is applied. It is deemed appropriate since the aim is to test how known theories function in a marketing context (Bryman & Bell, 2015). Since it is a pilot study, the results of this study will not be generalizable, but instead aim to illustrate how such a future study would be designed and conducted. In order to improve on the method used in the pilot study, interviews were conducted with some of the participants and possible improvements discussed.

To investigate the research questions, a non-experimental quantitative design is used. Data is collected through a questionnaire, targeting marketing employees in Sweden. A questionnaire allows for a larger sample, compared to other methods such as interviews (Bryman & Bell, 2015). In designing the study, the variables are derived from the theories about Kotter's 8 step model about why transformations fail (Kotter, 1995), Big Data in the Marketing Information System (Kotler & Keller, 2006) and Managerial heuristics vs. Big Data (Almqvist, 2018). To measure the attitudes of the respondents of the statements posed in the questionnaire, a Likert Scale is used. (Bryman & Bell, 2015). In order to evaluate the study, two respondents who completed the questionnaire of the pilot study are interviewed. This is done in order to gain insights in how to improve the questionnaire for future, full scale studies of the pilot study are to be conducted.

It was considered using a qualitative method in order to attain a result that would be possible to use as guidance for future studies. Instead it was decided that the study would be designed so that the results would be actionable for future studies using this framework on a larger scale. Since there already existed sufficient literature on theoretical background, the authors of this study reasoned that an inductive approach would provide less useful research (Bryman & Bell, 2015).

3.2. Sampling

In this study, convenience sampling is used when selecting participants for the questionnaire. Convenience sampling is a non-probability method where respondents are selected based on their availability. The drawback of this sampling method is that it isn't representative of the entire population. However, it is very commonly used in business and marketing research and since there is a very specific segment of employees that is sought after, it's very difficult to identify the exact population the sample should be drawn from. In this study, marketers in Stockholm with digital experience are contacted. Those who are relevant for the study will consequently be selected. This kind

of sampling is not a form of sampling appropriate for quantitative studies. However, since the study is a pilot study, and the results are not aimed to reach any conclusions regarding the research area, the method is chosen as it allows for a quicker sampling process. If a larger quantitative study were to be conducted based on this pilot study, it is preferable that another sampling method is used in order to collect data that can be used for generalizable results. (Bryman & Bell, 2015).

3.3. Questionnaire and Variables

3.3.1. Questionnaire

The questionnaire contains 25 questions. 9 of these include more than one statement, which respondents will answer on a Likert Scale with 5 steps (Bryman & Bell 2015). In total, there are 52 such statements. If a respondent answered that they hadn't been part of any digital change process only 37 of the statements would be displayed. The questions were designed and distributed through the digital questionnaire tool Qualtrics. Participation was anonymous, and the questionnaire was answered on the initiative of the respondents. In order to ensure that all respondents were marketers, there were several questions about the respondents' background. If they responded that they had an education in marketing (Appendix 9), their position in the company was associated with marketing (Appendix 10), their tasks were related to marketing (Appendix 11), they have extensive experience working with marketing data (Appendix 13) or their current area of work is marketing (Appendix 14), they would be considered as marketers. Furthermore, in order to ensure that respondents were marketers only marketers were actively approached. Where we had less control over respondents, the distribution of the survey clearly stated that only marketers were targeted as respondents before the survey was even opened.

3.3.2. Variables

To construct the questionnaire a set of variables is derived from the theory outlined in section 2. The statements are denoted as "Q1, Q2 etc". See appendix part 1. for the complete questionnaire.

3.2.2.1 The Usage of Data in the Marketing Information System

The Collection of Data

The access to data is central in the marketing information system, whether it's internal or externally collected data. It also plays into the role of managerial heuristics. Data can be accessed through collection of data by the organization or through accessed through external sources. In Q1, the means of accessing data in a company is measured through an index of five statements. A Likert Scale (Bryman & Bell, 2015) of 1 (disagree) to 5 (strongly agree) is used.

Furthermore, in Q3, the respondents are given an open question about the most common type of data collected to be used for marketing purposes. Likert Scales, while user friendly with the five points alternative for statements, limits the number of answering possibilities, thus compromising the quality of the data. Therefore, an open answer alternative is given.

Internal Reports Subsystem, Marketing Intelligence Subsystem, The Marketing Research Subsystem & The Marketing Analytical Subsystem

The usage of data within the subsystems of Kotler's Marketing Information Model Internal Reports Subsystem & Marketing Intelligence and Marketing Research Subsystem is measured in Q4 through an index of 8 statements. A Likert Scale (Bryman & Bell, 2015) of 1-5 of 1 (disagree) to 5 (strongly agree) is used.

The first statement captures the collection and utilization of data within the Internal Reports Subsystem, while the second, third and fourth statement focuses on the Marketing Intelligence Subsystem. The sixth statement focuses on the Market Analytical Subsystem and the seventh and eighth statement about the Marketing Research Subsystem.

The Marketing Mix within The Marketing Information System

The usage of data for Positioning and Segmentation within Kotler's Marketing Information System is measured in Q5, with an index of seven statements and a Likert Scale (Bryman & Bell, 2015) of 1-5 of 1 (disagree) to 5 (strongly agree). The first four statements focus on Positioning and Segmentation. The sixth captures Distribution, and the fifth and seventh Communication as per Ikeda and Salvador (2014).

3.2.2.2 Limitations to the use of Big Data

In Almqvist's study about managerial heuristics and big data, there are findings about problems regarding data, namely the problems with quality and computation. These aspects are measured in Q6 through an index of five statements. A Likert Scale (Bryman & Bell, 2015) of 1 (disagree) to 5 (strongly agree) is used. The first statement is a general one about the ease of use. The second and sixth statement captures the computation-aspect. The third, fourth and fifth statement regards the quality of the data (Almqvist, 2018).

3.2.2.3 Managerial Heuristics vs Big Data

In Q7, an examination of the usage of managerial heuristics versus the use of a more quantitative approach is investigated. These aspects are measured by an index of seven statements. A Likert Scale (Bryman & Bell, 2015) of 1 (disagree) to 5 (strongly agree) is used. The first three statements regard the usage of managerial heuristics and predictive models. The fourth and fifth measure the perceived utility of heuristics and predictive models. The sixth and seventh statements measure eventual problems with

utilization of predictive models. Q8 is an open question, where the respondent has the possibility to specify what models are used by his or her company. An open question allows for a more in-depth collection of data, that an appendix measured through a Likert Scale does not (Bryman & Bell, 2015)

3.2.2.4 Kotter's 8 step model of why transformations fail

Establishing a sense of urgency

In order to assess the extent to which companies succeed in establishing urgency, question Q11.1 measures whether there are any established routines for making the organizational members aware of the business environment, as is outlined by Kaut as a key factor for establishing urgency (Kaut, 2009). Then question Q11.2 about whether decision-makers in the company are actively identifying opportunities for digitalization, based on Kotter's model that organizations need to recognize the need for change as a first step (Kotter, 1995). A Likert Scale (Bryman & Bell, 2015) of 1-5 from 1 (disagree) to 5 (strongly agree) is used.

Creating a powerful coalition

The creation of a powerful guiding coalition is outlined as a key factor in driving change by Kottter. Question Q11.3 is posited to answer whether there is enough support for digitalization change processes, based on the need for a core group of supporters for the change effort (Kotter, 1995). Question Q11.4 is based on Kotter's revised model of change processes, where he believes change shouldn't only come from a powerful guiding coalition, but from everyone in the organization being activated to support the change process (Appelbaum, 2012). A Likert Scale (Bryman & Bell, 2015) of 1-5 from 1 (disagree) to 5 (strongly agree) is used.

Creating a vision

Question Q11.5 is aimed to test the degree to which workers appreciate the vision for digitalization (Kotter, 1995). Question Q11.6 is based on the idea that in order for organizational members to embrace the vision, it is useful to have them involved in outlining the vision, as per Cartwright & Baldwin (Cartwright & Baldwin, 2007). Question Q11.7 aims to measure whether organizational members are allowed to participate in the creation of the vision and get to actually give input on it. A Likert Scale (Bryman & Bell, 2015) of 1-5 from 1 (disagree) to 5 (strongly agree) is used.

Communicating the vision

Question Q11.8 is based on the need to communicate the vision and seeks to measure to what degree the communication has been successful, as outlined by Kotter (Kotter, 1995). Question Q12.1 is based on the need to spend enough time communicating the vision, as outlined by Kotter (1995). Question Q12.2 is based on the need for senior executives to not act antithetical to the vision of the change initiative (Kotter 1995). A

Likert Scale (Bryman & Bell, 2015) of 1-5 from 1 (disagree) to 5 (strongly agree) is used.

Removing obstacles to the vision

Question Q12.3 is designed to measure whether people at the company can seamlessly transfer to the new way of working (Kotter, 1995), which is outlined as a factor that can block the vision. Question Q12.4 is designed to measure if the change process is hampered by individual coworkers who oppose it, which is one of the main problems in removing obstacles to the vision (Kotter, 1995). Question Q12.5 is based on the experience that training facilities for coworkers to adopt new modes of working is going to improve the results of the change process (Appelbaum, 2012). A Likert Scale (Bryman & Bell, 2015) of 1-5 from 1 (disagree) to 5 (strongly agree) is used.

Systematically planning for and creating short-term wins

Question Q12.6 is designed to measure whether short-term wins are achieved, by asking whether coworkers believe there have been improvements made early on in the change process (Appelbaum, 2012). A Likert Scale (Bryman & Bell, 2015) of 1-5 from 1 (disagree) to 5 (strongly agree) is used.

Declaring victory too soon

Question Q12.6 is also designed to measure the degree to which it can be shown to organizational members that successes have been achieved that can be credibly shown to have improved the organization (Pfeifer, 2005). A Likert Scale (Bryman & Bell, 2015) of 1-5 from 1 (disagree) to 5 (strongly agree) is used.

The change needs to be institutionalized

Question Q12.7 is designed to measure whether coworkers believe that the change has led to improvements after the change process is completed. This is meant to test Kotter's model that it needs to be shown how change processes have improved the organization (Kotter 1995). A Likert Scale (Bryman & Bell, 2015) of 1-5 from 1 (disagree) to 5 (strongly agree) is used.

3.3.3. Interviews

The interviews are conducted with two of the respondents to the questionnaire in order to assess its efficacy. The interviews are semi-structured so that the respondent would answer what they thought about each individual block as a whole. This was meant to allow for a segmented analysis of each of the three individual areas of research and each block as a whole. They had the questions available to them during the interview. They would then be given the chance to give input about any individual question in that block. The interviews were recorded and transcribed. The transcriptions were then sent

out to the respondents in order to allow them to confirm that they agreed with what had been recorded (Bryman & Bell, 2015).

3.4. Data Collection

The Questionnaire on the platform Qualtrics was distributed by e-mail and directly sent links to the questionnaire on Linkedin and Facebook. It was also posted on an alumni group on LinkedIn for former students at Stockholm School of Economics. The survey was distributed between April 29th and May 7th 2020. The method of distribution was chosen due to relative accessibility of digital tools of the potential respondents. Respondents were targeted based on the ability of how to get a response from somebody who works with marketing. In order to incentivize respondents to answer, they were offered 50 SEK in donations per completed questionnaire to Médecins sans Frontières (2020) work with COVID-19. The 14 respondents meant that the total donation amounted to 700 SEK, which was donated on 22 July 2020. Due to technical problems with the recipient, the donation instead had to be submitted as a general donation to Médecins sans Frontière, but with an unchanged amount of 700 SEK.

27 respondents answered the questionnaire. Of the respondents, 14 completed the questionnaire and were deemed to have provided adequate answers for further analysis. The questionnaire data was exported from Qualtrics (2020) to Microsoft Excel (2020) and Statistical Package for the Social Sciences, SPSS version 26 (2020).

3.5. Reliability, Validity and Generalizability

In the questionnaire, the respondents were asked on a likert scale (Bryman & Bell, 2015) of 1-5 certain propositions about the inquiry. These were the following: “The statements were clearly stated”, “The multiple choice alternatives were clearly stated”, “The multiple choice alternatives tried to alter your answers in any way”. In order to increase the quality of the questionnaire, it was reviewed by Patric Andersson, Associate Professor.

A problem with qualitative methods such as interviews is that it is hard to achieve external validity given the nature of an interview, that the setting is not static. In order to increase the quality of the data from the interviews, and the internal validity, they were recorded and transcribed. Before the interview was conducted, the interviewee was asked to study the questionnaire once again, in order to be able to come up with relevant input during the interview. The transcribed interviews were then reviewed by the interviewed subjects to make sure the interviewed subjects agreed with the transcription made by the authors (Bryman & Bell, 2015).

The fact that the quantitative study is conducted as a self-completion questionnaire is a source of data collection error, lowering validity, due to willingness and reluctance to

participate (Bryman & Bell, 2015). Additionally, the fact that the questionnaire was answered on the initiative of the respondents, means that there is a sampling error. Only those most inclined to answer would do so, but this is a difficulty with all studies where you send out a questionnaire where you try to reach as many people as possible. This results in a convenience sample, which is not desirable in terms of validity, however, it is considered to be a decent method for pilot studies (Bryman & Bell, 2015).

As the purpose of the interview was to understand the interviewee's point of view regarding the questionnaire, an open interview with predetermined topics were conducted. This allows for a more broad and personal feedback that do not risk the exclusion of relevant information that may come with a structured interview (Bryman & Bell, 2015).

Furthermore, the questions were formulated as open questions, which means that the interviewee could answer on their own terms. Open questions are beneficial in this setting, as the interviewee may have knowledge that the authors of this study do not possess, and the possibility to express this may be limited by in a structured interview.

The interviews increase the validity of this study as far as they contribute with information about the questionnaire used in the pilot study, which align with the overall purpose of the study. (Bryman & Bell, 2015). The fact that it was the authors who constructed the questionnaire also constructed the interview protocol may affect the validity of the results from the interviews (Bryman & Bell, 2015). However, the relatively open format of a structured interview allows for a format that does not compromise flexibility, and counteract some of the bias that may come from the authors.

Proposal for a full-scale study of the pilot study would be to use IMC's, instructional manipulation checks. These are control questions that may be utilized to measure the reliability.(Oppenhimer, Meyvis & Davidenko, 2009). IMC has benefits, mainly it provides an indirect measure of satisfaction and to increase the attention and focus of the respondents. IMC, or instructional manipulation checks are useful, but also have disadvantages. If an IMC-question causes participants to be removed from the sample, this may affect the external validity of the study. Furthermore, if there are major differences between the population that failed the IMC from those who passed it, it could lead to issues of the generalizability of the findings.

4. Results

The results in this section are showcased in order to illustrate how a larger study could present the data. Due to the low sample size of the dataset in this pilot study these results should not be used for any conclusions.

4.1. Questionnaire

Figure 3: Descriptive statistics on background of participants

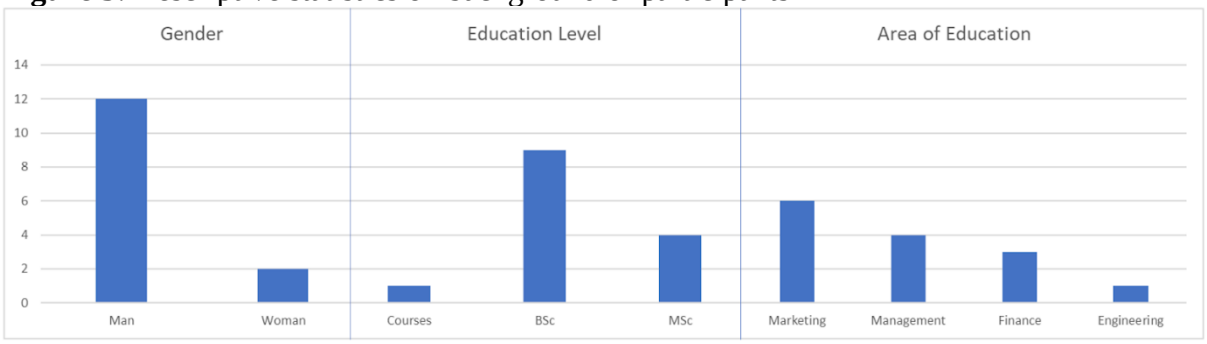

Table 1: Descriptive statistics with the frequencies of respondents' beliefs about data collection.

Variable	Frequency (N=14)	1	2	3	4	5	Tot.	mean	std.
Q1.1		0	2	1	2	8		4,29	1,10
		0%	14..3%	7.1%	14.3%	64.3%			
Q 1.2		1	3	2	5	3		3,43	1,24
		7.1%	21.4%	14.3%	35.7%	21.4%			
Q 1.3		1	5	2	3	3		3,14	1,30
		7.3%	35.7%	14.3%	21.4%	21.4%			
Q 1.4		2	1	5	4	2		3.21	1.21
		14.3%	7.1%	35.7%	28.6%	14.3%			
Q 2.1		1	3	2	3	4		3.57	1,35
		7.1%	21.4%	14.3%	21.4%	35.7%			
Q 2.2		5	2	1	2	4		2.86	1.68
		35.7%	14.3%	7.1%	14.3%	28.6%			

Note: 5 indicates that the respondent agrees completely, 1 that they disagree completely. The statements were the following: Q 1.1 There is active collection of customer data. Q 1.2 There is active collection of data on competitors. Q 1.3 Competitor data collection is acquired externally. Q 1.4 Data is collected via internal reports. Q 1.5 Advanced algorithms are used in my department. Q 1.6 Machine learning is used in my department.

Table 2: Descriptive statistics with the frequencies of respondents' beliefs about data analysis.

Variable	Frequency (N=14)	1	2	3	4	5	mean	std.
Q 4.1		2	0	1	6	5	4.29	1.10
		0%	14.3%	7.1%	14.3%	64.3%		
Q 4.2		2	2	2	6	2	3.43	1.24
		7.1%	21.4%	14.3%	35.7%	21.4%		
Q 4.3		0	3	4	5	2	3,14	1,30
		7.3%	35.7%	14.3%	21.4%	21.4%		
Q 4.4		3	3	1	5	2	3.21	1.21
		14.3%	7.1%	35.7%	28.6%	14.3%		
Q 4.5		2	1	3	4	5	3.57	1,35
		7.1%	21.4%	14.3%	21.4%	35.7%		
Q 4.6		3	0	3	5	3	2.86	1.68
		21.4%	0%	21.4%	35.7%	21.4%		
Q 4.7		1	0	1	5	7		
		7.1%	0	7.1%	35.7%	50%	4.21	1.08
Q 4.8		1	1	4	3	5		
		7.1%	7.1%	28.6%	21.4%	35.7%	1.22	3.71

5 indicates that the respondent agrees completely, 1 that they disagree completely. The statements were the following: Q 2.1 Internal data is generated on sales, inventory, etc.. Q 2.2 There is data analysis about the brand Q 2.3 There is data collection about competitors. Q 2.4 Competitor data is analyzed. Q 2.5 Data is collected from social media. Q 2.6 Data analysis is used in pricing. Q 2.7 Data analysis is used in identification of customer segments. Q 2.8 Data analysis is used in product development.

Table 3: Descriptive statistics with the frequencies of respondents' beliefs about usage of data.

Variable	Frequency (N =14)	1	2	3	4	5	mean	std.
Q 5.1		1	3	2	4	4	4.29	1.10
		7.1%	21.4%	14.3%	28.6%	28.6%		
Q 5.2		3	0	3	7	1	3.43	1.24
		21.4%	0%	21.4%	50%	7.1%		
Q 5.3		2	0	1	6	5	3.14	1.30
		14.3%	0%	7.1%	42.9%	35.7%		
Q 5.4		1	2	0	3	8	3.21	1.21
		7.1%	14.3%	0%	21.4%	57.1%		

Q 5.5	2	1	3	4	5	3.57	1,35
	7.1%	21.4%	21.4%	14.3%	35.7%		
Q 5.6	2	2	1	2	7	2.86	1.68
	14.3%	14.3%	7.1%	14.3%	50%		
Q 5.7	2	0	3	4	5	4.21	1.08
	14.3%	0%	21.4%	28.6%	35.7%		

5 indicates that the respondent agrees completely, 1 that they disagree completely. 5 indicates that the respondent agrees completely, 1 that they disagree completely. The statements were the following: Q 5.1 Data analysis is used in outlining promotions. Q 5.2 Data is collected about customer purchase intentions of products or services Q 5.3 Customer data is used in development of products and promotions. Q 5.4 Data is collected about customers' geographic location. Q 5.5 Customer data about geographic location is used in outlining of promotions. Q 5.6 Geographic data is used in product distribution. Q 5.7 Geographic data is used in advertising.

Table 4: Descriptive statistics with the frequencies of respondents' beliefs about the reliability of data.

Variable	**Frequency (N=14)**	**1**	**2**	**3**	**4**	**5**	**mean**	**std.**
Q 6.1		0	7	2	4	1	2.93	1.03
		0%	50%	14.3%	28.6%	7.1%		
Q 6.2		2	6	2	4	0	2.57	1.05
		14.3%	42.9%	14.3%	28.6%	0%		
Q 6.3		0	1	1	9	3	4.0	0.76
		0%	7.1%	7.1%	64.3%	21.4%		
Q 6.4		1	7	5	1	0	2.43	0.73
		7.1%	50%	35.7%	7.1%	0%		
Q 6.5		1	2	2	8	1	3.43	1.05
		7.1%	14.3%	14.3%	57.1%	7.1%		
Q 6.6		3	9	1	1	0	2.64	1.68
		21.4%	64.3%	7.1%	7.1%	0%		

5 indicates that the respondent agrees completely, 1 that they disagree completely. The statements were the following: Q 6.1 Collected data is difficult to handle. Q 6.2 It's difficult to get good results from analyzed data. Q 6.3 Collected data is relevant. Q 6.4. Collected data is of low quality. Q 6.5 Collected data is well structured. Q 6.6 Collected data is rarely useful for reliable analysis

Table 5: Descriptive statistics with the frequencies of respondents' beliefs about heuristics vs. usage of data in decision making.

Variable	Frequency (N=14)	1	2	3	4	5	mean	std.
Q 7.1		1	6	4	3	0	2.64	0.89
		7.1%	42.9%	28.6%	21.4%	0%		
Q 7.2		0	2	1	10	1	3.71	0.80
		0%	14.3%	7.1%	71.4%	7.1%		
Q 7.3		2	0	2	6	4	3.71	1.28
		14.3%	0%	14.3%	42.9%	28.6%		
Q 7.4		0	1	2	7	4	4.00	0.85
		0%	7.1%	14.3%	50%	28.6%		
Q 7.5		0	1	6	7	0	3.43	0.62
		0%	7.1%	42.9%	50%	0%		
Q 7.6		1	5	6	2	0	2.64	0.81
		7.1%%	35.7%	42.9%	14.3%	0%		
Q 7.7		0	0	6	8	0	3.57	0.49
		0%	0%	42.9%	57.1%	0%		

5 indicates that the respondent agrees completely, 1 that they disagree completely. 5 indicates that the respondent agrees completely, 1 that they disagree completely. The statements were the following: Q 7.1 I make decisions based on heuristics. Q 7.2 I make decisions based on previous experience. Q 7.3 I make decisions based on data models. Q 7.4. I consider data models more reliable than heuristics. Q 7.5 I consider data models more reliable than previous experience. Q 7.6 My company struggles with the underlying data when making predictions. Q 7.7 My company's data models work well.

Table 6: Descriptive statistics with the frequencies of respondents' beliefs about digital change processes.

Variable	Frequency (N=8)	1	2	3	4	5	mean	std.
Q 11.1		1	1	2	4	0	3.13	1.05
		12.5%	12.5%	25%	50%	0%		
Q 11.2		0	2	2	4	0	3.25	0.83
		0%	25%	25%	50%	0%		
Q 11.3		0	2	3	3	0	3.13	0.78
		0%	25%	37.5%	37.5%	0%		
Q 11.4		0	1	2	5	0	3.50	0.71
		0%	12.5%	25%	62.5%	0%		
Q 11.5		1	0	4	3	0	3.13	0.93
		12.5%	0	50%	37.5%	0%		

Q 11.6	0	1	2	4	1	3.63	0.86
	0%	12.5%	25%	50%	12.5%		
Q 11.7	0	2	0	6	0	3.50	0.87
	0%	25%	0	75%	0%		
Q 11.8	0	1	5	2	0	3.13	0.60
	0%	12.5%	62.5%	25%	0%		

5 indicates that the respondent agrees completely, 1 that they disagree completely. 5 indicates that the respondent agrees completely, 1 that they disagree completely. 5 indicates that the respondent agrees completely, 1 that they disagree completely. The statements were the following: Q 11.1 My company is good at illuminating workers of the competitive situation. Q 11.2 Decision makers in my company identify opportunities for digitalization. Q 11.3 There is sufficient support for digitalization from decision makers. Q 11.4. I consider data models more reliable than heuristics. Q 11.5 The entire company is encouraged to participate in digitalization initiatives. Q 11.6 Employees appreciate the vision for digitalization. Q 11.7 Employees are given the chance to participate in the creation of the vision for digitalization. Q 11.8 Employees are overall inspired by the vision for digitalization

Table 7: Descriptive statistics with the frequencies of respondents' beliefs about digital change processes.

Variable	**Frequency (N=8)**	**1**	**2**	**3**	**4**	**5**	**mean**	**std.**
Q 12.1		0	2	4	2	0	3.00	0.71
		0%	25%	50%	25%	0%		
Q 12.2		0	4	2	2	0	2.75	0.83
		0%	50%	25%	25%	0%		
Q 12.3		0	1	2	4	1	3.63	0.86
		0%	12.5%	25%	50%	12.5%		
Q 12.4		2	2	1	3	0	2.63	1.22
		25%	25%	12.5%	37.5%%	0%		
Q 12.5		0	1	0	6	1	3.88	0.78
		0	12.5%	0	75%	12.5%		
Q 12.6		0	1	3	4	0	3.38	0.78
		0%	12.5%	37.5%	50%	0%		
Q 12.7		0	1	2	4	1	3.63	0.86
		0%	12.5%	25%	50%	12.5%		

5 indicates that the respondent agrees completely, 1 that they disagree completely. The statements were the following: Q 12.1 The vision for digitalization is sufficiently communicated to employees. Q 12.2 Decision makers act in accordance with digitalization change initiatives, in a way that legitimizes it. Q 12.3 It's easy to transition into new digital ways of working. Q 12.4. Digital change processes tend to be impeded by employees who actively oppose them. Q 12.5 Employees are provided sufficient instructions when adopting new digital ways of working. Q 12.6 Employees believe that digital change processes have led to improvements early on in the change process. Q12.7 Employees believe that digital change processes have led to operative improvements.

Table 8: Frequencies showing positive or negative indication toward a statement. The table shows respondents' beliefs about data collection.

Variable	Positive	Negative/Neutral	%Positive
There is active collection of customer data.	11	3	78.6%
There is active collection of data on competitors.	8	6	57.1%
Competitor data collection is acquired externally.	6	8	42.9%
Data is collected via own analyzes.	6	8	42.9%
Advanced algorithms are used in my department.	8	6	57.1%
Machine learning is used in my department.	6	8	42.9%

A positive indication is given by an answer of 4 or 5 on a Likert scale, whereas neutral indication is given by a response of 1 to 3.

Table 9: Frequencies showing positive or negative indication toward a statement. The table shows respondents' beliefs about data analysis.

Variable	Positive	Negative/Neutral	%Positive
Internal data is generated on sales, inventory, etc.	11	3	78.6%
There is data analysis about the brand.	8	6	57.1%
There is data collection about competitors.	7	7	50%
Competitor data is analyzed.	7	7	50%
Data is collected from social media.	8	6	57.1%
Data analysis is used in pricing.	8	6	57.1%

Data analysis is used in identification of customer segments.	12	2	85.7%
Data analysis is used in product development.	8	6	57.1%

A positive indication is given by an answer of 4 or 5 on a Likert scale, whereas neutral indication is given by a response of 1 to 3.

Table 10: Frequencies showing positive or negative indication toward a statement. The table shows respondents' beliefs about usage of data.

Variable	**Positive**	**Negative/Neutral**	**%Positive**
Data analysis is used in outlining promotions.	8	6	57.1%
Data is collected about customer purchase intentions of products or services.	8	6	57.1%
Customer data is used in development of products and promotions.	11	3	78.6%
Data is collected about customers' geographic location.	11	3	78.6%
Customer data about geographic location is used in outlining of promotions.	7	7	50%
Geographic data is used in product distribution.	9	5	64.3%
Geographic data is used in advertising.	9	5	64.3%

A positive indication is given by an answer of 4 or 5 on a Likert scale, whereas neutral indication is given by a response of 1 to 3.

Table 11: Frequencies showing positive or negative indication toward a statement. The table shows respondents' beliefs about the reliability of data.

Variable	Positive	Negative/Neutral	%Positive
Collected data is difficult to handle.	5	9	35.7%
It's difficult to get good results from analyzed data.	4	10	28.6%
Collected data is relevant.	12	2	85.7%
Collected data is of low quality.	1	13	7.1%
Collected data is well structured.	9	5	64.3%
Collected data is rarely useful for reliable analysis.	1	13	7.1%

A positive indication is given by an answer of 4 or 5 on a Likert scale, whereas neutral indication is given by a response of 1 to 3.

Table 12: Frequencies showing positive or negative indication toward a statement. The table shows respondents' beliefs about heuristics vs. usage of data in decision making.

Variable	Positive	Negative/Neutral	%Positive
I make decisions based on heuristics.	3	11	21.4%
I make decisions based on previous experience.	11	3	78.6%
I make decisions based on data models.	10	4	71.4%
I consider data models more reliable than heuristics.	11	3	78.6%
I consider data models more reliable than	7	7	50%

previous experience.			
My company struggles with the underlying data when making predictions.	2	12	14.3%
My company's data models work well.	8	6	57.1%

A positive indication is given by an answer of 4 or 5 on a Likert scale, whereas neutral indication is given by a response of 1 to 3.

Table 13: Frequencies showing positive or negative indication toward a statement. The table shows respondents' beliefs about digital change processes

Variable	**Positive**	**Negative/Neutral**	**%Positive**
My company is good at illuminating workers of the competitive situation.	4	4	50%
Decision makers in my company identify opportunities for digitalization.	4	4	50%
There is sufficient support for digitalization from decision makers.	3	5	37.5%
The entire company is encouraged to participate in digitalization initiatives.	5	3	62.5%
Employees appreciate the vision for digitalization.	3	5	37.5%
Employees feel included in the creation	5	3	62.5%

of the vision for digitalization.			
Employees are given the chance to participate in the creation of the vision for digitalization.	6	2	75%
Employees are overall inspired by the vision for digitalization.	2	6	25%

A positive indication is given by an answer of 4 or 5 on a Likert scale, whereas neutral indication is given by a response of 1 to 3.

Table 14: Frequencies showing positive or negative indication toward a statement. The table shows respondents' beliefs about digital change processes.

Variable	**Positive**	**Negative/Neutral**	**%Positive**
The vision for digitalization is sufficiently communicated to workers.	2	6	25%
Decision makers act in accordance with digitalization change initiatives, in a way that legitimizes it.	2	6	25%
It's easy to transition into new digital ways of working.	5	3	62.5%
Digital change processes tend to be impeded by workers who actively oppose them.	3	5	37.5%
Employees are provided sufficient instructions when adopting new digital ways of working.	7	1	87.5%
Employees believe that digital change processes have led to improvements	4	4	50%

early on in the change process.			
Employees believe that digital change processes have led to operative improvements.	5	3	62.5%

A positive indication is given by an answer of 4 or 5 on a Likert scale, whereas neutral indication is given by a response of 1 to 3.

Table 15: Frequencies showing positive or negative indication toward a statement.

Variable	Positive	Negative/Neutral	%Positive
The questions were clearly formulated.	11	3	78.6%
The alternatives were clearly formulated.	10	4	71.4%
The questions were designed to skew the answers in some direction. *	3	11	21.4%

A positive indication is given by an answer of 4 or 5 on a Likert scale, whereas neutral indication is given by a response of 1 to 3. *The last statement includes responses from 3 to 5 as a positive or neutral indication, whereas a negative indication is given by a response of 1 or 2.

Table 16: Control question

Variable	Correct	False	%Positive
What was the survey about?	14	0	100%

4.2. Interviews

Interviewee 1

From our interview with Interviewee 1 it was indicated that question Q1.3 should be separated into two questions, as to allow for the respondent to answer more specifically about whether collection is made about consumer data or competitor data. In question

Q1.4, Interviewee 1 expresses that it should be clarified whether we want an answer to consumer data or competitor data.

In the lead paragraph to question Q2, Interviewee 1 believes that it should be clarified whether a third party is used or if it's the company itself that creates the algorithms. In question Q2.1 Interviewee 1 believes that using the words "advanced algorithms" is problematic, since advanced is a controversial word to use. Instead, he believes that the word should either be removed or the question be divided into sub questions with advanced and basic algorithms. In question Q2.2, Interviewee 1 believes that we should be clearer about whether we want to study companies' use of machine learning or the marketing departments'.

In Q3 Interviewee 1 indicated that it should be added that many companies don't develop their own systems for data collection. Instead, they may use external vendors for this function. In Q4.1 Interviewee 1 indicated that the focus of the questionnaire up to that point had been on marketing and that introducing a question about accounting may be confusing and irrelevant to marketers. Interviewee 1 believes that Q4.3 is too similar to Q1.2, since both ask about collection of data on competitors, with only a very slight nuance. Interviewee 1 also believes that Q4.4 should be asked in conjunction with Q1.2, since the question of collection of data on competitors should be immediately followed by the question of analysis of said data. Interviewee 1 believes that Q4.5 should include the alternative that data may be collected via a vendor and not only the company itself. Interviewee 1 also believes that in Q4 should have an additional question asking an open answer question about additional areas of application for data analysis.

In Q5.3 Interviewee 1 believes that the question shouldn't be asking about both product development and promotions. Additionally, he believes the question about product development is a repetition of Q4.8. Interviewee 1 believes that Q5.4 goes into some specifics about consumer data, but since it is already mentioned in Q1 it would be more logical to discuss it after that. Overall, he believes the order of questions about consumer data could be more logical. Interviewee 1 also believes that Q5.5 is too similar to Q5.7 and that they essentially ask about the same thing.

Interviewee 1 thinks that the questions throughout Q6 don't capture the rationale behind the questions. They cover all types of data and it would be more appropriate to specify the questions in this section to only cover a specific type of data. He thinks that under the current structure the respondents are forced to generalize over all types of data. In Q6.1, Interviewee 1 believes that there should be questions about why the data is difficult to handle, or alternatively an open question where they could provide context themselves. Interviewee 1 believes that Q6.6 should be divided to ask about why the data can't be used for reliable analysis. Since questions Q6.1-Q6.5 allude to different causes of why collected data can't be used for analysis, Interviewee 1 thinks Q6.6

should be structured in a way that makes it possible to indicate either of these reasons in order to show causality between the individual issues with collected data and analysis of the data.

In the lead paragraph to Q7, Interviewee 1 believes that Big Data shouldn't be used synonymously with data models. Additionally, he thinks that Big Data is a buzzword that a lot of people misuse and should be used carefully. In Q7.1 Interviewee 1 thinks it should be clearer whether the questionnaire is dealing with the individual respondent or the company. In Q7.2 Interviewee 1 thinks earlier experiences and heuristics ("tumregler" in Swedish) are very similar and that it should be made clear whether and what distinction there is between the two. In Q7.3, Interviewee 1 indicates that while the question makes a distinction between decision making based on data models and heuristics, it should be noted that decisions based on data models need to be interpreted heuristically. Interviewee 1 believes that Q7.6 essentially is the same question as Q6.6. He also believes that Q7.7 shouldn't add organization as a new expression, instead sticking with company. Additionally, it should be clearer whether we are talking about the company, the individual marketer or somebody else. Interviewee 1 believes that Q8 is too open-ended, making it difficult to acquire any quantifiable results. The interviewee also thinks "data models" could be widely interpreted, which may result in respondents perceiving the question differently.

Interviewee 1 believes that Q9 is too open to interpretation, since most people have been part of some type of digital change process, given the definition in the question. Overall, he believes the entire section from Q9-Q12 loses focus on what is relevant in the study for marketers.

In the block about demographic questions, Interviewee 1 believes that there should be a question about the sector the company is active in. He also believes that it's relevant to know if the company does Business to Business or Business to Consumer marketing, since the two differ greatly from a marketer's perspective.

In Q16, Interviewee 1 believes that there should be more alternatives, since the respondents may only have elementary school education, or a 4-year vocational high school diploma. Also, he believes university courses shouldn't be included as an alternative. Interviewee 1 believes Q17 should be conditional on Q16 since the area of education is dependent on whether you actually have had an education. He also believes that Q20 should be structured so that the format shows whether you should answer in years or months. Furthermore, in Q21 he believes that the question shouldn't just try to capture how long the respondent has been working with data analysis of marketing data but also to which degree, since most marketers do it at some level.

Interviewee 2

From our interview with Interviewee 2, he said that there weren't any problems with the introduction to the questionnaire. Interviewee 2 indicated that Q1 was good overall. However, the step from consumer data and competitor data is big and he indicated that their company has very extensive consumer data, but very limited competitor data. He indicated that if data on competitors was gathered, it was usually extensive and expensive reports that weren't internally created, while consumer data was continuously gathered as a key aspect of their marketing operations.

In Q2, Interviewee 2 believed that algorithms and machine learning came very quickly and that he would have begun with automation. He adds that they are buzzwords that most companies say that they use, but in reality, they may not work with it at any advanced level. He also makes the distinction that many companies may use the technique of machine learning and algorithms, but they do not work with the technical capabilities themselves.

Interviewee 2 believes that Q4 is dependent on how a company works. Most companies use social media and he believes that most would answer yes to that question. On the other hand, he believes that most companies wouldn't indicate that they work with segmentation. He thinks that it's relevant though, since it can yield interesting results. Furthermore interviewee 2 claims that marketers don't really analyze consumers as segments anymore, but rather in terms of behavior. So instead of identifying a clear segment of consumers, they look to identify behaviors of their consumers and target consumers exhibiting that behavior. He believes that grouping consumers in terms of segments is outdated, but could perhaps still be valid in television marketing, where they have a more traditional way of reaching consumers.

In Q5, interviewee 2 believes that many of the questions ask about areas of data collection that they obviously conduct. He mentions the geographical location and advertising questions in particular. On the other hand, they don't conduct any explicit studies about consumer's data.

Interviewee 2 indicated that in Q6, the questions were fine per se. However, he said that in his company, they don't have systems that are suited for visualization of data. Instead, they get the final output of the data from Google Data, but once it's been received it's difficult to look at the underlying computations.

In Q7, interviewee 2 indicated that the connotation behind heuristics (which in Swedish was translated to 'tumregler') was a bit confusing. One interpretation could be that it is a mediocre guess. The question that he finds interesting here is the degree to which data models are trusted. Often, he finds that a company is given an output from a data model that shows the exact spending they should have for different types of marketing in order to have the largest impact. But in the end, they may decide to not follow what the data

models indicated. In summary, he believed that the degree to which managers actually adhere to the results of available data models is a relevant question in regards to his own experience.

Interviewee 2 said that in Q8 he thinks there should be a set of responses where commonly used tools will be included and that the question should capture if said tool was routinely used. This is because marketers working with data analysis can easily use 20 or 30 different tools, but many to a small degree. So the question needs to capture the degree to which they are used.

Interviewee 2 indicated in Q9 it was difficult to understand what a digital change process was. When it was clarified orally during the interview he thought it was easy to understand and that the question itself should reflect that. In Q10, he thought that it should clearly indicate that it was about a digital change process, but with the difficulty understanding the previous question, it was confusing to understand this one as well.

In Q11 he recognized many of the issues with digital change processes from his own experiences. Often there are initiatives to implement new digital solutions, but there is a lack of resources and competence to actually be successful. He believes that more focus on the issue of decision makers in these types of projects could be interesting. In Q12 he thought that the concept of how individuals disrupt change processes was something he recognized from his own experience. However, the two last questions were difficult to understand.

In the demographic section of the questionnaire (Q13-26) there were no major changes that he found necessary, apart from Q24 where he would have preferred a couple of alternatives.

Overall Interviewee 2 had found the interview questions as relevant. He would like to have some few improvements so that it was clearer what was asked for. He also believes some questions could be switched around to make it more logical.

5. Discussion

5.1. Discussion about interviews

Based on the interviews, there are improvements that can be made. Interviewee 1 indicated that the questions about consumer data and competitor data should be divided in two different parts. Both interviewee 1 and 2 thought that the questions about consumer and competitor data were areas that could be split up as their companies have very different approaches to the two. Consumer data on the one hand tended to be collected continuously as a natural part of operations, while competitor data required concerted effort and spending. Interviewee 2 even indicated that they barely analyze competitor data, while consumer data was something they worked with a lot. An improvement to a future instance of the study would be to have the two separated. Additionally, there could be questions that are unique about consumer data and competitor data. One interesting path would be to ask more detailed questions of the extent to which consumer data is collected and used.

Both Interviewee 1 and Interviewee 2 indicated that the usage of algorithms and machine learning should have included questions about the way they work with them. Usually, they don't develop their own systems but go via a vendor, which would be interesting for future studies to ask about. Further, Interviewee 1 believes that there should be more nuanced questions on the details of whether a company uses basic or advanced algorithms. Interviewee 2 also commented on the risks of using terms like machine learning and big data. According to him, in the marketing business in Sweden, it is not that uncommon to wrongly use these terms, and that the exact meaning of them is not widely known. This is important to note if conducting a further study, to eliminate the risk of the target group not knowing the definition of certain terms. One way of doing it is thoroughly explain definitions such as these, and through control questions investigate the level of knowledge of a potential participant, before including them.

Interviewee 1 indicated that the question about warehousing (Q4.1) is irrelevant to marketers and may be removed for future studies. Interviewee 1 also believes that the order of the questions should be changed and that there are some repetitive statements in question 4, which were asked about in question 1. There are some more minor details about the design of question 4 which Interviewee 1 believes can be improved. But a major addition that could be added would be to allow for the respondent to add any other areas of data collection.

In question 5, interviewee 1 believes that some of the questions would have been more logical to ask about in conjunction with question 1. He thinks it would be more logical

since it would link together all questions about consumer data and it's an area of improvement for future studies.

In question 6 interviewee 1 thinks that the questions force the respondents to generalize over many different types of data. His suggestion is that the questions in this section should ask about each specific type of data in order to get good results. Based on this it may be advisable to have future studies be more focused on one particular area of data collection and analysis such as geographical location of consumers.

In question 7 there was a problem with the interpretation of the concept of heuristics, since the Swedish translation has a more negative connotation where it implies more of guessing. If a future study were to be conducted, it would be advisable to work around this problem with a more thorough explanation of the meaning of the expression.

Interviewee 1 indicated that the section about digital transformations (question 11-12) do not belong with the other aspects of the study. Interviewee 2 indicated that this part of the study was interesting and that he recognized a lot of the issues that were asked about from his own experience. In his experience, he has found it especially interesting how decision makers act during change processes and believes that more focus on that would be of interest. For a future study then, it may be interesting to only look at the aspect of transformations rather than as a part of a larger study. Putting particular focus on how management deals with issues during the transformation process can be of particular interest. As previously mentioned in the thesis, Kotter's 8 step model of why transformations fail is a framework built on Kotter's observations rather than empirically supported findings. However, given the response of Interviewee 1, there is an indication that the model can prove to be useful to create a theoretical background when conducting these kinds of studies.

Based on what Interviewee 1 said about this section, the authors believe it would perhaps be better to implement this part of the study in a setting where an organization has failed with a digital transformation in order to study what went wrong.

Overall, Interviewee 1 believes that the study in its current form has a too wide scope. The authors' comment on this is that the scope is large in order to conduct a pilot study over a large research area, in order to lay a foundation for future studies. Aspects of this foundation can be drawn upon for future research, where only one research area would be chosen. Thus, with a smaller scope only one aspect could be researched and this would allow for a more specific phenomenon to be analyzed.

There are some examples of settings where it may be interesting for other studies to draw upon this study. For instance, it may be interesting for future studies that want to analyze change processes in a company to use this framework and the suggested improvements. It could also be used for research into how marketers use data, or with some modifications it could be used in any aspect of a company's data collection and

analysis. Further, the part about heuristics could be reused to analyze how managers make decisions based on the available data. On this matter, interviewee 2 indicated that managers often ignore data analysis in favor of their own heuristics. A future study could use this study's framework and apply it to other areas than marketers, since nowadays many managers of different departments have to make complex decisions with underlying data as a part of the analysis.

5.2. Conclusions from a potential future study

Following are the discussion of the pilot study, and the conclusions that could be drawn if conducted on a larger scale, with a statistically significant population.

5.2.1. The marketing Information System

A full scale study based on the questionnaire presented in this study (see appendix for full questionnaire) could give new facts about the usage of data within the setting of Kotler's Marketing Information System (Kotler & Keller, 2006). The questionnaire could give information about the collection of data among marketers, and the primary source of data. Regarding the feedback from the interviewee's, the source may vary as the primary source for interviewee 2 was through purchase from a vendor. It further can give an indication about the most common type of data collected, or acquired, as for example data about customers or competitors. Furthermore, it could give indications about the source of the data. If it is bought from an external vendor, or if the company collects the data itself. It will also provide a basic understanding for what the data is used for in terms of brand building, competitors and product development. Furthermore, the study will give an indication about how common algorithms and machine learning is among marketers in Sweden. This is interesting to see since the use of algorithms and machine learning is has increased in the last decades (Almqvist, 2018) It should be considered that the person taking the questionnaire may not be aware about to what extent algorithms are being used, since they are integrated to platforms used by marketers, for example Google Analytics (2020).

The questionnaire also examines further to what the data collected is used for. This is for the purpose of creating ads campaigns, to find the geographical location of customers or to examine the willingness to buy among potential customers. But again, the questionnaire does not go into a deeper level about each of the research areas, but examines them briefly.

Moreover, the questionnaire examines problems that may arise when collecting data and analyzing it. These questions are not formulated in such a way that they ask about specific, for example technical issues, or specific statistical problems. But rather, they ask general questions about if the collected data is relevant, is structured or can be analyzed. These questions can collect answers about the current state among marketers,

and how well data can be utilized in a general sense. If a larger study is conducted using the questions proposed, it can give ground for further research that examines different areas that may appear as interesting depending on the results.

5.2.2. Managerial Heuristics and Big Data

The questionnaire also examines the area of the extension of heuristics is utilized, and to what extent larger sets of data are utilized, denoted “big data”. These questions look further into the use of heuristics and previous experience. It also looks into the utilization of data models. Once again, these questions are not formulated in such a manner that they can provide data that answer specific questions in the subject, but can provide a general understanding. Based on the data collected from these, if used in a larger study, one could gain a better understanding of to what extent marketers use their own intuition rather than computer models. It could also give a hint about the attitudes marketers have about heuristic decision making if conducted on a larger scale. This may show questions that are relevant for previous studies such as the one made by Almqvist (2018), examining the use of managerial heuristics versus big data.

5.2.3. Kotter’s 8 step model of why transformations fail

The study is designed to attain results about where in digital transformations that companies fail to implement it. It uses Kotter’s 8 step model of why transformations fail and attempts to map out at what stages of the transformation process that it may fail. Using the method outlined in this study but on a larger scale, the results of that study will be able to indicate at what stage marketing departments fail to implement the change and make it possible for companies to understand where marketing departments would fail at effecting change in how they work with digital tools. For example, it may turn out that there tends to be a failure in creating a strong guiding coalition leading the change. This knowledge would then be possible to use for companies to remedy that particular problem.

5.3. Conclusions

The research questions were to develop quantitative methods for evaluating how digital transformation processes within marketing fail, how common it is to apply managerial heuristics or data based decision making and the usage of big data in marketing operations. In this study, it has been shown how this can be done, since a method has been developed, the method has been illustrated, it has been evaluated and possible improvements have been discussed for future studies on a larger scale. In conclusion, the purpose of this study has been fulfilled as the research questions have been answered.

Overall, the feedback from the interviewee's is that the majority of the questionnaire is relevant to them as marketers. The approach in this study was to investigate a broad number of topics, to create a framework for future quantitative studies. However, future studies should not be conducted in this exact manner. Instead, aspects of this study that are relevant to a particular subject or setting should be used where it's appropriate. Specifically, the questions about Kotter's 8 step model of why transformations fail need to be more concrete about what type of digital transformation that has occurred. The authors' thoughts are that this would be more useful as a study specifically aimed at a particular digital transformation in a company, possibly one that has failed. Regarding the part of this study that investigates the use of managerial heuristics, it is crucial to find subjects in relevant positions for such a study, and to be clear regarding the definitions of what exactly managerial heuristics are. The most important aspects of a study regarding the usage of big data in marketing operations are to find the right subjects for such a study, that have knowledge about the digital tools they use, and are very aware of the definition of big data.

- A framework for a quantitative study on evaluating how digital transformation processes within marketing fail, how common it is to apply managerial heuristics or data based decision making and the usage of big data in marketing operations has been developed.

- If the framework developed in this study is used for further research, it is highly recommendable to not use all the different topics in the framework of this study, but maybe one.

- Improvements need to be made to certain parts of the questionnaire, if used, such as accurately choosing relevant test subjects and to clearly communicate the meaning of definitions such as "big data". Some parts of the questionnaire are most effective in given settings, such as when analyzing digital transformation processes.

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7. Appendix

Appendix 1: The complete survey, as it was distributed in Swedish.

Number	Questions and statements
Text	Välkomna till vår undersökning! Vi är två studenter från Handelshögskolan i Stockholm som genomför en undersökning om digitala förändringsarbeten och datahantering. Enkäten utgör underlag för vår kandidatuppsats i marknadsföring. Svaren kommer behandlas konfidentiellt. Frågorna är formulerade som påståenden, och du kommer ges olika alternativ. Välj det svar som du anser passa bäst. Dina svar kommer att bidra till ökad förståelse för digitaliseringsarbetet på svenska företag. Enkäten kommer ta ungefär 10-15 minuter att besvara och som tack för att ni tar er tid att svara på den kommer vi att ge 50 kronor till Läkare Utan Gränsers arbete med att hantera COVID-19 för varje svar. Vi rekommenderar att ni besvarar enkäten antingen via dator eller surfplatta. Vid fråga eller fundering om enkäten, vänligen kontakta 23617@student.hhs.se Tack på förhand för din medverkan! Einar Stenback & Martin Söderberg
Q1	Nedan följer påståenden om datainsamling på er arbetsplats. Ange i vilken omfattning tycker du att dessa påståenden gäller för ditt företag.
Q1.1 (L)	- Det sker aktiv insamling av kunddata.
Q1.2 (L)	- Det sker aktiv insamling av data om konkurrenter.
Q1.3 (L)	- Data i form av exempelvis kunddata eller data om konkurrenters försäljning köps in från externa företag.
Q1.4 (L)	- Data i mitt företag samlas in genom egna undersökningar.
Q2	Nedan följer två påståenden gällande algoritmer och maskininlärning. Med algoritmer avses en uppsättning regler eller instruktioner som i bestämd ordning beräknar data, ofta i syfte att lösa ett numeriskt problem. Med maskininlärning avses algoritmer som automatiskt förbättras och "bygger upp" egen erfarenhet. I vilken omfattning tycker du att påståendena gäller för ditt företag?
Q2.1 (L)	- Avancerade algoritmer används på min avdelning.
Q2.2 (L)	- Maskininlärning används på min avdelning.
Q3 (Open)	Vänligen ange det eller de områden som ditt företag samlar in mest data om som avses användas i marknadsföringssyfte (Specificera några olika typer av marknadsföringsdata).
Q4	Data kan användas till att analysera flera områden, såsom förändringar i kundpreferenser eller konkurrenters strategier. Nedan följer ett antal påståenden om dataanalys. I vilken omfattning tycker du att påståendena gäller för ditt företag?

Q4.1 (L)	-	Idag använder mitt företag dataanalyser för att generera interna rapporter om exempelvis försäljningsstatistik eller lagerhållning.
Q4.2 (L)	-	Idag använder mitt företag dataanalyser för att få en bättre bild egna varumärket.
Q4.3 (L)	-	Idag samlar mitt företag in data om konkurrenters agerande på marknaden.
Q4.4 (L)	-	Idag analyserar mitt företag insamlad data om konkurrenters agerande på marknaden.
Q4.5 (L)	-	Idag samlar mitt företag in data från sociala medier (ex. Facebook, LinkedIn).
Q4.6 (L)	-	Insamlad data används för att optimera prissättning.
Q4.7 (L)	-	Insamlad data används för att identifiera kundsegment.
Q4.8 (L)	-	Insamlad data analyseras i syfte att användas i produktutveckling.
Q5	I marknadsföring används dataanalyser på olika sätt. Nedan följer ett antal påståenden om sätt dataanalyser kan användas. Vänligen ange till vilken grad som de passar in på ditt företag.	
Q5.1 (L)	-	Insamlad data används i utformningen av kampanjer.
Q5.2 (L)	-	Idag genomför mitt företag kundundersökningar om kunders köpvilja för våra produkter eller tjänster.
Q5.3 (L)	-	Insamlad data från kundundersökningar används till att utveckla produkter och kampanjer.
Q5.4 (L)	-	Mitt företag samlar in data om sina kunders geografiska placering.
Q5.5 (L)	-	Mitt företag använder data om kunders geografiska placering i syfte att utforma kampanjer.
Q5.6 (L)	-	Mitt företag använder data om kunders geografiska placering i syfte att förbättra distribution.
Q5.7 (L)	-	Mitt företag använder data om sina kunders geografiska placering i syfte att effektivisera reklamannonsering.
Q6	Att samla in och analysera stora volymer data kan innebära begränsningar. Nedan följer några påståenden om vilka problem det kan beröra. I vilken omfattning tycker du att de gäller för ditt företag? Med data i den här frågan menas den data som används i marknadsföringsaktiviter. Det gäller exempelvis kunddata, data om konkurrenter, försäljningsdata, etc.	
Q6.1 (L)	-	Insamlad data är svår att hantera.
Q6.2 (L)	-	Det är svårt att få fram resultat vid analys av data.
Q6.3 (L)	-	Insamlad data är relevant.
Q6.4 (L)	-	Insamlad data är av dålig kvalitet.
Q6.5 (L)	-	Insamlad data är välstrukturerad.
Q6.6 (L)	-	Insamlad data går sällan att användas för pålitliga analyser.
Q7	Nedan följer påståenden om att använda erfarenhet och tumregler vid beslutsfattande snarare än kvantitativa beräkningar av stora volymer data, s.k. Big Data, här benämnt som datamodeller. I vilken omfattning tycker du att dessa påståenden gäller för ditt företag?	
Q7.1 (L)	-	Idag fattar jag beslut baserat på tumregler.
Q7.2 (L)	-	Idag fattar jag beslut baserat på tidigare erfarenhet.
Q7.3 (L)	-	Idag fattar jag beslut baserat på datamodeller.
Q7.4 (L)	-	Jag anser att datamodeller ger ett bättre underlag för beslutsfattande än tumregler.

Q7.5 (L)	- Jag anser att datamodeller ger ett bättre underlag för beslutsfattande än tidigare erfarenhet.
Q7.6 (L)	- Mitt företag har problem med den underliggande datan när man gör prediktioner.
Q7.7 (L)	- De datamodeller som organisationen använder fungerar väl.
Q8 (Open)	Vänligen ange de datamodeller som ditt företag använder.
Q9 (Yes/No)	En digital förändringsprocess är en ökning i användningen av digitala resurser och hjälpmedel. Har du under de senaste tre åren deltagit i någon typ av digital förändringsprocess i ditt arbetsliv?
Q10 (Open)	Vad har du jobbat med för digitala frågor?
Q11	En digital förändringsprocess är en ökning i användningen av digitala resurser och hjälpmedel. Med digitalisering avses skapandet av nya sätt att generera värde för företaget via digital teknologi. Med en digital förändringsprocess avses att ett företag genomför en strukturell förändring för att generera mer värde för företaget via digital teknologi. Ange till vilken grad dessa påståenden passar in på förändringsprocesser mot digitalisering som du deltagit i.
Q11.1 (L)	Mitt företag har bra rutiner för att medarbetare ska vara medvetna om företagets utmaningar och konkurrenssituation.
Q11.2 (L)	Beslutsfattare i mitt företag jobbar med att identifiera behov av digitalisering.
Q11.3 (L)	Det finns tillräckligt med stöd för digitala förändringsinitiativ från personer i beslutsfattande positioner.
Q11.4 (L)	Hela företaget uppmanas att driva förändringsprocesser för digitalisering.
Q11.5 (L)	Mitt företags vision för digitalisering är något som medarbetare uppskattar.
Q11.6 (L)	Medarbetare känner sig delaktiga i skapandet av visionen för digitalisering.
Q11.7 (L)	Medarbetare ges utrymme för att delta i utformningen av och komma med synpunkter på visionen.
Q11.8 (L)	Överlag inspireras medarbetare av visionen för digitalisering.
Q12	En digital förändringsprocess är en ökning i användningen av digitala resurser och hjälpmedel. Med digitalisering avses skapandet av nya sätt att generera värde för företaget via digital teknologi. Med en digital förändringsprocess avses att ett företag genomför en strukturell förändring för att generera mer värde för företaget via digital teknologi. Ange till vilken grad dessa påståenden passar in på förändringsprocesser mot digitalisering som du deltagit i.
Q12.1 (L)	Visionen för digitalisering kommuniceras tillräckligt till medarbetare.
Q12.2 (L)	Beslutsfattare tenderar att agera i linje med digitala förändringsinitiativ på ett sätt som legitimerar det.
Q12.3 (L)	Det är enkelt för medarbetare att gå över till att jobba på nya sätt vid digitalisering.
Q12.4 (L)	Digitala förändringsprocesser brukar försvåras av medarbetare som aktivt motsätter sig dem.
Q12.5 (L)	Medarbetare ges tillräckliga instruktioner för att förstå hur de ska använda nya arbetsmetoder vid digitalisering.
Q12.6 (L)	Medarbetare upplever att digitala förändringsprocesser har haft positiva effekter redan tidigt i förändringsarbetet.
Q12.7 (L)	Medarbetare upplever att digitala förändringsarbeten har lett till operativa förbättringar.
Q13	Nu har du kommit till den sista delen av enkäten. Vi vill ställa några frågor om dig som besvarat den.

Q14 (Alt_1)	Kön
Q15 (Open)	Hur gammal är du?
Q16 (Alt_2)	Vilken är din högsta utbildningsnivå?
Q17 (Alt_3)	Vad har du för utbildningsområde?
Q18 (Open)	Vad har du för position i ditt företag?
Q19 (Open)	Beskriv dina arbetsuppgifter.
Q20 (Open)	Hur länge har du varit på din nuvarande arbetsplats?
Q21 (Open)	Hur lång erfarenhet har du av att jobba med dataanalyser av marknadsdata?
Q22 (Open)	Vänligen ange ditt arbetsområde (exempelvis marknadsföring eller finans)
Q23 (Open)	Hur många personer jobbar på ditt företag?
Q24 (Open)	Vilka digitala verktyg använder du i ditt arbetsliv? (Excel, Google analytics, etc)
Q25 (Alt_4)	Vad handlade enkäten om?
Q26	Nedan följer frågor om din uppfattning av undersökningen.
Q26.1 (L)	Frågorna var tydligt formulerade.
Q26.2 (L)	Svarsalternativen var tydligt formulerade.
Q26.3 (L)	Frågorna försökte påverka dina svar i någon riktning.

A parenthesis after a question denotes that it requires a response. No parenthesis denotes that it is text, with no response. An (L) shows that the question has answers on a Likert scale from 1-5. A (Yes/No) shows that the question has a yes and a no alternative. An (Open) shows that the question has an open answer. An (Alt) shows that the question has set alternatives, the number indicating which alternatives that were used, provided below. The first question is denoted text, and only shows the initial text respondents are met with before taking the survey.

Alt_1	Man – Kvinna – Annat – Vill inte ange
Alt_2	Gymnasium – Universitetskurser – Kandidatexamen – Masterexamen Doktorsexamen eller högre – Annat (Open)
Alt_3	Finans – Management – Redovisning - Marknadsföring - Matematik/Statistik – Ingenjör – Juridik – Annat (Open)
Alt_4	Finans – Digitalisering - Bokföring

Appendix 2-17 show respondents' answers to the text questions in the survey, as well as other questions not shown in the results section. The responses and questions are in Swedish.

Appendix 2: Data collection in companies

Q3. Vänligen ange det eller de områden som ditt företag samlar in mest data om som avses användas i marknadsföringssyfte (Specificera några olika typer av marknadsföringsdata).

Respondent	Q3

1	Webbsida trafik, google och Facebook annonser
2	Mailadresser
3	webbhistorik, sökbeteende på webben
4	Adressinformation, produktintresse
5	Köpbeteenden & ålder
6	App-relaterade metrics (e.g. retention, # of sessions, spend)
7	Kundernas preferenser gällande produkter
8	Köper data från 3:e part. Samlar ej själva
9	
10	Direkta kundkrav, kundens kunds krav, indata från standardisering, konkurrentanalyser
11	Demografi, kundbeteende
12	Bilmarknaden
13	Demografi, köpbeteende, intresseområden, finansiell data
14	Kundanalys

Appendix 3: Data models used by the company

Q8. Vänligen ange de datamodeller som ditt företag använder.

Respondent	Q8
1	Vet ej
2	
3	
4	
5	
6	Främst regression
7	
8	Google analytics
9	
10	Kravdatabaser, diverse simuleringsmodeller av målsystem
11	
12	Oklart
13	Egenkonstruerade
14	Google Analytics

Appendix 4: Participation in digital change processes

Q9. En digital förändringsprocess är en ökning i användningen av digitala resurser och hjälpmedel. Har du under de senaste tre åren deltagit i någon typ av digital förändringsprocess i ditt arbetsliv?

Respondent	Q9
1	Ja
2	Nej
3	Nej
4	Nej
5	Ja
6	Ja
7	Nej
8	Ja
9	Nej
10	Ja
11	Ja
12	Nej
13	Ja
14	Ja

Appendix 5: What digital questions have you worked with?

Q10. Vad har du jobbat med för digitala frågor?

Respondent	Q10
1	Digital marknadsföring/media
2	
3	
4	
5	Utformning av kampanjer baserat på kunddata
6	Datahantering, datamodellering
7	
8	Val av SAAS plattform
9	
10	utökad användning av simulering av målsystem för både mjukvara och systembeteeende
11	marknadsföring, försäljning
12	
13	Allt möjligt. Från retail till due diligence
14	Försäljning, interna data

Appendix 6: Gender

Q14. Kön

Respondent	Q14
1	Man
2	Man
3	Man
4	Man
5	Man
6	Man
7	Kvinna
8	Man
9	Man
10	Man
11	Man
12	Man
13	Man
14	Kvinna

Appendix 7: Age

Q15. Hur gammal är du?

Respondent	Q15
1	25
2	24
3	25
4	32
5	24
6	24
7	25
8	25
9	21
10	54
11	28
12	26
13	26
14	29

Appendix 8: Education level

Q16. Vilken är din högsta utbildningsnivå?

Respondent	Q16

1	Kandidatexamen
2	Universitetskurser
3	Masterexamen
4	Masterexamen
5	Kandidatexamen
6	Kandidatexamen
7	Kandidatexamen
8	Kandidatexamen
9	Kandidatexamen
10	Masterexamen
11	Kandidatexamen
12	Kandidatexamen
13	Masterexamen
14	Kandidatexamen

Appendix 9: Area of education

Q17. Vad har du för utbildningsområde?

Respondent	Q17
1	Marknadsföring
2	Marknadsföring
3	Management
4	Marknadsföring
5	Marknadsföring
6	Finans
7	Marknadsföring
8	Management
9	Finans
10	Ingenjör
11	Finans
12	Marknadsföring
13	Management
14	Management

Appendix 10: Position in the company

Q18. Vad har du för position i ditt företag?

Respondent	Q18
1	Members Manager

2	Marknadsföringsassistent
3	programmatisk coordinator
4	Marknadskoordinator
5	CMO/CFO
6	Investment Associate
7	Analytiker och skribent
8	Entry level
9	
10	Produktarkitekt
11	Grundare
12	Key Account Manager
13	Managementkonsult
14	

Appendix 11: Tasks within the company

Q19. Beskriv dina arbetsuppgifter.

Respondent	Q19
1	Öka trafik till webbsida
2	Copywriting
3	
4	Koordinering av kommunikation och säljdrivande aktiviteter
5	
6	Due diligence, strategi, projektledning
7	Skriver artiklar och marknadsföringsmaterial, analyserar kunddata, A/B-testing etc.
8	Köper reklam
9	
10	Kundnära systemeringsarbete med fokus på kravöverföring
11	Försäljning, marknadsföring
12	Sälj
13	
14	

Appendix 12: Duration at current place of work

Q20. Hur länge har du varit på din nuvarande arbetsplats?

Respondent	Q20
1	2 veckor

2	2 månader
3	4 månader
4	4 år
5	
6	2 år
7	3 år
8	2 år
9	
10	20 år med samma team i varierande roller
11	2 (we assume years)
12	4 månader
13	3 år
14	1 år

Appendix 13: Experience working with marketing data

Q21. Hur lång erfarenhet har du av att jobba med dataanalyser av marknadsdata?

Respondent	Q21
1	2 år
2	2 år
3	1 år
4	Nästan obefintlig
5	
6	3.5 år
7	3 år
8	1 år
9	
10	15+ år
11	5 år
12	4 månader
13	3 år
14	3 år

Appendix 14: Current area of work

Vänligen ange ditt arbetsområde (exempelvis marknadsföring eller finans)

Respondent	Q22
1	Marknadsföring
2	Marknadsföring

3	Markandsföring
4	Marknadsföring
5	Marknadsföring
6	Marknadsföring, finans, strategi- och affärsutveckling
7	Medieproduktion
8	Marknadsföring
9	Finans
10	Teknisk marknadsföring, kravinsamling och systemering
11	Marknadsföring
12	Sälj
13	Management
14	Management

Appendix 15: Number of people working at the company

Q23. Hur många personer jobbar på ditt företag?

Respondent	Q17
1	65
2	5
3	120
4	40 000
5	4
6	Approx. 1,000
7	40
8	200
9	
10	50
11	1
12	ca. 35-40
13	30 000
14	

Appendix 16: Digital tools used at work

Q24. Vilka digitala verktyg använder du i ditt arbetsliv? (Excel, Google analytics, etc)

Respondent	Q24
1	Excel, Google Ads, Google Analytics, Meltwater, wordpress, mailchimp
2	Facebook business manager, Google analytics

3	MS Office, D&V 360, AdForm
4	Excel, Ziplabs, interna CRM-system
5	Google analytics, excel
6	Främst MS Office (data hämtas från andra plattformar och databaser)
7	Google analytics, Wordpress
8	Google 360, google analytics
9	Excel, sheets, linkedin Recruiting tools
10	Excel, Powerpoint, Word, diverse programmerings- och simuleringsspråk
11	Microsoft Office, Google-analytics
12	Excel
13	Excel, alteryx, tableau, sql
14	Google Analytics

Appendix 17: What the survey was about – Control question

Q25. Vad handlade enkäten om?

Respondent	Q25
1	Digitalisering
2	Digitalisering
3	Digitalisering
4	Digitalisering
5	Digitalisering
6	Digitalisering
7	Digitalisering
8	Digitalisering
9	Digitalisering
10	Digitalisering
11	Digitalisering
12	Digitalisering
13	Digitalisering
14	Digitalisering

Appendix 18: Interview Questions

- "What are your thoughts about the introduction?"

- "What are your thoughts about the statements in Q1 regarding the collection of data? "

- "What are your thoughts about the statements in Q2 regarding the use of algorithms and machine learning?"

- " What are your thoughts about the open answer question in Q3 in regarding the collection of data?"

- "What are your thoughts about the statements on Q4 regarding the application areas of data analytics?"

- "What are your thoughts about the statements in Q4 regarding collection of data?"

- "What are your thoughts in Q4 regarding the utilization of collected data?"

- "What are your thoughts about the statements in Q5 regarding the collection and/or utilization of customer data?"

- "What are your thoughts about the statements in Q6 regarding collected data?"

- "What are your thoughts about the statements in Q7 regarding heuristical decision making?"

- "What are your thoughts about the statements in Q7 regarding data driven decision making?"

- "What are your thoughts about the statements on Q8 regarding data models?"

- "What are your thoughts about the question on Q9 regarding digital transformation processes?"

- "What are your thoughts about the question on Q10 on working with digital question?"

- "What are your thoughts in the statements in Q11 regarding digitalization processes that you've participated in?"

- "What are your thoughts on the statements in Q12 regarding the processes of digital transformation at your organization?"

- "What are your thoughts about demographic questions in Q13, i.e. your age, gender etc.?"