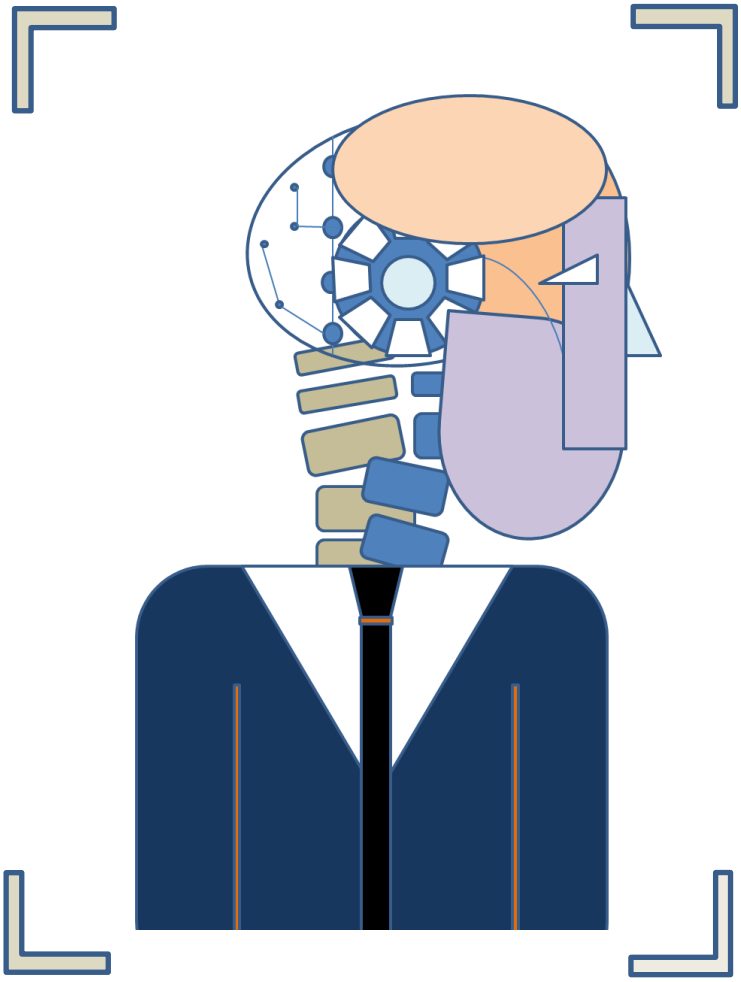

# Perceptions of Artificial Intelligence

## Framing a Consultancy's Successful Establishment of a Shared Understanding


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## Abstract

In this project, we have analysed how and why the consultancy Bluefragments has succeeded in establishing a shared technological frame of reference with three of their clients. The analysis was specifically focused on understanding how organisations perceive and make sense of the technology of Artificial Intelligence (AI). We have investigated the technological frame of Bluefragments and each of their three clients. We have identified some distinct similarities and differences. We have then compared our findings to determine the extent to which Bluefragments technological frame was aligned or misaligned with each of the three clients. Finally, we have used Bluefragments' own concept of Ready-Made-AI to analyse why each of the consultancy's respective collaborations were a success. We generally found that Bluefragments has not had a conceptual discussion about AI with its clients. Nonetheless, all clients saw their collaborations with the consultancy as a success. Therefore, we have concluded that a conceptual agreement on the nature of AI technology has not been a prerequisite for a successful collaboration. Bluefragments has, however, had an extensive focus on the establishment of a shared terminology with each of their clients. Bluefragments focus on terminology has been with the aim to avoid misunderstandings and to find common ground with regards to the agreement on the practical solution.

We have used Orlikowski and Gash's (1994) technological framing theory as a basis for our analysis. We have used their two categories, Nature of Technology and Technology Strategy, to structure our interviews and subsequent analysis. However, we replaced Orlikowski and Gash's third category, Technology in Use, with our own category: AI in action. This new third category includes a socio-materialistic focus on AI technology. Our new category has allowed us to analyse organisational sense making, with regards to the interactive interplay between AI as an active technology and the people using it

# Table of content

# 1. Introduction

Artificial Intelligence (AI) technology has been around for some years already (Anyoha, 2017), but it is not until rather recently that the technology has attracted attention in relation to work processes. Especially news media is highlighting the technology - in both a positive and negative light. Since AI is fairly "new", there is a lot of uncertainty about what AI actually is, how it is supposed to be used in a business context and what organisational effects it will bring. An especially heated discussion is about whether AI is coming to replace existing employees - the discussion is one of the most prominent ethical issues related to the increasing interplay between humans and AI (Skytte, 2017).

In a business context, the technology has mostly been discussed in terms of how companies are incorporating it into existing work processes to, especially, optimise those processes (The Economist, 2018; Tran, 2018). However, many companies do not have the capability to implement AI technology on their own. Therefore, we are interested in focusing on the B2B perspective of a consultancy and its clients, as this is the constellation through which AI is often being introduced.

To that end, we have chosen to base our thesis in collaboration with Bluefragments - a Danish consultancy, which specialises in developing AI solutions for small and large clients within different sectors. Bluefragments is a general tech company founded by Thomas Martinsen. The company is mostly focused on creating apps, IoT and mobility solutions for their clients, and their focus on creating AI solutions is still a minor part of the business offerings. However, they expect that AI solutions will take up more and more of their business solutions as the technology gets more widespread. We have focused specifically on three of their clients, namely IDA, Frontliners and Bestseller.

Bluefragments have created a concept called Ready-Made-AI. The concept is meant to create a common understanding of AI to avoiding misunderstandings between Bluefragments and their clients. Since there are a vast amount of different perceptions surrounding AI, the concept entails both a discussion of what AI is and some ready-made components which can be further developed to fit to the individual organisation and their project. The concept is thereby used to create a frame for the organisational perceptions to gain insight of the general sense making for Bluefragments and their three clients.

We have chosen to analyse the perceptions of both Bluefragments and their clients by means of a technological frame analysis. We have slightly changed Orlikowski and Gash (1994) existing framework to incorporate a focus on AI by means of a socio-materialistic line of questioning. We will focus on the inter-subjectivity between the four organisations and how Bluefragments' frame corresponds to their three clients' frames. Thereby, we will analyse how and why Ready-

Made-AI have been the technological frame which has aligned the various perceptions of Bluefragments and respectively IDA, Frontliners and Bestseller.

## 1.1. Problem Area

Technological change has since the industrial revolution been about specialising tasks in an effort to create standardised machinery for standardised work. Outcomes were predefined and so automation or mechanisation was the name of the game (Acemoglu & Restrepo, 2018). However, with the advent of self-learning algorithms, tasks today may still be predefined by a specific target, but the outcomes are largely idiosyncratic. Due to AI's self-learning capabilities, it can generate even more efficiency and cost reductions than conventional automation. Today a learning organisation is a necessity. We believe that we are seeing a change in the modus operandi of how businesses understand their processes and as it is the case with technical change, one cannot afford to be left behind.

AI describes a large array of data processing methods with one thing in common, namely the ability of the technology to self-improve with little or no supervision. AI is strictly speaking not a new technology (Appendix 1, l. 184-185), but it is only now seeing widespread implementation into work practices, which for some create unease and instability while for others it garners enthusiasm. Naturally, there are heated discussions about what AI is, what it can provide a company and the ethical aspect of implementing AI in work processes. For the time being, there are no real conclusions as to what AI will bring or how it should be used for organisational purposes - or not be used. The definitions around AI are rather vague and it seems to create confusion in people's perceptions of the technology. If members of an organisation have dispersed perceptions of what AI is and what it can do, it can be difficult for a consultancy company to implement AI technology successfully in a client organisation.

We are curious to examine how the perception from different organisations affect how AI is conceptualised by a consulting company. We believe that *"(...) an understanding of people's interpretations of technology is critical to understanding their interaction with it*" (Orlikowski & Gash, 1994, p. 175). As a consequence of that belief, we are specifically interested in analysing how Ready-Made-AI is used to align Bluefragments and their client organisations' perception of AI. We are interested in analysing if there is a field of contention between Bluefragments' understanding of their clients' perceptions and the clients' actual perception of the AI solution they have adopted. Since this field have not yet been thoroughly explored as most theories either deal with the feeling and strategies that individuals employ (Bagozzi, 2007; Beaudry & Pinsonneault, 2005, 2010; De Guinea & Markus, 2009; Stein, M. K., Newell, S., Wagner, E. L., & Galliers, 2015), or intra-

organisational sense making in terms of how a new technology is conceptualized (Davidson, 2006; Kaplan & Tripsas, 2001; Weick, 2001). We want to use existing theories to understand the inter-organisational sense making of organisations in a consultant-client relationship. We believe inter-organisational frames will eventually affect individual's interaction with new technology (Orlikowski & Gash, 1994), however such effects are not the focus of this thesis.

It is interesting to investigate if Bluefragments actually do adjust Ready-Made-AI according to the respective clients' perception or if there is a misalignment. We believe that this adjustment of perceptions presents an interesting and unexplored perspective on AI in organisations and may help to clarify some of the observed confusion around AI as seen in some of the above-mentioned examples.

## 1.2. Research Question

How and why has Bluefragments succeeded in establishing a shared technological frame of reference, in terms of their own and their client's perceptions of AI?

## 1.3. Delimitation

It is important to acknowledge that perception, implementation, adoption and use of AI are interrelated concepts. We will therefore briefly touch upon all these aspects, but will only focus, in detail, on perception. For instance, we will not examine the implementation of AI, but will touch upon how perceptions might influence the implementation of the technology.

Our understanding of the terminology, implementation relates to the practical process of imposing the technology into the organisational structure, for instance the manufacturing process. We understand it as a top-down process. Whereas adoption relates to the organisational endorsement of technology. Use is an action motivated by adoption and implementation. Nonetheless, to describe the actual use, implementation and adoption would require direct observation, which is not the focus of this thesis.

We do not explicitly aim to fact check people but we do want to discern their opinions and analyse why they hold certain beliefs about AI, especially if that belief is grounded in an incorrect understanding of the technology. An understanding that often translate to a wider societal debate, seeing as there is quite a lot of talk in the media about the potential negative or positive effects AI will have on the job market - this debate is not within the scope of our thesis, but we recognise it may inform people's perception of AI. Neither do we aim to express our personal opinions or perceptions of whether AI will have positive or negative effects in organisations, in our specific case research. Nonetheless, we do believe that AI will be a vital part of future work processes and

therefore we want to investigate how people perceive AI, seeing as it inevitably will be part of their day-to-day work.

# 2. Theories and Models

In this section, we intend to give a basic insight of AI for the non-technically educated reader. We have selected to only focus on AI, which is one aspect of data science. However, it should be noted that within AI and data science in general, there are vastly more to explore than these modest pages, and they are merely for the purpose of providing the reader with the necessary knowledge to appreciate the technical aspects of this thesis. It is not only the aim to give an insight of how AI is used in this thesis, but also to establish what exactly AI is - and what it is not. In our experience, the explanation and use of the term AI is often used differently depending on who is talking. For example, we have found that most journalists are generally not aware of their own lack of knowledge about the terminology - thereby often creating further confusion rather than understanding about the exact nature of AI and its various but interconnected aspects.

We will also be going through the various aspects of framing and establish our theoretical footing in terms of how we have conducted our analysis of perception. As part of this, we have combined available framing theory with our knowledge about AI to better accommodate its unique technical aspects.

## 2.1. Artificial Intelligence

### 2.1.1. Data Science

Data science is an area of study that covers the overall aspects of the technical processing of data. Provost and Fawcett (2013) define it as "*data science is a set of fundamental principles that guide the extraction of knowledge from data*" (Provost & Fawcett, 2013, p. 2). To get the gist of this field, it is not necessary to be able to apply methods, but it is vital to understand the fundamental factors of the thinking behind it to gain a data-analytical mindset. A data-analytical way of thinking allows one to recognise how various methods of both data mining and use are deployed for different purposes. Choosing the better method depends on the result you are aiming for. Artificially intelligent processing is one such method among the numerous methods of processing data within data science.

Artificial intelligence (AI) is a broad term referring to an intelligent agent capable of perceiving and interacting with its environment in order to maximise its actions towards a given goal over time with increasing efficiency (Provost & Fawcett, 2013; Russell & Norvig, 1995). Intelligence is sometimes, but not always understood as emulating human intelligence and therefore defined by what we associate with intelligence (Tecuci, 2012) - an idea which has links back as far as the original concept of the Turing Test (Turing, 2010). By its very definition, AI is a broad term, which covers

several different methods of intelligent data processing and modelling. In the following section we will uncover the most frequently used methods.

### 2.1.2. Automation

Automation refers to the process of having a technology or a machine executing a task without human assistance (Groover, 2014). We want to emphasise that automation is not the same as AI, but AI solutions might involve automating a process, which is often the case with robotics (Appendix 2, l. 933-935).

Often when AI is discussed in popular media, the nature of AI is rarely addressed in detail but what is explored, and speculated about, at great length is the outcome of using AI. One of the primary benefits of AI more often than not is increased automation. However, the work being automated is currently done by humans who now stand to lose their jobs (McKinsey & Company, 2017), at least in the short term. In the long term, automation is also a concept you can use to explain the changing nature of tasks undertaken, allowing one to analyse the role of AI as merely a technology in a larger historical context. Based on historical precedent, AI might only initially decrease jobs available, but might very well increase labour demand in the long run, as a result of increased capital and a larger labour pool (Acemoglu & Restrepo, 2018).

Automation is an important concept to understand as it is what we believe people readily associate with AI due to its effects on the job market. We believe the way people perceive AI as a whole is dependent on how automation will affect them personally and their environment generally, even though these are two distinct concepts.

### 2.1.3. Subcategories of Artificial Intelligence

The most frequently used methods of AI modelling are, but not limited to, machine learning (ML), artificial neural networks (ANN) and deep learning (DL). They are all closely connected and it can therefore be difficult to distinguish them from each other, however, they are all used for different purposes because of their different attributes. It should be noted that these concepts are interconnected and often describe different aspect of the same thing, therefore it can be difficult to describe the various concepts individually. Nonetheless, the following will give an overview of the various aspects of AI, explained as separately as possible, to give an insight into the specific details, but certain overlap will occur intentionally.

#### *2.1.3.1. Machine Learning*

Machine learning is generally defined as "*The programming of an algorithm to constantly improvise itself, based on available data*" (Nath & Levinson, 2014, p.39). It is important to notice that both ANNs and DL are a subcategory of ML - where ML is the overall area and ANN and DL are methods within ML. There are also other methods within ML, such as decision trees and other linear models (Appendix 1, l. 16-19), however ANN and DL are the most well known overall methods and we will therefore focus solely on them. The general characteristics for all these methods are the large data sets they all need in order to function successfully. The processing of the data is where they are different and are hence used for various purposes (Appendix 1, l. 391-394). The other characteristic is labelled or unlabelled data. Where labelled data has a known target variable and unlabelled data has an unknown target variable (Provost & Fawcett, 2013). A certain amount of labelled data is always needed to create an algorithm as a model needs to know how the data is to be processed, at least initially (Appendix 1, l. 293-296). The labelling of data is often about categorizing data and making sure you have the right data - meaning that the data should correctly reflect the problem you are trying to analyse. It requires labour and is therefore often an expensive process. Provost and Fawcett (2013) present the example that if one wanted to make a customer retention analysis after 6 months - but one only had customer data from the past 2 months - additional data would manually have to be acquired and labelled in order for any analysis to take place. Otherwise, one would not have the necessary dataset to conduct the desired data analysis.

Overall, three different approaches to ML exist: supervised learning, unsupervised learning and reinforcement learning. It is important to understand that these are approaches towards how you handle your data not methods in themselves. An analogy could be the difference between conducting a quantitative or qualitative interview. Both approaches can yield interesting insights but you must first decide which approach to use in order for the end-result to have any value, as the result should say something interesting about the question you want answered. ML works much the same way, as the approach to the data springs form the target you have, which in turn allows you to choose an adequate method e.g. clustering, to find an answer. We will go into further detail about the various method in the coming sections.

Supervised learning is used when there is a specific target of the outcome and can lead to predictions. Because of the specific target, supervised learning usually has more useful results as well, which can be applied accordingly. What is important in order to use supervised learning is that there must be data on the target - not only the existence on target information itself (Provost & Fawcett, 2013). You would typically use a supervised method when you have a clear idea about what you need an answer to, i.e. the target value. Provost and Fawcett (2013) use the example of wanting

to know whether a specific incentive would make a customer buy a specific service. Since it is a 'yes/no' question, it is a classification problem, which is best solved by using a supervised method. Conversely, if you wanted to know which different customer groups exist, without relying on existing definitions, you would not have a precise target value and thereby not be able to use a supervised method. However, through an unsupervised method, such as clustering, you would be able to draw valuable conclusions from your dataset, even if you did not know exactly what you were looking for. Thus, it is important to notice that the distinctions between supervised and unsupervised learning is about if there is a precise target or not, which then determine the approach towards handling the data.

Some technical methods can have overlaps in whether they are being used through a supervised or unsupervised approach. However, in general supervised learning methods are usually understood to be classification, regression and causal modelling, whereas similarity matching, link prediction and data reduction can be solved by both supervised and unsupervised methods, and finally clustering, co-occurrence grouping and profiling are typically understood to be unsupervised methods (Provost & Fawcett, 2013).

As described, unsupervised learning can be used when there is no precise target, for instance by generating groupings based on similarities. However, because of the lack of a specific target the results may not be as meaningful and provide what is needed (Provost & Fawcett, 2013). For instance, a marketing manager discovers that a group of customers went shopping at a specific time - through an unsupervised method. The marketing manager would still not know why this shopping took place and this makes any form of direct customer marketing extremely difficult, as nothing defines the group other than the shopping time.

The third ML type is reinforcement learning, which is slightly different from the two others. It is driven by predicting errors, which is characterised by learning to balance aspects of a problem and not by learning to achieve a known or unknown result most efficiently, like in the case of supervised and unsupervised ML (Sutton & Barto, 1998). A learning problem in this context refers to the fact that the ideal outcome is not fixed but situational. The problem requires the learning agent to interact with its environment to find the best solution possible in a specific situation. This type of learning has roots in classical conditioning and Ivan Pavlov's dogs experiment where actions are based on how best to gain rewards or avoid punishment (Glimcher & Fehr, 2013). Reinforcement learning is based on interaction, meaning that a learning algorithm, in this context, is any algorithm that allows the learning agent to interact with its environment in order to achieve its overall target. This further initiates that the algorithm will need a target, or targets, in relation to its environment and be able to sense the state of the environment. In contrast to the other types of ML where they

address sub-problems, reinforcement learning is addressing the whole problem and how it might relate to the bigger picture (Sutton & Barto, 1998). The best current example of reinforcement learning is self-driving cars. Driving involves a multitude of smaller sub-problems, but the overall goal is a safe driving experience both for the passengers and the pedestrians. It is hard to say precisely what would be the best driving experience beforehand as it is largely situational, which is why reinforcement learning sees widespread use in this area (Chuo, Kamalnath, & McCarthy, 2018).

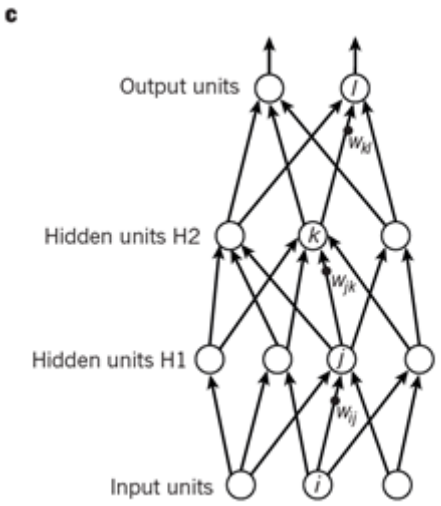
The problems being addressed with reinforcement learning are complex, which is why the methods being used can vary from problem to problem. It is important to understand that reinforcement learning is an approach and not a specific method. However, whenever a method is being approached by using reinforcement learning, the method must have a complete target-seeking and interactive algorithm, which can then choose actions that influence its environment. Put differently, the algorithm must be able to learn a task by trying to maximize the rewards it receives for its actions (Chuo et al., 2018). For example, Google's AlphaGo used reinforcement learning as it allowed the system to develop strategies when it was rewarded for a winning combination and punished for a losing combination of moves (Silver & Hassabis, 2016). In Go, or any game for that matter, the winning combination of moves is contextual and unknown before the game ends. Since it is impossible to predict exactly what will happen in each individual play-through, you need to deploy an evolving strategy and not simply an exact combination of moves, which has worked previously. That is the difference between predicting strategic moves and providing a fixed outcome. The target is always to win, but in order to win; the system always has to present a unique combination of moves and not simply become more efficient at processing the same combination of moves.

Besides being able to interact with its environment, reinforcement learning has the additional benefit of being able to work with a low amount of input data. It is expected that any operating reinforcement learning system will have to predict the most likely outcome of a situation based the limited amount of information available to it, which essentially means it has to be able to work with incomplete datasets (Chuo et al., 2018).

#### *2.1.3.2 Artificial Neural networks*

An Artificial Neural Network (ANN) is an advanced form of AI processing. The word neural is derived from the word neuron and is an analogy to the brain, where a neuron is the smallest processing unit. A brain's neuron is triggered by an electrical signal from connected neurons. Upon activation the neuron will fire out an electrical signal to whichever neurons are connected to it, thereby creating a sequence of events (Graupe, 2014; Lecun, Bengio, & Hinton, 2015; Smith & Gupta, 2002). There are

many different types of ANNs, but we will touch upon only a few, mainly Multi-layered Feed-forward Neural Network and Recurrent Neural Network.




*LeCun, Bengio & Hinton, 2015, p. 2*

An ANN works in a similar fashion to the human brain; the smallest component part is known as a node or perceptron - but here we will simply continue to refer to it as a neuron. An ANN always has an input and output layer and in principle all neurons in the network are simply organised on a layered grid and are all connected between the layers (Graupe, 2014; Smith & Gupta, 2002). What can make ANN processing very complex, is the fact that all neurons in a layer can in principle trigger all other neurons in the next layer, seeing as they are all connected. Meaning that seemingly unconnected neurons from opposite sides of the grid might trigger each other directly. What makes the ANN even more complex is the fact that the strength of the connection between neurons can vary according to the weights between the neurons (Smith & Gupta, 2002). Not all connections are equal and therefore the neuron can be activated to various degrees depending on the signal it receives, the weight might therefore be anywhere between 0-100%. Thus, what can be programmed in an ANN through the use of a supervised, unsupervised or reinforcement approach is the amount of layers in the network. What is learned by the machine is the weight of the connections between neurons (Lecun et al., 2015) (Appendix 1, l. 68-70).

Smith (2002) presents an example of a multi-layered feed-forward Neural Network (MFNN), which is a basic form of an ANN. It consists of a single input layer of neurons, which are clustered according to supervised input. The individual neuron simply calculates an output based on the relationship between its input and weight. The clusters are in effect a competition between neurons, as only the neuron with the weight that best reflects the input data is allowed to contribute to subsequent layers. In this case, the MFNN was used to create a self-organising map (SOM) which was used by the Wall Street Journal to create a ranking of 52 countries based on their economic performance. The input was based on eight economic variables and the SOM was used to determine the correlation in the data, based on a colouring scheme. As this was a supervised method the clustering and weighting of the neurons was up to the developer. Through a degree of trial-and-error, the developer found clusters that were wide and specific enough to detect unforeseen correlations in the data and reveal something interesting about the grouping of countries. Through

this method the Wall Street Journal was able to detect five distinct groups of countries which each had their own unique economic characteristics (Smith & Gupta, 2002).

Regardless of whether the method is supervised or unsupervised, not all layers in the grid are necessarily visible to the programmer and therefore these are called hidden layers (Lecun et al., 2015). In these hidden layers, the weights can be self-adjusted and the model can 'learn' to process data more efficiently through repeated use. This means that sometimes, as in the case of a recurrent neural network (RNN), the neurons within the hidden layers are also connected to one another. Thereby, the same input information can be processed multiple times before reaching the output layer - thereby the name 'recurrent' (Chuo et al., 2018). Such complex interconnected systems allow for what is called non-linear processing; without going into further detail, this essentially means that a chaotic input can be distorted in such a way that makes the output understandable to the programmer (Lecun et al., 2015).

#### *2.1.3.3. Deep Learning*

Deep learning (DL) is a way of using ANNs where there needs to be a several hidden layers (Appendix 1, l. 51-54). It is important to notice how DL is a way of using an ANN in a non-linear fashion through hidden layers, thus not all ANN are DL models (Lecun et al., 2015)(Appendix 1, l. 110-111). The word deep is related to the depth of the model's grid. A DL model is then by definition structured in such a way so as no one will actually be able to fully account for how the model came to the exact result it did.

Because DL is a way of using ANN, it is not always easy to make a clear distinction between when something is DL or simply an ANN. However, DL is typically used when applying data analysis to an area, which is very complex, and often changing in nature, as for instance language. Chuo et al. (2018) presents an example of a RNN, which is used to provide a 'next word' service for a chat function, it might seem simple but it is based on a complicated probability function. The RNN is able to suggest what words to use - in reality it presents you with other people's most used options. Therefore, you have a system that is able to analyse context and predict what might be the most likely next development given that context. People use language in many different ways and if you as a developer had to account for every one of them, it would arguably be an impossible task. What makes DL exceptional at this is the fact that it is able to respond to the changing nature of language, simply by learning from the way people use the DL network. Therefore, you as a developer do not have to understand why or how the change in language is happening, or maybe even be aware of it, as long as you have made a DL network that is good enough to account and respond to this change on its own. MFNN, which is a more conventional ANN, would most likely not be able to analyse and respond to context as well as a RNN. You as a developer would need to have a clear idea of what

changes in the language you wanted the MFNN to be aware of, which as mentioned would be an impossible task. Therefore, in this case you use DL rather than a conventional ANN (Chuo et al., 2018).

ANNs in general, and DL especially, has been used extensively in various forms of advanced pattern recognition such as imagine recognition or consumer behaviour, and as seen above with the example on language. The methods have been surprisingly good at sorting relevant information from the irrelevant information, for example being able to detect a face no matter what background of the image might be (Lecun et al., 2015; McKinsey & Company, 2017). It does this by constantly looking for distinct features or patterns. In the case of facial recognition, the model is typically trained to recognise the distinct proportions between your eyes, nose and mouth, which always follows a clear mathematical pattern. Whenever the ANN detects those exact proportions it 'knows' it is looking at a face since it recognises a distinct pattern, which allows it to ignore everything else (Lecun et al., 2015).

## 2.2 The Use of AI in this Thesis

We have provided some technical definitions of AI and its associated methods to make sense of the actual technical reality of this emerging field. The definitions explained will be how we make sense of AI throughout the thesis. These definitions will, however, not allow us to answer our RQ on their own, as we are aiming to analyse people's perception of AI and for that, we need a technical understanding to discern the technical legitimacy of people's arguments. In addition, we will need a method that will allow us to analyse perception. We have chosen to focus on framing which we will explore further in the next section.

## 2.3 Framing

We want to understand how Bluefragments and their clients' perceptions about AI align or do not align, and hopefully we will also be able to understand how a client's perception of AI can influence the solutions Bluefragments propose for them or vice versa. Consequently, we need a method, which allows for an explanation of how cognition influences behaviour. Hence, we have chosen to use 'framing' as our primary tool for analysis as it deals with cognition and general sense making.

Framing was first defined by Goffman, as follows "*The frame establishes a boundary within which interactions - the significance and content of which are self-evident to the protagonists - take place more or less independently of their surrounding context* " (Goffman, 1974, p. 15). Goffmann's original definition of a frame conceptualises the cognitive brackets we impose or adopt to make sense of the world around us. In other words, framing is a social constructivist framework, which

relies on conversation with the individual whose world you are trying to conceptualise. Strictly speaking, framing is epistemologically subjective, but as it deals with sense making there is often, at least implicitly, an understanding that especially organisational constructs are inter-subjective as it is about how a collective of people make sense of something as a group (Cornelissen & Werner, 2014).

Frames are often divided into different levels. When talking about different level frames it is important to understand that a frame is principally employed by the individual to make sense of his or her world. Thus, if a frame is shared with a larger group it is not experienced collectively, but by individuals. Keeping that in mind, frames can be divided into three main levels: micro, meso and macro. Cornelissen and Werner (2014) have created a well-defined framework to make sense of the many different, and sometimes contradictory, forms of framing theory available.

In their definition, a micro level frame is "*a knowledge structure that directs and guides information processing*" (Cornelissen & Werner, 2014, p. 6). It deals primarily with cognition and sense making, meaning it is about how an individual validates his/her perception of a given social environment. It is assumed that the environment influences the individual, and therefore principally about how the individual codifies that information into a 'frame' that allows that individual to act in accordance with the social norms of the given environment. An example of an individual frame in relation to IT could be the different and often vacillating strategies individual users deploy, in order to cope with the various emotions an individual may have towards a newly introduced IT system (Stein, M. K., Newell, S., Wagner, E. L., & Galliers, 2015). The way individuals strategize could be understood as a form of framing, and these strategies might just as easily apply to the introduction of AI technology.

Next is the meso or organizational level frame, which they define as "*a jointly constructed cognitive representation of firms in an industry, including assumptions of capabilities and the bases of competition*" (Cornelissen & Werner, 2014, p. 6). This level deals with the intersubjective connections between individuals as they negotiate the goals of the organised group. It should be noted that Cornelissen and Werner criticize these level analyses for having a too narrow focus on the organisational consequences rather than the construction process of that frame. Often, organisational level frames are analysed in terms of organisational change, especially when it comes to the introduction of new technology. For instance, Heracleous and Barrett's (2001) discourse analysis reveals how members of an organisation conceptualise a new technology. Kaplan and Tripsas' (2001) analysis of the life cycle of a technology shows the way we conceptualise a technology changes what outcome we expect from it. Both of these studies are organisational level frame analyses, which analyse technology generally, but could be applied to AI technology specifically.

Finally, macro frames are defined as "*a jointly constructed cultural template within an institutional field that, when it settles, provides the basis for socio-economic change.*" (Cornelissen & Werner, 2014, p. 6)**.** This largest level frame can also be understood as our shared social reality, it is rarely ever challenged successfully, but when it is, it causes seismic swifts in the way we understand how and why we interact with one another (Cornelissen & Werner, 2014). An example of a macro frame analysis could be the book *Living in a Material World: Economic Sociology Meets Science and Technology Studies by Pinch and Swedberg* (2008), in which the authors try to generally conceptualize the intersection between the subjective and objective notion of materiality, which we will touch upon later. It should be noted that the term 'macro frame analysis' is a comprehensive term, which covers a broad area of analysis of large social constructivist phenomena. The term itself is rarely ever used, but is helpful as a tool to describe the theoretical substance, for instance an institutional analysis of a shared perception.

We expect that a shared frame is important for a successful project of AI implementation. Therefore, we need a method, which will allow us to examine how these perceptions interact. To that end, we will need a method, which allows for a certain degree of inter-subjectivity. Thus, we have chosen to focus solely on technological frames as a means of discerning the inter-organisational sense making, in regards to AI. Cornelissen and Werner (2014) explicitly mention technological frames as being part of the meso level. They criticise many of meso level frames for having a too narrow focus on the organizational consequences rather than the construction process. However, seeing that we are dealing with inter-organizational sense making we want to understand, to a lesser extent, how the individual frame came to be, and to a much larger extent, want to analyse the differences between Bluefragments and their clients' frames. Thus, we understand frames as largely predetermined concepts, which on an inter-organisational level interacts through the representatives of the various client organisations and the consultancy company. We therefore find it justifiable to assume that the representatives of the respective client organisations can, to a reasonable degree, convey the organisational frame as a whole and be analysed as such.

### 2.3.1 Technological Frames

Technological frames are different from other frames as they deal with something material, rather than something purely cognitive or social. We understand a technological frame of AI to be socio-materialistic. Socio-materiality (Leonardi & Barley, 2010) presents a good synthesis between what is dictated - namely the limitations of the materials around you - and what is chosen, in the way we use or shape these materials.

An AI is by definition able to change its output without constant direct supervision. It distinguishes itself by providing an outcome that you did not know you specifically needed, or at very least could not find on your own. What you ask of the technology shapes the way it operates. What makes the technology intelligent is its ability to autonomously self-improve towards providing exactly what you ask. In other words, the way you interact with an AI shapes it, therefore we understand the technology as socio-materialistic.

We understand this interaction between man and machine as constitutive entanglement as described by Orlikowski (2007). She states that "*The notion of constitutive entanglement presumes that there are no independently existing entities with inherent characteristics (Barad 2003: 816)*." (Orlikowski, 2007, p. 4). To that end, we as humans exist with a dependence on the materials around us, but those materials are shaped to fit the way we intend to use them. Previously, that meant that each tool or technology was shaped, used and then discarded. With the invention of AI, the pattern has become much more circular, as each time an AI fails it learns, so it discards little to nothing from its failure. For example, insurance companies would previously have employees to invest time in the examination of claims for an individual customer's insurance, which could take several days. Now, the insurance companies can use AI algorithms to take care of the examination of claims within a few seconds. The AI algorithm is able to search through all the data of previous examination of claims and insurance policies, and with the training from employees, it can quickly learn itself what outcome is best fitted (Deloitte, 2018).

As a consequence of our socio-materialistic footing, we must conclude that technologies generally, and AI specifically, do not hold predetermined characteristics that dictate their use. Therefore, we find that perception must hold an important role in regulating how we interact with technologies - as the way we make sense of, or frame something, influences our behaviour (Goffman, 1974). Thus, a logical premise for our examination of shared frames are the belief that AI cannot be implemented successfully if there is not a common perception of the technology between Bluefragments and the client. The way we make sense of technology influences the way we perceive and interact with it (Mishra & Agarwal, 2010; Olesen, 2014; Stein, M. K., Newell, S., Wagner, E. L., & Galliers, 2015). Thus we will not be able to conclude whether the implementation of AI has been an objective success, for instance by increasing production output. However, we will be able to conclude whether it has been an organisational success in terms of how the organisational members think about and make sense of AI in their company.

#### *2.3.1.1. Our Frame for Interpreting Technology*

Davidson (2006) presents a categorical framework for discerning the different framing domains used in technological frames of reference studies. The domains are: features and attributes, potential organisational applications, incorporating IT into work practices, and finally, frames related to developing IT applications in organisations. Based on this framework we have chosen to use Orlikowski and Gash (1994) as a starting point for our technological frame method. We have chosen this method, as it falls within Davidson's first three categories (Davidson, 2006) thereby allowing us to analyse several aspects of the established shared technological frame between Bluefragments and their client.

As previously mentioned, Orlikowski and Gash clearly state *"(...) that an understanding of people's interpretations of technology is critical to understanding their interaction with it*" (Orlikowski & Gash, 1994, p. 175). Thus, their emphasis is on the importance of perception in regards to our behaviour with and around technology. They further specify the context of this interaction by stating: "*We use the term technological frames to identify that subset of members' organizational frames that concern the assumptions, expectations, and knowledge they use to understand technology in organizations. This includes not only the nature and role of the technology itself, but the specific conditions, applications, and consequences of that technology in particular contexts*." (Orlikowski & Gash, 1994, p. 175)**.** This method allows us to answer our Research Question accurately, as it is based on a holistic understanding of the complex nature of how technology is understood and used in a specific organizational context.

Through their study, they identify three domains, which characterises the interpretation of technology. Orlikowski and Gash's (1994) three domains are:

*Nature of technology* - refers to people's images of the technology and their understanding of its capabilities and functionality.
*Technology Strategy* - refers to people's views of why their organization acquired and implemented the technology. It includes their understanding of the motivation or vision behind the adoption decision and its likely value to the organization.
*Technology in Use* - refers to people's understanding of how the technology will be used on a day-to-day basis and the likely or actual conditions and the consequences associated with such use.

The technological frame definition is quite broad but we believe it needs to be in order to fully uncover the various components of people's perceptions of AI. The definition also allows us to analyse what Orlikowski and Gash describe as congruence and incongruence, or the alignment or

misalignment of expectations, assumptions or knowledge about a technology. They use the concepts to explain and analyse how different groups of the same organisation can have different frames for the same technology. We will stretch our interpretation of these concepts to also include incongruence or congruence of a client company and Bluefragments, as a consultant company.

#### *2.3.1.2 Incorporating AI into the Technological Frame*

Orlikowski and Gash's (1994) method allows for extensive examination of how AI is understood both in terms of the nature of the technology and the strategy surrounding it. However, the method will not allow us to analyse the socio-materialistic aspects of AI, since a technology to Orlikowski and Gash amounts to little more than an inanimate object. Which in and of itself was not a problem when talking about traditional technologies, which were unchanging during use. However, what makes AI different is its ability to continually improve itself. What Orlikowski and Gash's method is missing, is the understanding that technology now holds capabilities inherent to itself and therefore must be analysed as a co-evolving entity, which can be perceived by the people using it.

To accommodate the socio-materialistic capabilities of AI, we have modified the technological frame through what we have called *AI in action*:

*AI in action* - refers to people's perception of the AI's increasing agency. Where agency is understood to be the result of a socio-materialistic evolution of the technology through interactions with its users.

We have replaced *technology in use* with our own category, as we are less interested in how people imagine the eventual use of the technology. Instead, we are more interested in how or whether people perceive an evolution of AI in reaction to its use. With the new formulation, we are able to analyse AI as a technology, which holds agency and is capable of taking autonomous action. Meaning that AI can be developed to seemingly act independently of human interaction, which entails that the AI can recognise the relevance of its tasks and results.

This corresponds to socio-materialism, which entails that the technology - in this case an AI - is ascribed value by humans because of the interaction between man and machine. An AI can exist on its own, but its purpose of existence is defined by humans. The moment humans take an AI into use, is where the AI's existence has value. In reverse order, AI is a material, which also influences human life - both in the way we perceive the material and how we use it - as a material that provides humans opportunities that we did not have beforehand. Humans constantly find new ways of using the material and discover how it can bring most value to our daily life. This is a socio-materialistic

understanding where human and technology are in constant evolution with each other, because of the value we chose to ascribe to it. This can be seen in how generated data from users, customers or others are analysed for then again to be used to have an effect on people. This method is especially used when businesses are creating a digital marketing strategy. Companies extract information from data on various social media platforms - data which is created by the individual user - to incorporate in the digital marketing strategy, for the purpose of attracting relevant users to become consumers of the products or services that the companies provide (Gonçalves, 2017).

With the introduction of our own category, we believe we will be able to better explain how perception relates to an interactive technology. Socio-materiality emphasise the plasticity of the relationship between man and machine. We believe we have now created a theoretical framework, which emphasises this plasticity but focuses on perception.

Table 2.1 provides an overview of the concepts we will use in our analysis and how we intend to apply them.

Table 2.1 Applying the three domains

| **Concepts** | **How we will apply them** |
|---|---|
| **Nature of Technology** | We are interested in analysing how people perceive technology and AI in general. Additionally, what they believe AI does or does not consists of and where they believe AI has its limits. Furthermore, we are interested in analysing how Bluefragments perceive their clients' perception of technology and AI specifically. |
| **Technology Strategy** | We are interested in analysing if adopting AI methods are a strategic decision, and if so, what the strategic decision is and what effects they believe it will have and why they have chosen to adopt it. Likewise, we are interested in analysing Bluefragments' beliefs of their clients' perceptions towards a strategic decision. |
| **AI in Action** | We are interested in analysing if people perceive AI differently than other technologies (e.g. automation) and ascribe AI to be self-evolving. We are interested in finding out what value they ascribe to AI in order to analyse if they have a socio-materialistic understanding of AI, as explained above. |

# 3. Methodology

It is our claim that in order to have a successful implementation of AI in an organisation, it is necessary for all stakeholders involved in the implementation, to have the same understanding of the concept of AI and the technology it involves (Beaudry & Pinsonneault, 2005; Orlikowski & Gash, 1994). This understanding can also be seen in how Bluefragments uses the concept of Ready-Made-AI when incorporating AI into the client organisations. This thesis aims to analyse and understand the underlying forces of perception of AI.

We have worked with the consultant company Bluefragments and they have given us full disclosure of their work and methods in relation to their clients. This thesis will provide more knowledge of the perceptions regarding AI as this area has not vastly explored as of yet. It is the aim that this knowledge can be used for understanding how it affects organisations when they chose to develop AI for specific tasks within a company. At the moment, there is no real definition of what AI is and what effects it have on the companies who chose to adopt AI solutions. The findings from this thesis will then clarify some of the mystic surrounding AI, which can shed light on how AI could affect the company.

## 3.1 Data Collection

### 3.1.1 Empirical Data Sources

We have conducted six interviews in total in order to provide primary data to sources our research. We have therefore chosen a qualitative approach of collecting data as this additionally corresponds to the type of information we are interested in - namely, perceptions.

We have conducted an interview with Daniel Hardt, lector from the Department of Digitalization at CBS (during the processes of writing the thesis, he has transferred to the Department of Management, Society and Communication). Two interviews with Thomas Martinsen, CEO and owner at Bluefragments. One interview before we conducted the interviews with the client organisations and one interview after we conducted the interviews with the clients. Then we had one interview with Danny Fabricius Fogel, CEO of Frontliners - in the beginning of our project the company was called Optisquare, but has later changed name to Frontliners. We had one interview with Lisbeth Bach Keldsen, Digital Project Manager at IDA. Lastly, we had one interview with Lars Hjørnholm, Team Leader at Bestseller.

Table 3.1 Overview of all interviews conducted

| Company | Role | Member | No. of inter-view |
|---|---|---|---|
| **CBS** | Provide basic knowledge and understanding of the various aspects of AI and how these aspects connect and disconnect. | Daniel Hardt | 1 |
| **Bluefragments** | To give us insight of Bluefragments as a company in general and how they work with AI with their clients. The interviews provide important inside knowledge and is a cornerstone to understand how Bluefragments perceives AI themselves, how they think their clients perceive AI and how they have worked with their clients. | Thomas Martinsen | 2 |
| **Frontliners** | To gain knowledge on how they perceive AI in their organisation and the concept of Ready-Made-AI. | Danny Fabricius Fogel | 1 |
| **IDA** | To gain knowledge on how they perceive AI in their organisation and the concept of Ready-Made-AI. | Lisbeth Bach Keldsen | 1 |
| **Bestseller** | To gain knowledge on how they perceive AI in their organisation and the concept of Ready-Made-AI. | Lars Hjørnholm | 1 |

The interview with Daniel Hardt, lector from the Department of Digitalization at CBS, was to provide basic information about the concept of AI and what the technology entails to provide us with a better understanding and in-depth knowledge in order to critique others perceptions on AI. His explanations constitutes the definition of AI of this thesis and thereby also guides how we understand AI in general.

When we conducted the interviews for Bluefragments and the clients, we had prepared introductory questions, which would give us rich descriptions and the opportunity for the interviewees to give their own opinions without the influence of our agenda. When the interviewees explained their perceptions, we then asked follow-up questions or specifying questions to gain clearance or more in-depth knowledge. Direct questions were asked only when we did not receive enough clearance on the matter or to understate what was being said (Kvale & Brinkmann, 2015). Thereby the interviews were semi-structured, as follow-up questions and direct questions were not

prepared in advance, but instead on what was being explained by the interviewee (Kvale & Brinkmann, 2015).

Furthermore, we have used the three domains from Orlikowski & Gash (1994) as an overall structure for our interview guide. The three domains form the foundation of the analysis and therefore they were important to incorporate in the structure of the interviews. First, we asked questions related to Nature of Technology, these entailed questions about how the respective interviewees understood AI as a technology. Second, we asked questions about Technology Strategy, which were focused on how they believed AI had been a strategic decision for the organisation. Lastly, we asked questions about AI in Action, where we asked whether they had seen a change in the AI itself - and subsequently a change in how it could be used.

We conducted two interviews with Thomas Martinsen from Bluefragments, the first interview was to gain basic knowledge about Bluefragments as a company, and to understand how they perceive AI, and what they believe their clients in general perceive AI. The information from the first interview is to provide the foundation of the analysis. The second interview was to gain knowledge of Bluefragments' perception of the three specific clients of the thesis. This interview was more in-depth in regards to the three clients and enabled us to analyse even more specifically.

The interviews conducted for each of the client organisations were to gain insight to their respective perceptions of AI and Ready-Made-AI as a part of their work practices, and Bluefragments as the expertise consultancy company.

The three client interviews and the two interviews with Bluefragments are a large part of the findings for the thesis and provide us with insight knowledge with which we are able to analyse if Bluefragments' Ready-Made-AI corresponds to the clients' perception of AI.

### 3.1.2 Source Criticism

We are interested in the interviewees' subjective perceptions and we have sought to maintain a critical approach to our research, findings and discussion. When that is said, it is sometimes necessary to discern general truth from subjective opinions - especially when dealing with a topic such as AI, which is widely known but little understood.

The interview with lector Daniel Hardt is meant to support our basic understanding of the technicalities of AI and is being used to provide expert information. Furthermore, it is important to acknowledge that the interview does not cover more than the basic understanding of the technicalities of AI. As it is his personal knowledge, there may be gaps in his explanation where other experts may have additional knowledge. To avoid this conflict as much as possible, we have

supported his claims with Provost & Fawcett "*Data Science for Business - What You Need to Know About Data Mining and Data-Analytical Thinking*" from 2013 among other sources.

When extracting information from the interview with CEO Thomas Martinsen, it is important to acknowledge that he is positively biased towards Bluefragments and its services, as he is the founder and owner of the company.

It should also be noted that the clients that we have been interviewing as a foundation of our analysis and discussion, were selected by Bluefragments. This might cause the clients to be positively biased towards Bluefragments and their operations, which we have kept in mind when analysing the answers from the interviews and opposed perceptions.

Additionally, both Lisbeth Bach Keldsen and Lars Hjørnholm is project managers/team leader on the project of developing AI. It is therefore important to note that they have a limited authority for the AI project, as it is their superior of the respective companies that has the final say in the project. Danny Fabricius Fogel is the authority of Frontliners and are therefore able to choose how AI should be used in his company.

## 3.2 Data Analysis

This thesis aims to understand how AI is perceived and thereby how Ready-Made-AI is adjusted to the different client organisations. The approach towards the conclusion have been deductive, as we have first found a theoretical framework that could capture the essence of organisational and technological changes. Then, from the theoretical framework, we had general assumptions of what reality was and used this as a direction, which have been applied to the empirical data we have gathered. We found this as the best approach in terms of the vast amount of information on technology and AI. We found that we were easily lost in the various information and easily lost our direction; therefore, we chose a theoretical framework that would provide a direction and allow us to extract knowledge from the right sources. We analysed the data by using the three domains from Orlikowski & Gash (1994) as a lens to understand the perceptions of AI from Bluefragments and the three client organisations.

First, we identified the aspects of nature of technology with how they all understood AI as a concept and what they respectively believed to be understood by the technology. We also identified what Bluefragments believed to be their clients' perception of AI and how Bluefragments believed how their clients differentiated AI from other technologies – e.g. automation.

Secondly, we identified technology strategy with what Bluefragments believed to be the reason why organisations in general chose to develop AI solutions, and next why the three specific client organisations chose to develop AI solutions. Additionally, we identified what the three client

organisations respectively perceived to be the reason for the development. We also identified if Bluefragments believed if it was a strategic decision for the clients to adopt AI and what the respective client believed.

Thirdly, we identified AI in Action with how Bluefragments and the three clients perceive AI in interaction with humans and AI's increasing agency. We wanted to identify to which extent our interviewees understood AI as a socio-materialistic technology.

After we coded the data into the categories of the three domains, we analysed Bluefragments perceptions of AI and the three clients. Then we analysed the three clients separately and hereafter compared Bluefragments perception to the individual client organisation. Lastly, we analysed how and why Ready-Made-AI had been the technological frame of reference for the successful collaborations with their client.

# 4. Bluefragments

## 4.1 Description of Bluefragments

Bluefragments ApS is an IT based consultancy, which specialises in providing AI solutions for businesses and large public institutions. The company was founded in 2009 and operates out of Copenhagen in the start-up community of Univate - since they believe that the start-up environment brings more innovation and creativity to the company. Bluefragments currently employs around 15 people. The company's CEO and founder is Thomas Martinsen who has a background in business studies at CBS and professional experience as a developer in various Danish banks and insurance companies (LinkedIn.dk, 2018b).

Bluefragments has grown steadily for half a decade, but the last two years have been especially profitable as 2017 closed with a gross profit of 9,035,000 DKK and net income of 968,000 DKK. 2016 was also a watershed year for the company as it ended with a net income of 2,826,000 DKK, almost 17 times the income of the year before (Proff.dk, 2018b). Overall, the company is doing very well and it is expected that this tendency will continue into 2018. Bluefragments primarily creates revenue through professional service contracts with large companies (min. 100 employees), but it occasionally takes contacts with smaller companies and start-ups as well.

The work of Bluefragments primarily consists of creating apps and finding IoT and mobility solutions for their clients and the main source of income derives from these activities. With this stable income they are able to invest and develop AI solutions, which often involves greater risks than developing conventional software and mobility. Their aim is to focus more on AI solutions in the future, as the tendency to incorporate AI is increasing and thereby creating a growing market. They are partners with Microsoft, which enables them with the tools to develop AI solutions and provides brand validity to Bluefragments, as well. Furthermore, the partnership creates both opportunities and new clients as Microsoft recommends companies to work with Bluefragments (Appendix 2, l. 676-683).

Bluefragments aim to create solutions for the individual client, as not all clients are alike and therefore have different perceptions on what a good software contains (Appendix 2, l. 230-239). Bluefragments are aware that the large companies, they are working for, have their own technical staff and developers. Therefore, they focus on gaining and providing knowledge they can share - or sell - to their clients. Bluefragments' foundation for selling AI solutions relies on their ability to stay innovative and gain new knowledge (Appendix 2, l. 142-146). They view themselves as technical pioneers who 'deep dive' into new technology to gain an edge in their understanding of the new technology's potential business applications. The business strategy is therefore not focused on

ownership of any of the technologies they use, but to consult and provide specific solutions within existing technologies and services.

The company adheres to a modern, non-bureaucratic and quite informal management philosophy. Employees are not required to work in a specific office location nor are they expected to work during specific hours of the day or night - as long as they work a minimum of 37 hours a week. The philosophy is aimed at saving costs as any economic resources saved on office equipment and upkeep is instead spent on social events for employees.

Bluefragments has primarily serviced the Danish market and their name is well known in Danish IT circles, because of their mobility solutions and their frequent endorsements from Microsoft (Appendix 2, l. 176-178). However, Bluefragments' ambition is to expand their operations to other Nordic countries. They have recently experienced this endeavour by providing a mobility solution to the Icelandic police force, increasing the force's potential productivity by 8,000 work hours per year (Bluefragments, 2018b).

Bluefragments sell a specific solution based on general products and services, making their AI solutions customised. They use tools, which the tech giants are offering, to make their client's existing software infrastructure intelligent or more efficient. Since they are providing a specific solution to a specific problem, it allows for a gradual introduction of AI into a client organisation, for instance department by department, rather than a total overhaul of the entire organisational software infrastructure. This means, that clients have much more control over how much and how quickly they want to up-scale their AI operations (Appendix 2, l. 32-38). A process, which other competitors have a hard time to replicate.

## 4.2 Ready-Made-AI

Ready-Made-AI is a concept that Bluefragments has developed as a means of introducing companies to AI technology. It is a set of guiding presentations and discussions about what AI is and some of the ready-made components they offer (Appendix 7). The outcome is focused on establishing a terminology about AI for a specific corporate context which might, but is not required to, lead to the implementation of AI technology into the client organisation.

Ready-Made-AI consists primarily of a workshop, which takes place over one to three days. On one hand, the client organisations' participants will have an opportunity to experiment with AI and gain insights about the various components. Typically, the participants would be people with some technical background, for instance the employees of an IT department, who in actual terms, would get to experiment with AI through a test case - often involving Microsoft's cognitive services. On the other hand, Bluefragments have the opportunity to assess the needs of the client in question

and the chance to present various AI solutions. By the end of a workshop, Bluefragments will deliver a written report to the client. The report describes all the areas where Bluefragments find that the implementation of AI could be relevant to the client. Neither the workshop nor the report requires the client to pursue further contracts with Bluefragments, however, if the client is interested, Bluefragments will present them with a pilot project, which will work as a test case for both parties (Appendix 2, l. 36-38).

It should be noted, that it is not always possible for Bluefragments to employ intelligent data processing as part of the pilot, as some companies require extensive restructuring of their data archives in order for any form of data processing to take place. For example, Bluefragments made an AI model which was capable of compress a thousand pages of chaotic data down to a single page brief (Appendix 2, l. 548-551). In this case, the pilot program was the creation of an automated data gathering and archiving system. In effect, the pilot was a modernisation of the data-handling infrastructure, which was a prerequisite for any form of intelligent data processing. Regardless of whether intelligent data processing is a possibility from the beginning, the initial introduction of AI will typically be based on a customisation of existing cognitive services - such as Microsoft Azure. Only when the options within these existing services have been depleted, will Bluefragments make an offer to the client to develop a unique software - e.g. an internal search engine based on deep learning, only for application within that specific client's IT systems (Appendix 2, l. 947-951).

A big part of Ready-Made-AI is the establishment of a terminology between Bluefragments and the clients about AI. As evident in our previous technical definitions, AI is a broad term and if you are not familiar with the technicalities, it can be hard to distinguish between the outcomes of intelligent data processing and the technology itself. For example, one outcome of AI could be automation, but as discussed that does not automatically make all AI into automation. Bluefragments try to avoid the confusion of concepts by creating a clear terminology with the client, through the "What is AI" exercises and presentation inherent to Ready-Made-AI (Appendix 2, l. 71-84)(Appendix 7).

Another big part of establishing a terminology relates to the difference in time management between the development of AI software, versus conventional software development. As conventional software is often manually developed, giving a time frame for the software development is often only a question of the developer's ability to estimate the time requirements correctly. However, since you cannot set up linear rules for an AI environment, it might be impossible to estimate how long it will take for a ML model to provide useful results. As the machine is learning to operate autonomously a developer, or in this case a data scientist, will have a much harder time estimating when an AI is sufficiently autonomous to provide useful results as this

development is gradual and non-linear. As the proverb goes ‘time is money’, and therefore Bluefragments spends a substantial amount of resources explaining to their clients that implementing AI is a process that will sometimes take an unspecified amount of time (Appendix 2, l. 403-406).

Not being able to manage time as precisely may seem like a substantial disadvantage of AI, and one could easily imagine that many companies would be deterred by such lack of control. Nonetheless, in Bluefragments’ experience there is a significant amount of the companies, in which they consult, who recognises AI as the way forward for them. Martinsen also points out that AI and intelligence generally are buzzwords in today’s business world - it is believed that when a company has obtained AI, it has a distinct advantage over its competitors. The company’s ability to process, analyse and act on its own data has now been vastly enhanced to the point that the company is now able to undertake actions, which would otherwise be unavailable to the company (Appendix 2, l. 68-70).

Some expectations about AI can be somewhat unrealistic if they are born out of a popular understanding of the technology. Bluefragments often experience some ambiguity in their clients understanding of AI’s capabilities (Appendix 2, l. 349-352). Such ambiguity could easily become a barrier of the understanding between the client and the consultant. However, Bluefragments try to use the ambiguity and popular understanding to their advantage by allowing for adjustment of their own terminology of AI. In effect, Bluefragments change their terminology to fit the context in which AI is being used. For example, they adjusted their definition and use of the word ‘bot’. The client understood a bot as a machine doing an automated process, whereas in Bluefragments’ perspective, a bot is an intelligent machine (Appendix 2, l. 923-929). The example shows how Ready-Made-AI is a way of establishing a terminology which allows Bluefragments to operate in the organisation they are servicing, even if the terminology is only correct within that specific organisational context.

The final and arguably most attractive part of Ready-Made-AI, is its cost effective nature. The whole idea of ‘ready-made’ is that whatever solution Bluefragments suggest, should be made of components, which are already complete services in themselves. The solution should therefore, in principle, require little to no specialised development before seeing implementation into the client organisation. Whenever possible, the introduction of AI should be gradual - for instance department-by-department. According to Bluefragments, if companies would develop their own AI solutions they could face up to one million DKK investment, which is 10 times the commitment compared to Bluefragments’ offer (Appendix 2, l.131-134). The clients are able to test the viability of the technology to them without having to commit to a company-wide investment of funds and resources, thereby allowing them to quickly discover emergent advantages and disadvantages. The

final report also helps in this regard, as it outlines exactly what the client should expect in terms of commitments to different solutions, which also ensures a clear set of expectations between Bluefragments and the client, when a solution is chosen.

We have chosen to focus on the initial part of Ready-Made-AI, namely “What is AI”, where the meaning of the concept of AI has been discussed. We have chosen this focus, as we are more interested in the perceptions around AI than the practical details and execution of the specific projects.

## 4.3 Client Portfolio

### 4.3.1 IDA

IDA Ingeniørforening, which translates to the engineer’s union and is an abbreviated IDA, is a Danish labour union and interest group, which specialises in the representation of engineers and other closely related fields of science. The union was founded in 1995 as a result of a merger between two existing labour unions which both represented engineers (IDA.dk, 2018b).

IDA is member driven, and as such, is not a conventional profit oriented organisation. As evident in their organisational chart, administrative functions are made up by employees, however, higher management is elected directly by the members of the organisation (IDA.dk, 2018c). The core of the business is the representation of the union’s members. In a Danish context, representation means negotiating collective agreements with the major employers of the union’s members. Additionally, the union is expected to enforce the collective agreement by helping the individual member obtain all agreed upon benefits. They also aid in the legal representation if the individual contract has been violated. IDA has, in addition to conventional aspects of a worker’s union, expanded its offers to its members to also include various insurances. IDA Forsikring, which translates to IDA Insurance (IDA.dk, 2018a), is the subdivision of the larger organisation, which has been in a collaboration with Bluefragments to improve its services.

IDA has not, and is not required, to publish any financial records or amount of employees within the organisations. Therefore, the organisation's exact size is unknown to us. What is known is the size of IDA’s membership pool, which currently stands at about 110,000 members (IDA.dk, 2018b). The size of the membership pool makes IDA a significant player in its industry, as the amount of members a union has directly translates to the amount of representation the union is given in a negotiation with a specific employer and/or industry in Denmark.

IDA is currently in the midst of an expansion of its membership pool. According to their vision for 2025, they what to increase their number of members from the current 110,000 to 175,000 members. Their slogan for the plan is ‘IDA - a community which realises the potential of

technology and knowledge' (IDA.dk, 2018d). Therefore, it should be understood that IDA is both an organisation with a strong ambition to expand, and have an enthusiasm for new technologies. Additionally, IDA also promotes itself as an interest group, which encourages the general public to take a larger interest in the field of engineering and pushes politicians to create measures, which would make science and related technical fields study more readily accessible throughout the Danish school system. This general enthusiasm and advocacy for the adoption of new technology includes artificial intelligence.

Lisbeth Michala Bach Keldsen was our contact in IDA and has been working in IDA since 2008. She has a 10 year long career with IDA, mainly from legal counselling and now as a Digital Project Manager (LinkedIn.dk, 2018a). There is not a specific AI department in IDA, instead the organisation put Bach Keldsen in charge of this specific project and she picked various people from the organisation that was best fitted for the project - mainly IT developers and people within the car insurance department (Appendix 4, l. 48-56). There were two scopes that Bach Keldsen were focused on, AI for legal contract and AI for insurances. Together with Bluefragments, they decided to focus on one scope of car insurances and developed a chatbot based on ML (Appendix 4, l. 32-34). The AI driven chatbot was created to specifically aid the customer service of IDA's existing members, which had or were interested in acquiring a car insurance through IDA Insurance. The project began in June 2017 and the chatbot is yet to be implemented, as it is still a prototype. The chatbot still requires a vast amount of data, that is what Bach Keldsen, and her team is currently working on (Appendix 4, l. 26-28).

### 4.3.2 Frontliners ApS

The company is a tech start-up, categorised as a limited liability company, established in the heart of Copenhagen in 2017 (Proff.dk, 2018c). It was founded by Danny Fabricius Fogel, who is also the CEO of the company. Besides the CEO, the company has a CTO, three developers and a student helper - all working as freelancers. The company currently runs a deficit of about 436.000 DKK due to the extensive investment the company needed to undertake to develop the software platform, which is at the heart of the business (Appendix 5, l. 8-10).

The software platform focuses on the improvement of sales staff of various retail stores through better hiring procedures and training programmes. Frontliners' clients can subscribe to their service and have access to use the AI driven software. The platform allows their clients to test the applicants and thereby predict what type of sales performer the person will be. When the prediction has been made, the retail store can then, in theory, with greater accuracy hire the best fitted applicant. After the hiring Frontliners' clients will also have access to various services which will help to ensure continuous motivation and development of the hired sales staff. These services include

work scheduling, videos, and quizzes for motivational purposes, as well as measurements of every performance. The platform will use the gathered data to give suggestions for how to improve everyday performance. It will inform the subscriber when he/she should use the different elements to ensure the best performance for the staff. The overall goal is to provide the subscriber with an exact percentage of increased performance of the individual staff (Appendix 5, l. 38-40).

Frontliners does not, at the time of writing, have any clients yet, as they are still in the start-up stage. However, they have test-clients, which have given feedback, data, and time for Frontliners to improve the platform and will use their service when it is ready. Frontliners have, more recently, started the collaboration with BlueFragments who will develop the AI software for the platform. Frontliners are currently in the process of collecting a vast amount of data from their test-clients to be used for developing the AI.

When the AI has been developed, Frontliners expects to target large retail chain stores, along with smaller retail stores where closing a deal is less time consuming. The company also have intentions to work internationally from the beginning. They have launched their social media marketing to create awareness of the service they will be able to provide and to attract investors. As of yet, they do not experience competition in their market (Appendix 5, l. 120-125).

Danny Fabricius Fogel was our contact in Frontliners, who has started several companies and have later on sold some of them as well. Besides his Founder and CEO position in Frontliners, he is currently a board member in various Danish companies, such as Promoters. He does not hold a technical expert background, but since he has previously started a tech-consultancy he has a technical understanding and have knowledge with selling tech rather than creating tech.

### 4.3.3 Bestseller A/S

Bestseller is a Danish stock company headquartered in Brande, Denmark, and is fully owned by the Holch Povlsen family. Bestseller supplies various clothing companies with a variety of brands aimed at both women's, men's and children's clothing. They supply about 2,700 chain stores and 15,000 multi-brand stores. The company services an international client portfolio with clients found in both Europe, the Middle East, North America, Latin America, Australia, and India. They also supply 8,000 stores in China, but through an independent subsidiary (Bestseller.dk, 2018a).

Bestseller has seen steady economic growth for the past five years with reported revenues never dipping below 10 billion DKK a year. In 2017, the company reported an income of about two billion DKK before taxes and with a net revenue of about 13 billion DKK (Proff.dk, 2018a). To date, Bestseller employs about 15,000 employees worldwide with 3,000 employees located in Denmark (Bestseller.dk, 2018b, 2018a). The company is, in every sense of the word, a large company.

Bestseller has built up a strong company philosophy around its family values. The company puts great emphasis on their unitary approach, both internally and externally. Their values are divided into four categories being one vision, one world, one philosophy, and one family - evidently the one or 'oneness' of the approach is a recurring theme. Their philosophy is based on the values of trust, respect, and honesty which underpins the way they do business (Bestseller.dk, 2018c).

Bestseller have actively approached the development of AI for their organisation. They originally had three proposals for potential projects, which Bestseller could pursue. The first being cognitive fashion were various cognitive services would be used to identify fashion items in pictures, e.g. denim jacket, slim fit, etc. This analysis of metadata would be used to improve the e-com platform (Appendix 6, l. 26-33). The second proposal was a virtual agent, which could help Bestsellers' service desk to answer the ten most asked questions. However, the project was never developed far enough to determine whether these answers should be provided via text, voice or a blend of the two. These two project were quickly abandoned as the development team quickly realised that they did not have the data structure to provide a sufficient amount of quality data (Appendix 6, l. 34-40). Rather than attempt to create the needed data infrastructure, they prioritised an automatic dispatching system.

The automatic dispatching system is an internal system, which is geared towards translating all tickets (cases of IT issues) into English as Bestseller deals with a multitude of languages. For example, if the printer does not work the employees can file in a ticket, which will then be translated into English and be sent directly to the correct person. When the tickets are translated, the system should assign weight to the tickets' wording, categorise it and then dispatch it to the correct department within Bestseller (Appendix 6, l. 19-23). Rather than using labour for identifying and dispatching tickets, Bestseller wants to develop a system, which could do this automatically and more precisely. Bluefragments were hired to aid in the development of this system. The project started in the summer of 2017 and the development time for the project was approximately six months and are currently being developed (Appendix 6, l.121-122 + l. 133).

Our contact in the company was Lars Hjørnholm who was the team lead and was responsible for a team of six IT employees. He was also the principal contact to Bluefragments. He was responsible for, not only leading the IT team towards a successful development of the project, but also for communicating to the rest of the company what was being developed. He has an educational background as a data technician and has been working in Bestseller since 2012 in a variety of positions.

# 5. Findings

The aim of this section is to uncover the technological frame of Bluefragments, as well as their clients' frames: IDA, Frontliners and Bestseller. We have first analysed each frame separately, within the three domains of technology, as we are interested in understanding the different organisations' perceptions on AI. To analyse the organisations representatives' perceptions of AI, it has been necessary for us to first discern the representatives' understanding of intelligence itself. We have subsequently analysed each individual perception of AI's attributes and its use in the respective organisations. In terms of the analysis of Bluefragments, we have primarily focused on how Martinsen believes his clients perceive AI's attributes and how it has been used in the organisations to understand how he has introduced AI.

After discerning the frames, we have subsequently compared the different organisations' technological frames, to understand how the frames are different or similar to one another. We have then in the last section used our comparison of the frames to analyse how it has been possible for Bluefragments, through the use of Ready-Made-AI, to successfully establish a shared technological frame of reference.

## 5.1. Bluefragments' Perception of AI

### 5.1.1 Nature of Technology

For Bluefragments the concept of intelligence is understood to be both broad, but at the same time clearly discernible, as intelligence is a display of intelligent action. Founder and CEO of Bluefragments, Thomas Martinsen, especially emphasised the act, as a sign of intelligence:

"*It's ((intelligence)) something that you do, that is smart, right? ((rhetorical question))*" (Appendix 2, l. 252).

Here intelligence is clearly understood to be an action. He further elaborated:

"*Well it's ((intelligence)) a bit abstract, because you can say well, right now the three of us here, we see yourselves as intelligent. But that is just a perspective. You could actually say that we could have a flower that is intelligent as well*" (Appendix 2, l. 253-255).

Intelligence is not presumed to be an absolute concept, but rather an abstract phenomenon, which is relative to whomever perceives it. We understand and perceive other human beings as intelligent, but in reality, your own intelligence is relative to your definition of the concept. You are only intelligent because you understand yourself to be so. Putting your own intelligence into perspective allows you to classify other people, machines or flowers as being intelligent based on their ability to

undertake actions, which you understand to be a display of intelligence. To that extent, if a flower were to define intelligence, the definition would probably be quite different to that of a human being. Martinsen uses the example of an extra-terrestrial encounter as a defining moment for our understanding of our own intelligence. The logic goes, that we will only know how intelligent we are when we, meaningfully, can compare ourselves with someone or something else with an equal or superior intelligence to our own (Appendix 2, l. 253-255).

This understanding of intelligence runs parallel to that of the Turing test (Turing, 1950). It is not surprising that someone with a background in software engineering understands intelligence as a result of an action, rather than an inherent quality of a consciousness itself. You can only know what you can prove, and therefore intelligence is defined by what can be directly observed. AI, in Bluefragments' perspective, is then clearly defined as:

"*AI is what we define as a machine doing something that we would normally have an intelligent person to do. So, that is AI in our perspective.*" (Appendix 2, l. 264-265).

In other words, the intelligence of an AI is determined by the extent to which, the person who is affected by the AI, perceives the machine to undertake action, which equals or surpasses that of a human being. Martinsen described the term as follows:

"*AI in itself is actually nothing, it's just a term. But beneath that, we have machine learning, we have neural networks and that is something*!" (Appendix 2, l. 270-272).

When Martinsen says AI is nothing, he means to indicate that the term does not refer to any specific technology, but a variety of different technologies. AI is a term, which is used to describe either the desired or the actual outcome, of for instance, an ANN. You could go further and say that AI becomes a term, which can be applied as a conclusion when the use of a tool such as an ANN has been executed correctly. Correctly being the above-mentioned display of intelligent action. AI then does not describe the technology, but its effect on humans.

Bluefragments also understands the nature of AI in terms of the operational autonomy of the technology itself. Martinsen distinguishes AI from other technologies by the amount and use of rules in an AI environment:

"*We cannot set up the rules for an AI environment. They are (.) I don't know if it's the right word to say that, but they have their own life. But it is an impossible task for us for humans to actually set up the number of rules that we need to do, when working with AI.*" (Appendix 2, l. 280-283).

Life in this context should not be understood as the AI being a living organism, but rather as a metaphor for the inherent operational autonomy of these systems. It is expected that the system will be able to act on its own with only a limited amount of instructions. Whereas traditional software requires every step in a process to be pre-programmed to successfully complete a given task. This autonomy is an essential part of how Bluefragments understands the nature of AI, and its increasing popularity. Martinsen continues explaining, that AI allows for solutions, which would be unattainable with conventional software.

However, Bluefragments does not understand AI as being a fully developed technology. On the contrary, they understand it to be in the very early stages of usability. In fact, Martinsen believes that the amount of software developers will decrease in the coming decades, as he reasons:

"*Because AI would become so easy to use, so that everybody can use it even kids can ((would be able to)) use it.*" (Appendix 2, l. 291).

Not surprisingly, Bluefragments are enthusiastic about the current application of AI and they see technology's potential as far from fulfilled. Nonetheless, they do acknowledge that the technology currently holds a certain number of limitations:

"*It's really important to keep in mind that AI is actually just as smart as we do it. And right now, many AI engines are more stupid than humans, and the reason for that is that they are super-intelligent in one specific area, but what they cannot do is what we can. Meaning, that we can be intelligent in many different areas and levels. A machine can only be intelligent in one very narrow area - but it can instead be so ((very)) intelligent, more than we can.*"(Appendix 2, l. 299-303).

This, again, draws on the idea of intelligence as an action. We understand Google's AlphaGo as being highly intelligent, but only in the context of playing GO. If you were to ask AlphaGo about the weather it would not be able to answer you, in fact, you might not even be able to ask the question in the first place, as the AI is not set up for such an input (Silver & Hassabis, 2016). Martinsen addresses this when he talks about super-intelligence in specific areas.

Martinsen's understanding of intelligence is grounded in, what we will describe as, relativism - the idea that intelligence is relative to the context. We understand relativism, in this specific context, to be a basic term, which describes a way of thinking about intelligence rather than a philosophical term used in a broad theoretical context. Bluefragments' relativistic interpretation allows for some interesting points about how we currently understand an AI's intelligence. We are currently willing to accept that a machine's intelligence is contextual, but we do not apply the same

contextuality to human beings. You would most likely describe a person with the same superintelligence, as an AI, as having some form of limited mental capacity - if they only displayed such a superintelligence in one specific area. We expect humans to have an average, but very broad intelligence. Therefore, according to Martinsen, we understand human and machine intelligence differently, as the two intelligences operate in different contexts.

However, Bluefragments expect that the context of intelligence might change. Martinsen specifically expects that the area of machine superintelligence will change in future:

"*Yes! There is no doubt that over time it ((AI)) will get a smarter and smarter, of course. And we will see that in many aspects, we as humans will need to redefine ourselves as well, because of that. And ((whether)) it will happen in the next 5-10 years, I don't know. It is totally impossible to predict. But what we can predict is that it's definitely going to be more intelligent, and even more intelligent than us in many areas.*" (Appendix 2, l. 307-310).

It is clear, that Bluefragments expect that the reliability and availability of AI will only increase in the coming decades, and that this change will have a profound impact. Bluefragments expect that the change will force us to rethink what we expect from ourselves and everyone arounds us, since everyone will have unimagined computing power at their fingertips. This will allow everyone to undertake actions in a matter of hours, which would previously have required years. This technological development will negatively affect the relevance of a multitude of specialisations, which Martinsen is aware of:

"*There is no doubt that we will see the involvement of AI as a threat for humans. Because many people will feel threatened by this, they will see that machines can do stuff we cannot do.*" (Appendix 2, l. 315-316).

Evidently, Martinsen expects that his company will be part of an industry, which will have quite a disruptive effect on many of the jobs traditionally done by humans. The machines will help to create, and will simply be better at completing the task than any human being.

### 5.1.2 Technology Strategy

Bluefragments' understanding of the motivation for any organisation to acquire AI technology is primarily as a practical means to an end. Martinsen emphasises the fact, that the technology is simply becoming more readily accessible, due to the increasing availability of cloud networks. Martinsen made it clear that most AI solutions simply would not have been possible without the cloud, since it has effectively decreased computing time from several days to a few hours:

"*Since the cloud is now available to everybody and all companies. That is what makes it possible to push AI into all companies.*" (Appendix 2, l. 498-499).

Despite that Bluefragments are seeing a rapid development of the availability of AI technology, they do not see the adoption of AI in an organisation as a strategic decision. Rather, Bluefragments understand the adoption of an AI technology as a practical solution to a specific problem. Martinsen emphasised the practical nature of many projects by illustrating a recent example from a client:

"*No, it's actually not ((a strategic decision)). We've just started a new project for a customer, where they have people working with data and they just said 'Well, at this point we as a human cannot solve this, because the data is too unstructured for us to do it, and then we can use a machine to do it instead.'.*

*So, that's actually not a strategic way of using AI. It is just, a tool in the toolbox. To say like ((In the same way as saying)), you have Excel, and now you have AI. Those two combined gives me the solution..*" (Appendix 2, l. 503-507).

AI is clearly understood to be a tool, which opens up new possibilities, but is not so revolutionary as to completely overhaul the entire organisation. Martinsen also acknowledges that, currently, there is also a lot of hype surrounding AI. According to Martinsen (Appendix 2, l. 68-70), the hype should also be considered as a reason why a significant amount of companies now show an increased interest in acquiring AI technology, as they simply want to 'ride the wave' to ensure that they do not 'miss out on anything' as Martinsen puts it (Appendix 2, l. 511-513).

There is room for interpretation in how Bluefragments understand the term strategic. However, we understand the difference between a strategic decision and a strategic tool to mean that a strategic decision will have operational implications for a significant part of the organisation. Whereas a strategic tool might not have any significant operational effects, the signal value is the main reason for acquiring AI solutions. That is not to say that it cannot have operational value, it is just not the reason for acquiring it.

However, as Martinsen subsequently pointed out, there might not be any strategic elements to acquiring AI technology at all. He emphasised this lack of strategic elements by illustrating an example from a client:

"*No I guess not ((there is not always a strategic impact)). Because let's go back to the solution, where we just took AI as a tool and used it together with Excel. It actually didn't have any strategic impact. It was just a way*

*to solve a problem, and we found a valid solution. And I actually doubt that even the managers of that department of the company knew that they were going to use AI.*" (Appendix 2, l. 516-519).

We clearly have an example of AI not being used for any strategic purpose, as Martinsen states it is a way to solve a problem. However, you also have to ask the question 'how can the technology be used to solve a problem, which was otherwise unsolvable and then not be understood to be strategic?'.

We asked this question during our second interview with Bluefragments, the results of which can be found in the section 'Ready-Made-AI' adjusted (5.4). Martinsen, first and foremost, perceives Bluefragments as a provider of technological solutions to a specific practical problem. Solutions which are easier to facilitate if they do not require a significant restructuring of the client company's strategies. Therefore, it could be understood to be better fitted for Bluefragments when companies do not consider adopting AI in strategic terms. The whole idea of Ready-Made-AI is to facilitate a smooth, straightforward, and most importantly, predictable process for the companies - from the point where they find a need to adopt AI to the point where they actually implement it. However, once you step outside the ready-made framework, the time scale for projects becomes quite large:

"*The smallest project, when talking about custom AI solutions, that is, after you talk about Ready-Made-AI concepts - that is between one and two months. That is the minimum you need to use.*" (Appendix 2, l. 531-532).

It is clear that Bluefragments makes a distinction between Ready-Made-AI solutions, which will work well generally, and a custom AI solution, which will only work in a specific context. It is interesting that Martinsen does not see any strategic element to implementing a custom solution, which by Bluefragments themselves, is considered to be quite time-consuming. It would not be unreasonable for Bluefragments to ask their clients to consider the money, time and human resources they spend on the technology in strategic terms. That would allow the client companies to better understand and plan for the technology's use in the future relative to the size of the initial investment in both money, time and HR. Martinsen also emphasised time as a continual challenge:

"*The time, definitely the time! Accepting that things cannot be done super-fast*" (Appendix 2, l. 568).

Evidently, there is still a consulting task in terms of explaining to the client companies that they should change their traditional software development paradigm. After all, working with data and AI

is more 'organic', as you need the AI model to work with the data and mould itself into something useful. Whereas conventional software development is still very complex, but in nature it is very functional - A leads to B which gives you C. AI modelling is not as straightforward as it is based on trial and error:

"*We cannot do that with data, we cannot say 'Well, we just upscale the machine learning model and make it better'. That is hard work, that is based on a good insight into the data. So, that is pretty hard to scale!*" (Appendix 2, l. 571-572).

On their website, Bluefragments presents their services as specialised enterprise solutions and not as strategic services (Bluefragments, 2018a). In fairness, it does make sense for Bluefragments not to present themselves as strategic consultants. A core part of their business model, surrounding AI, is to present the technology as something, which is easy to use, gives you immediate operational benefits and only requires minimal re-schooling of your existing IT-personnel. By not including a big change in strategic philosophy to go along with the technology, they are able to sell the AI piece-by-piece to any customer. Bluefragments effectively leaves the strategy to the strategist, whomever that may be, in the given client company - such strategists might very well be PwC, Deloitte or EY. By focusing on technical solutions rather than strategic ones, Bluefragments avoids competition.

### 5.1.3 AI in Action

Bluefragments sees a clear distinction between a machine performing an action and an intelligent machine performing an action. Martinsen emphasises how important it is that Bluefragments' clients understand this difference:

"*And that is actually also what we're doing in Ready-Made-AI, making sure that they understand the difference between just having a machine doing it, and have an intelligent machine doing it, because that is a huge difference. Especially the time management in that*" (Appendix 2, l. 751-753).

Martinsen also underlined what Bluefragments understand by the concept of an intelligent machine:

"*If we have an intelligent machine doing it, you begin looking into what can we do ((in terms)) of predictions, what advice can we provide for our employees, so that they can do the job even better. How can we reply even better to our customers, in the customer service for example. How can we respond better as a company when we communicate.*" (Appendix 2, l. 754-757).

Bluefragments expects an intelligent machine to be something, which will challenge the status quo but they also believe that AI can be used in a positive conjunction with human action. Martinsen specifically underlines the intelligent machine's ability to predict, so as to advice its user towards the best possible action in a given situation. We assume that is in contrast to an 'unintelligent' machine - as an unintelligent machine will undertake whatever action is ordered to undertake for eternity, until it is ordered to stop. What makes an unintelligent machine 'unintelligent' is that it in effect exists in a vacuum where it is unable to react to its in- or output. Contrast that to an intelligent machine, which can change the way it performs an action as a reaction to its in- and output. Such reactions are typically based on a complicated set of predictions, i.e. an algorithm.

Bluefragments also talks about the maturity of an AI, where maturity is understood to be the extent to which an AI is able to deliver useful results. Martinsen understands AI technology to be maturing, not as a whole, but as something, which matures in different areas, time and speed - as an example, he mentions a customer service. In the customer service example, the AI is mature since it enhances service optimisation of every customer service employee, which in turn enhances the overall customer experience. As pointed out by Martinsen, the whole company would then have benefitted from more effective communication with its customers (Appendix 2, l. 745-757).

Martinsen also acknowledge that if customer service is an example of a mature area for AI then there are, of course, also areas where AI is not mature, which is where people's opinions matter (Appendix 2, l. 762-764). He explained that there are different ways people's opinions can influence the required performance of the AI:

"*Of course AI doing something like a haircut, you ((a developer)) cannot do that, because that is really complex.*" (Appendix 2, l. 765-766).

We understand 'complexity' in this context to mean the difficulty of conducting a successful interaction between man and machine as any person might have impossibly vague input data, but extremely strict output requirements, that any AI would have to interpret. The complexity of making a mechanised hairdresser is both a challenge in terms of making a machine, which would be able to understand the unique task it was given by each customer, and making a machine capable of executing said task correctly.

In some cases - even if you manage to get all the complex technical requirements right - the AI might still not be able to execute the task to a satisfactory degree:

"*If you're going to a doctor, you can have a machine, an intelligent machine saying, what is wrong with you. But if you have deathly cancer you cannot have a machine telling you that - you need a person to do that, in the*

*correct manner! And that is where it is super difficult to replace a human with a machine.*" (Appendix 2, l. 767-769).

It would probably not be overly difficult to make a computer, with a high level of accuracy, tell you that you had cancer. However, it would never be a feasible solution as people require compassion rather than accuracy in such a situation. However, that still leaves a role for AI:

"*The combination of the doctor and the machine that can ensure that you (as a doctor) have way better facts and arguments, when you're talking to patient because you know you have gone through 10,000 more images, then you normally would have. And you can specify a way better solution for the cure.*" (Appendix 2, l. 771-773).

In effect, Martinsen makes a socio-materialistic point, as the AI grants the doctor abilities that he or she did not otherwise have. In the example, the AI is super intelligent. In fact, it is even more intelligent than the doctor, as it can go through 10,000 more images at a faster and more accurate speed. However, it cannot and should not replace the doctor, according to Martinsen, as it is simply a tool that aids him or her to better diagnose the patients and ensure better care. What makes this socio-materialistic is that only the doctor can provide the social dimension of a diagnosis, whereas only the AI can ensure the modern level of accuracy of said diagnosis.

An important part of socio-materialism is the idea that the way humans interact with materials shape them. Martinsen also believes such interactions to be important:

"*The way that many AI works, is that it grows based on an input, and that's also what we saw a year ago (or) year and a half ago. When we had a chatbot that was released, and it was only learning from what was communicated with it, and within a few hours it was a racist and talked really bad, so they had to shut it down within one day. If you say it in general, 'will AI learn based on inputs?' - yeah that is, I guess, the only way for it to learn.*" (Appendix 2, l. 800-804).

Here Martinsen acknowledges that an AI is shaped by the way we interact with it. This chatbot example is extremely socio-materialistic, as the whole premise for the AI is to learn without restriction and to simply communicate in same the way it is being communicated to. However, Martinsen uses this example as an argument for how you can deploy AI unsuccessfully, as any AI needs to be shaped into something useful. Martinsen points out, that what we do is not always what we want. The AI is clearly moulded by the interactions with it, but is not shaped in a way that makes it desirable. We do not want a machine, which can do something exactly as badly as humans can -we

want a machine, or a tool, which makes us better. However, that will only happen if we shape the materials at our disposal to a desirable form.

### 5.1.4 Sub Conclusion

In short, Bluefragments understand both the actual and potential value of AI very positively. They envision AI to be an enabling force rather than a limiting force. However, adopting AI is not strategic despite that the technology can be seen in strategic use. It makes sense for Bluefragments not to address AI in strategic terms, as it allows them to solely focus on providing technical rather than managerial solutions for its clients.

Bluefragments do not see AI as something, which can act independently from human supervision. In their understanding AI is a super intelligent tool, but only in a narrow domain, as it is only able to act intelligently within the parameters it is given. Therefore, AI is a tool at the disposal of its user, which should be shaped towards a desired purpose. However, 'the narrowness' of the area is also where Bluefragments see that AI will improve, as the need of a definition may not be needed in the future as a result of increased computing power.

To our knowledge, Martinsen is not familiar with socio-materialistic philosophy, nonetheless, the way he understands humans increasing dependency of AI is to a large degree best described as socio-materialistic. He emphasises that AI is created through interaction and shaped by human supervision, which to us constitutes socio-materialism. He sees a great potential for the use of AI, but recognises that the way we chose to use it will affect many people. To him it is therefore necessary to use AI as a tool, which can create new opportunities for people rather than simply as something, that limits existing ones.

## 5.2 Clients' Perceptions of AI

### 5.2.1 IDA

#### *5.2.1.1 Nature of Technology*

Lisbeth Bach Keldsen, who represents IDA, has a rather specific view on what intelligence is:

"*Always looking for a smarter solution than the one you've been using. Or being able to add your experiences or wisdom or whatever to the current problem, that you need to solve.*" (Appendix 4, l. 74-75).

Intelligence is defined as the ability to solve problems and she therefore has a pragmatic approach rather than a conceptual one. We understand pragmatic as describing a practical solution to a specific problem of what can be seen and compared. Whereas conceptual is understood as how you understand the problem rather than the way to solve the problem.

Having a pragmatic approach, Bach Keldsen focuses more on results rather than on how you processed the information to get to the result. Intelligence is then defined as result-oriented where two different solutions can be compared in terms of what solutions is best fitted for the given situation. This approach leaves little room for interpretation, as she does not have a focus on why the specific result has been processed, but rather on what the specific result is.

Her pragmatic and result-oriented perspective on intelligence is closely related to her perspective on artificial intelligence. Bach Keldsen adds that an artificial intelligence is the same as human intelligence:

"*Well, basically having a machine that more or less does that ((looking for a smarter solution or adding experiences and wisdom)). Takes several things into consideration.*" (Appendix 4, l. 79).

This description indicates that she does not perceive much difference between the human intelligence and an artificial intelligence. In fact, she perceives the two intelligences much the same with the only difference being that the artificial intelligence, is artificial. Meaning, that she distinguishes them in such a way that the result coming from the two intelligences can be compared.

This further indicate that Bach Keldsen perceives intelligence to be measured by outcome – the smarter the solution, the more intelligent. In this case, we will assume that a smart solution is defined in terms of what the specific need is or what kind of problem is at hand. Her definition of AI leads back to her definition of human intelligence – that it is pragmatic rather than conceptual.

Her way of looking at intelligence as pragmatic is, to a large extent, related to how IDA desires to use AI in their organisation – they are aiming at having the AI imitating human intelligence in some ways:

"*But with the Artificial Intelligence we would like to try and imitate some of the solutions that today are very time-consuming, because you can't really know which way this conversation ((with customers)) is going to go.*" (Appendix 4, l. 83-84).

This statement indicate that what is meant by imitation, is the AI's ability to replace some of the heavy and time-consuming tasks, which leaves employees the opportunity to focus on other more relevant tasks. In order for the AI to be able to imitate anything, there is a need for clear parameters of what part(s) of IDA it will need to assist and what outcomes are expected from the AI - for it to actually make a difference. This adds to the conclusion that Bach Keldsen perceives intelligence as pragmatic, as there is a need for parameters and specific results.

The imitation is also meant for the AI to make decisions for the human:

"*What I expect and hope and (.) Think we will be getting with the AI is that we can in a much larger sense copy the human mind. We can get a machine to actually tell me whether, should I go left or should I go right.*" (Appendix 4, l. 98-100).

For the AI to make decisions on behalf of humans, it would need to be able to deliver results equivalent to humans, in order for the employees to trust the AI's decisions and not question its validity. Therefore, to be able to copy the human mind, the AI imitation is not only a question of copying tasks, but to simulate human intuition.

IDA recognises a potential in the AI's capabilities to guide, solve tasks and make smart solutions on its own, however IDA will still need the AI to do it in a specific way, in which the AI is not completely entrusted to itself. Bach Keldsen further states that she does not believe that IDA – or the development of AI in general – is at the point where the artificial intelligence equals human intelligence. The AI will still need to be monitored to achieve the desired intelligence needed for the organisation:

"*And we're talking about this with our own experts, that we need a person to monitor, quite closely, what answers it's giving out. What it is, what does it ((the AI)) base its answers on, and so forth. So, I don't see in the near future that artificial intelligence is a complete replacement of the human mind.*" (Appendix 4, l. 112-114).

She does indicate that the purpose of investing and working with AI is for the developed AI to reach a point where it is reliable enough to replace some of the human capabilities undertaken in the organisation's everyday work. (Appendix 4, l. 125-133). IDA recognises the potential AI hold in the organisation, but are well aware that AI is just at its first steps and still needs to be guided to give the right answers – right answers in the context of IDA's needs and issues.

The organisation also recognises the potential of using AI in other parts of the organisation, other than car insurances. Especially the lighter legal counselling was mentioned as a major area for potential optimisation in the organisation (Appendix 4, l. 137-151). In that sense, IDA also perceives AI as part of optimising processes and not as a replacement for the human work that is being done. As previously mentioned, AI can still be a soft spot for some individuals and IDA are aware of this concern - although the common perception in the organisation is positive about AI (Appendix 4, l. 397-409).

#### *5.2.1.2 Technology Strategy*

Since IDA has not implemented the AI technology yet, Bach Keldsen has not been able to comment on how people have reacted on it. However, it is possible to analyse people's views on why the AI

technology has been acquired in the first place. Employees in IDA have had an overall positive view of the development of AI into work processes in the organisation:

"*But mostly - people find it quite exciting now and I get the sense that in each department in the house, most people are looking at potentials 'could this be something that we could use the robot for?'*" (Appendix 4, l. 305-307).

One reason for why employees of the organisation find it interesting, rather than upsetting, is based on the openness of how IDA has handled it so far. Despite that it has not been implemented yet, they have already had workshops where employees were invited to learn more about how IDA viewed AI, and their future plans for how AI could be implemented in the company (Appendix 4, l. 580-584). They also emphasise that AI technology are being considered in order to optimise different parts of the work tasks – to benefit the individual employee.

IDA has openly presented the technology and directly aimed at providing information for their employees. Open knowledge sharing has through organisational history been a method to avoid confusion and resistance because the individual employee is aware of the organisational change – or addition – and the reason behind it (Agócs, 1997). When the employees of IDA are informed in advance of the new technology and the future implementations, it provides the employees with time to process the information. By processing the information, the employees are then able to embrace the coming AI technology in the work they do instead of being frustrated of how AI should be fitted in. It further gives the employees the opportunity to think of other ways in which AI can be used, which leaves an open and relaxed discussion about AI implementation in the organisation.

Additionally, IDA emphasis that the AI technology is an organisational improvement and will not be implemented to replace the existing employees:

"*I haven't heard anybody say 'oh my god it's coming'. On the contrary I've heard people say 'uh, that would be great because I will have more time to actually do this, and this, and this, that I never have time to do or I have to work overtime to do'. So we're busy like every other company in the world basically, some people don't always have enough time to do their tasks so I think most people see a great potential in using things, computers to solve things.*" (Appendix 4, l. 319-323).

When a new technology like AI can be extremely blurry – meaning that many people are not quite aware of what it is, what it can do and what it cannot do – there will be a tendency of resistance because of the uncertainty (Agócs, 1997). However, when IDA largely focuses on how it can aid the

individual rather than overtake the job, people are more relaxed and embrace AI. Especially the management of IDA is focused on how AI technology can optimise processes:

"*I think management have ambitions that we will be a lot more roboticized or whatever over the next few years. I can't speak for the whole management, but I think any management would see potential in optimisation when implementing robot technology.*" (Appendix 4, l. 327-329).

The management have visions of the long-term perspective in which AI can benefit IDA the most - and where it will be best fitted in terms of optimisation. They allocate the financial and human resources for the project development and it is then the responsibility of the middle management to develop the AI according to the resources allocated (Appendix 4, l. 241-247 + l. 566-567).

IDA's top management is aware of the strategy of wasting time in order to gain time. It is both a financially and time consuming project when engaging with AI - as previously mentioned by Martinsen from Bluefragments - as there is required a vast amount of data in order for the AI to work successfully. Bach Keldsen informed us that IDA began the project in June 2017 and the AI is still not fully developed, but is in fact still being trained by IDA's project team. It is then clear that the management of IDA has its focus on the long-term potential and benefits of having AI incorporated into specific work processes. Bach Keldsen mentioned Bluefragments' use of the Azure platform as something that would ensure an easier implementation of AI in future. Given that IDA would not be dependent on a single subcontractor, as Azure is a general tool, allowing IDA strategic wriggle room in the future, if they were to change subcontractor (Appendix 4, l. 51-56).

The acquiring of AI technology has therefore, evidently, been a strategic decision. IDA have an overall IT strategy in which AI technology is part of, and should be considered for optimisation purposes. The IT strategy is then connected to IDA's digitalisation strategy and further to their corporate strategy (Appendix 4, l. 267-269). The general strategy is to optimise processes within IDA, as previously mentioned, and AI is therefore one way of complying with the optimisation:

"*We do not have an AI strategy, but and IT strategy that suggests that AI is an option to be looked in to, whenever creating new services or looking into optimisation.*" (Appendix 4, l. 583-584).

To a large extent, IDA as an organisation is aligned in regards to the future implementation of AI in the organisation. Lisbeth pointed out how a large part of the organisation shares the same positive perception of the technology and how it can benefit the individual employee and the company as a whole (Appendix 4, l. 305-307). However, what is contradictory is that previous implementation of other technologies – be it a new telephone system or login system – IDA have met resistance from

employees. Lisbeth emphasises that it is difficult to get every employee on board and some employees will always feel better in doing things the same way as always (Appendix 4, l. 397-409). Some employees might feel annoyed about the change at first, and then afterwards appreciate the change since it provides opportunities for the employee that he or she did not have before.

Bach Keldsen haven not given this aspect much thought before the conducted interview, which cast light on a new perspective (Appendix 4, l. 405-406). IDA in general have been open about AI to enlighten their employees. Reversely, Lisbeth who is the project manager for developing and later implementing the AI technology, have not given it much thought as to how the technology is perceived from the employees. It is interesting to observe that the management of IDA takes the employees' perception into consideration, but the middle management are merely focused on the technology itself. It clearly elucidates where the responsibilities of the different levels of IDA is allocated. Therefore, we conclude that the top management have the responsibility of IDA and its employees whereas the middle management have the responsibility of making sure the AI technology is developed and executed.

#### *5.2.1.3 AI in Action*

Bach Keldsen believes there is a need for human interaction for AI to improve itself. The AI will need the human input to learn what is the right and wrong technical answers - according to the developer and the specific situation. However, she also believes that when the AI has been successfully developed it can (and should) be able to act independently from human input. It is of her opinion that the more humans train the AI the more independent it will become. As she clearly states, it will not make sense to incorporate AI technology if it will need to be constantly monitored – the whole point of using AI is because it is self-monitoring:

"*We were trying to work on a system that would gradually make itself smarter. So, it's definitely, yeah. The perspective on the AI, it's not just what we tell them ((the AI)) - the machine can keep going out the same direction it's been led and accumulate more and more information. And start to use it.*" (Appendix 4, l. 475-477).

When Bach Keldsen explains a system as 'make itself smarter', we understand it as independent improvement. She may not use the exact word, but from her description, it is clear to us that it is independence of the system, which is at the core of her understanding.

Bach Keldsen's opinion leads back to IDA's desires to incorporate AI in the first place, they wish for the AI technology to optimise processes for their employees. The optimisation will not be successfully completed if the employees of IDA would have to keep an eye out to ensure the AI's

correctness. In order for the AI to aid the employees of IDA, it would need to be able to act on added data when first it has been developed, instead of having to be re-programmed or monitored to ensure its stability (Appendix 4, l. 421-429, l. 474-479).

What we can draw from her perception, from this discovery and the two other sections as well, is that the AI is dependent on humans in the beginning, when it is being developed, and later the humans become dependent on the AI, when it is proving itself useful enough for people to rely on it. The AI would be able to execute some tasks more efficiently and give the individual employee more time for executing other tasks. The fact that the AI is able to continuously improve itself over time without human input, underlines that Bach Keldsen believes that the AI is a self-evolving entity.

This point, of self-evolving, is exactly what also makes the AI valuable, according to Bach Keldsen. If the AI is able to assist the employees in their work then the employees have time to focus on other tasks - which may very well bring more satisfaction to the employee, as well (Appendix 4, l. 487-499). When the employees are more satisfied with the tasks they are working on, it will positively affect the optimisation and thereby positively affect IDA as an organisation (MacLeod & Clarke, 2009).

Likewise, we were curious to know her perception of AI's agency - its ability of acting independently of human input:

"*I want to say I don't think it can ((act with agency)). But I don't think I can say that 100% and believe that because, well. I think that AI will always reflect the people that built it and that you can create it to, a certain extent, be independent or self-sufficient, or whatever.*" (Appendix 4, l. 519-521).

From this quote, we understand that Bach Keldsen are saying two things, without being specific about any of her two views. Her explanation of 'a certain extent' is quite vague, however we believe that she is referring to the AI being programmed in such a way as to be able it to improve itself based on the learnings from human interaction, and continuously added data. However, the AI will always be in need of the human input to continuously improve itself, with data and guiding parameters. Second, she describes AI's agency in much the same way as she describes AI's ability to self-evolve. The AI has agency because the humans are giving the AI the tools to achieve it, which reflects an evolution of the AI. She previously mentioned that IDA are developing AI technology with the intention that it can act on its own. The AI is created for a specific purpose, which brings value to IDA and its employees, which reflects that she does not believe that AI has value if humans do not ascribe value to the AI. Meaning, that the AI is made with a purpose - a purpose which is defined in terms of what we humans want it to assist us with. We develop it with a purpose within a specific domain and from that purpose the AI have the ability to improve itself within that specific domain. It

will not have the ability to improve itself within other domains, as it is has not been programmed to do so. There is a clear indication that Bach Keldsen perceives AI as social-materialistic because the AI is influenced by interactions with humans and it will provide results based on the input it has been given from humans, and reversely, humans are dependent on the AI's capabilities and functions.

Additionally, the way the AI will improve is based on the ambition or goal in which the developer has programmed it for (Appendix 4, l. 531-532). This programming is what gives the AI a purpose and value, because we have created it to fit the human's purpose. Bach Keldsen believes that exactly this.

In her opinion, IDA - or other companies for that matter - are not building AI just for the sake of it; they are building it because they have a specific purpose for the AI to fill. Thereby the AI is built on the present needs and for processes where it is actually possible for it to be developed for:

"*You build a machine with a purpose, in my opinion. I think and I hope so. But I don't know, maybe one day we'll have machines building machines, I don't know. Robocop.*" (Appendix 4, l. 529-530).

The statement clearly indicates that AI is not developed for the purpose of having agency, as this is not the wish - at least not from IDA's perspective. AI having agency is not even possible in Bach Keldsen's opinion, although she doubts her own beliefs.

The statement further indicates that she is of the opinion that other companies also develop AI for a specific purpose, and not because of its agency that it might possess. The fact that she states that she hopes others do the same, indicate an uncertainty and a slight fear of the outcomes from companies who do not think as she and IDA does. What is interesting to note, is that she has a general uncertainty of future prospects of AI and describe many of her answers with 'hoping'. This largely leads back to her way of defining AI as pragmatic - her job has been to put together a team, which can develop AI technology for a specific purpose within specific amounts of resources and a specific domain. Her way of perceiving AI is within the walls of IDA and how processes can be optimised in order to benefit the employees of IDA and thereby IDA as a company. It has been - and still is - the top management, which sets the overall vision of the IT strategy, along with the AI strategy, and it will also be the top management to consider future prospects with AI. Bach Keldsen has clearly not given it much thought as to what AI might become in future or how other companies should or should not use AI for, as it is not within her scope.

#### *5.2.1.4 Sub conclusion*

Bach Keldsen perceives human intelligence and artificial intelligence much as the same, with the only difference being that artificial intelligence is build or programmed by a human. She is pragmatic

in her way of thinking as she defines intelligence in terms of results and solutions, meaning that intelligences are comparable - both among humans and between humans and artificially build intelligence. It makes intelligence tangible as it can be compared and measured to which result is best fitted for IDA as an organisation.

This pragmatic approach is related to the purpose of developing AI technology for IDA in the first place. IDA's main goal is to constantly optimise how they can use their human resources the best - and AI is the solution for that. The organisation overall is aligned in terms of the positive view on AI, as most employees can see where AI could help them in their work, so they would have time to focus on other tasks. AI technology is therefore seen as a help and not as a threat, because it has been made clear what potential AI has for the company and what functions it will serve, namely optimisation.

Bach Keldsen further perceives AI as self-evolving in the sense that it can learn on its own, from the data that it has been given, and after a certain amount of monitoring. However, she does not perceive the AI as having agency as such, since she believes it will always be affected by the humans who have built it. Her understanding of the interaction between humans and AI is socio-materialistic because humans ascribe value, purpose and meaning to the AI and are increasingly reliant on the results the AI delivers.

### 5.2.2 Frontliners

#### *5.2.2.1 Nature of technology*

Frontliners' CEO and founder Danny Fabricius Fogel believes intelligence is primarily an expression of logical thought:

"*I think it means something capable of thinking (.) And the more capable you are of thinking, the more logical you think, the more intelligent you are. I think, yeah.*" (Appendix 5, l. 250-251).

This statement poses two immediate questions: What is meant by thinking, and what is meant by logical? In this example, we understand thinking as the efficiency of processing information. Whereas logic, in this context, is the extent to which you are capable of clearly relaying a line of reasoning. To Fogel the more logical you think the more intelligent you are. He emphasises the underling processing of information rather than the result of said processing, which seems to suggest a scalability to his understanding of intelligence. You can be more intelligent when you think more logical, naturally, that also means you can think less logical and therefore be less intelligent. Whether more intelligence can be acquired by learning to think more logical, remains unclear. Nonetheless, this understanding of intelligence is largely absolute as intelligence to Fogel is not a

concept relative to perception, but an absolute concept, which can be measured on a scale. Fogel's indicator for such a scale is human beings themselves:

"*Well, that it's a machine and an intelligence that is built, somehow. So, it's not a human intelligence, it's a machine. So, that's it. What people want to gain with this is to make a machine think like a human being, you can say. So, that's why it's artificial intelligence.*" (Appendix 5, l. 265-267).

Fogel again places emphasis on the ability to think and an AI is then understood to be a simulation of a human's ability to think, since he clearly states that AI is a machine capable of thinking as a human being. However, he also emphasises that a simulation of a human being is something artificial when he explains what distinguishes AI from human intelligence:

"*I distinguish it in that way that it's something not stored in the mind of a human. And that's almost about it. It's something that's facilitated by a human.*" (Appendix 5, l. 334-335).

In other words, Fogel recognises no difference in the nature of intelligence between an AI and a human being - it is simply a matter of how the intelligence is being stored. One intelligence is born and the other is facilitated. He later explained what he meant by facilitated:

"*It's ((AI)) something that's facilitated by someone who actually created it. But the thing is, that within a short time machines will be better at facilitating AI than humans will. And that's when humans are not needed.*" (Appendix 5, l. 339-340).

To Fogel, an AI is something which is created - we assume that this is meant for a specific purpose. In essence, there is in Fogel's opinion no difference between human intelligence and artificial intelligence, as the latter is simply a simulation of the former. Again, the idea of a scale comes into play, as he believes human beings themselves will in the near future become 'obsolete'. He believes that the facilitation of intelligence will no longer be overseen by humans:

"*Humans are like rats, just more clever. Not compared to the machine. The machine can learn so much faster than the computer ((human)), we've seen so many examples. It's so naive to say we will be necessary forever and ever because we will not be necessary.*" (Appendix 5, l. 341-343).

In addition, he does not see that AI has any limits:

"*I don't think it has ((limits)).*" (Appendix 5, l. 348).

It should be noted, that Fogel made the comparison between rats and humans somewhat jokily, his point, however, remained the same - that human intelligence is inferior to machine intelligence. He seems to believe that what makes AI superior is the speed at which it is able to process data. He believes that an AI's ability to process information is essentially limitless, however, he does not seem to acknowledge, or simply does not know, that an AI has often quite strict requirements of contextuality, which are needed to make sense of the data it is analysing. For instance, he does not distinguish between labelled and unlabelled data as a vital input for the AI. He elaborated on his argument that AI is essentially limitless:

"*Because it's self-educating. So (.) the limit is if we unplug it. If stop all (.) You need some things: you need data, you need connectivity - those two things are necessary. Because if you don't have data, there's nothing to work with and if you don't have connectivity you're cut off.*" (Appendix 5, l. 352-354).

Fogel does not seem to know that there is a rather large difference between a supervised and an unsupervised method of developing AI. The way he presents his argument, seems to suggest that he believes that any AI, no matter what type or purpose, would be able to make sense of the vast amount of chaotic data found on the internet. He is of course right in how an AI needs large amounts data, but also needs various amounts of supervision to make sense of this data - which, of course, also has to be sorted into labelled or unlabelled. Fogel confidently believes that AI is evolving:

"*I think the technology has (.) I don't know if it has changed, I just think that, just like machines are learning, the humans started learning before the machines. So, it's just regular people who evolved. So, they started working with AI in one way and learned from that, and then they found out there was a smarter way of doing things, and then they learned from that. And it will continue like that.*" (Appendix 5, l. 361-364).

Fogel, again, makes a comparison between humans learning and machines learning - confirmed to his argument that there is no difference in the nature of intelligence between the two. This similarity leads him to conclude that, just as humans have evolved, machines will follow a similar evolutionary trajectory. It then begs the question, how does Fogel distinguishes AI from other technologies? Fogel does not particularly distinguishes other technologies, such as automation and robotics, much differently:

"*I think it's all the same somehow. So, if something can do its own thinking then it's intelligence. If it's not a human or an animal, or whatever, then it's artificial intelligence. There's a lot of different software that's AI, but it has to be able to think by itself.*" (Appendix 5, l. 314-316).

Fogel does not make any concrete distinctions between what can and cannot be a specific manifestation of AI - as long as said manifestation has the ability to think. From this, we must also conclude that Fogel distinguishes AI from other technologies by its ability to think, which is analysed as a display of logic or the ability to rely a line of clearly reasoning.

#### *5.2.2.2 Technology Strategy*

For Frontliners, AI technology has been a necessary strategic asset for the company. The whole foundation of their value proposition is based on providing a platform, which is largely made up of AI technology. Fogel strongly emphasises that adopting AI has been a strategic move for the company:

"*Absolutely, so I don't think (.) without AI this ((Frontliners)) would not be a project. I don't think we would have done this at all. Because you wouldn't be able to achieve what we want to achieve ((without AI)), basically.*" (Appendix 5, l. 548-549).

Since Fogel states that he would not be able to run his business without AI technology, our analysis of Frontliners' technology strategy is therefore done with the assumption that adopting AI has been an essential strategic decision for the company. We also base this assumption on the fact that Fogel has been waiting for it to become technologically possible for him to pursue the Frontliners project:

"*So it's also like that sometimes, you just have to wait for something to happen, before you're able to do what you want. And this is possible ((Frontliners idea of incorporating AI)). I might have been able to do this a year ago, I also started this project almost two years ago. And I did a lot of wrong things. So, I'm glad that I have done those now so I can move forward.*" (Appendix 5, l. 555-558).

AI has been a necessary element for the viability of the Frontliners project. However, AI has largely been a new technology to Fogel and therefore something in which he has needed to gain competence. The acceptance or even appreciation of the 'wrong things' he has done, is in our understanding an indication of the underlying strategic importance he assigns to gaining this competence. He is appreciative of having made mistakes, as it has given him strategic insight into the capabilities and challenges associated with using AI. The insight has allowed him to move forward with the Frontliners project.

It is essential that Frontliners has competence with AI, as they are not using the technology to improve their own organisation, but to sell a unique product to customers:

"*We're ((Frontliners)) quite different, because we're not in it to save time for ourselves or be more efficient ourselves. We're in it, because we want to offer small businesses, all stores, around the world a solution, you know, some elements to use AI actually without them even having to engage in it themselves. Because we provide a platform with some things that are made by AI.*" (Appendix 5, l. 536-539).

We are not conducting a business analysis; however, we are interested in the assumptions behind the business model. Fogel believes that the extensive data analysis, which can be conducted via AI, requires certain data analytical skills which most organisations will have a hard time to acquire. For example, most cafés will not have neither the capital nor the organisational capacity to hire a data scientist. Fogel therefore believes that most SMEs would be interested in buying access to a platform, which could provide such analysis, in this case, provided by Frontliners.

We must assume that he does not view his company's organisational strength to be that of a software developer yet, since he consider Bluefragments as the technical experts (Appendix 5, l. 430-436). Fogel understands AI as an essential strategic element in creating an organisation capable of providing unique analytical services. Using AI as an essential element in your organisation creates some strategic challenges due to the extensive need for data. Fogel also saw data as one of Frontliners potential challenges:

"*I think that data might be a problem - the things that I want to (.)when we talk about AI. And, I want, you know, small coffee shops and so forth to use our system. No coffee shop with 10 employees will have enough data to get something clever from Artificial Intelligence. I'm sorry to say so, but the statistical foundation, of coffee shop that size, is just not big enough. But if I have a 1.000 coffee shops in my system, with five to ten employers each, with of course anonymised data.*" (Appendix 5, l. 569-573).

He later added:

"*I think that the data might be a challenge, depending on how the customers react to ((the idea)) of shared data.*" (Appendix 5, l. 577-578).

Fogel admits that he does not know how his potential clients would react to the idea of sharing their data. Whether Frontliners potential clients would see it as a problem to share their data in a common system, as it is outside the focus of this project. Nonetheless, we want to highlight that

securing a regular data flow will be of strategic importance to Frontliners, as any disruption to this flow will seriously affect Frontliners' ability to provide the service to their clients.

Another area in which the clients' opinions matter is with regard to the AI technology itself, Fogel pointed out that, currently, the idea of using AI technology has not created strong opinions - at least not among his clients:

"*No, I don't think that anyone has strong opinions about it ((AI technology)). I think it is a buzzword for ((companies)). I think most people don't care about it. People in big organisations ((however)), they get a lot of, you know, they have Microsoft, Saab, Google etc. Keep telling them "Hello, you need to look into this now! You need to look into this, now! You will lose if you don't look into this now, you will lose".*

*So, they ((big corps)) are now starting to look into it, and it takes much longer time than anticipated. It's always like that.*" (Appendix 5, l. 642-648).

In Fogel's opinion, there is a major strategic potential in acquiring competence in the use of AI technology right now. He highlights the core observation of his business project; he recognises a difference in the ability to adopt AI between big and small companies. Fogel points out how big companies are unable to ignore the increasing importance of AI technology whereas small companies might simply not be aware of its importance. It might be due to the fact, that at the moment, his clients do not have strong opinions about AI (Appendix 5, l. 642-648). It could be an advantage for Fogel, as he will not have to fight any prejudice about the technology. However, it might also prove to a disadvantage, as his potential clients might not recognise the potential of acquiring services from an AI platform if they do not understand its importance.

#### *5.2.2.3 AI in Action*

We briefly touched upon Fogel's idea of machine evolution in the Nature of Technology section, as that was where he first mentioned it during the interview. However, when we asked him many of the questions related to AI in action he further explained his understanding of this evolution. Fogel does not believe AI will unequivocally undergo an evolution, but rather it depends on the project (Appendix 5, l. 102-116). He elaborated on which project he saw an AI evolve:

"*What I think is interesting about this, is that we have some human behaviour and we measure that in some ways and measure what is influencing the behaviour and stuff like that. And then an AI makes some decisions based on that, to help people become better at something. So it demands human interaction.*" (Appendix 5, l. 102-105).

In fact, his answer is quite confusing because he seems to be giving two opposing answers at once. In the first instance, he is saying that AI evolve independently, and in the next he is suggesting that it is dependent on human interaction. We understand his point to be that currently AI requires human interaction, but that might not be the case in the future. Essentially, he understands AI and humans to currently to be co-evolving with the only difference being that machine evolution will happen at a much greater speed than human evolution. As a consequence of this belief, he refers to the fact that humans will be unable to keep up and therefore become obsolete:

"*The thing is, at some point the machines will be able to do the same things they already do, within things we're asking it to do it within. But it will also be able to do it regarding programming itself and stuff like that. They are already doing machine learning, it just depends what you tell it the rules are.*" (Appendix 5, l. 364-367).

We understand his argument to be that machine evolution will become self-maintained - essentially making machines capable of outcompeting humans in their otherwise unique areas of competence. Fogel is therefore also of the believe that AI can have agency:

"*I think so (.) I don't think it's, I don't know if it's there yet. I think it will be capable of doing that ((acting with agency)). But I'm not sure it is there yet. I don't think it's there yet.*" (Appendix 5, l. 783-784).

Since Fogel believes AI will at some point be able program itself and therefore be able to act independently from human input, it follows logically that he does not question the merits of an AI having agency. In fact, to Fogel it seems to be only a matter of time before AI technology can act with agency.

AI to Fogel is no doubt a powerful technology with a lot of potential. Whether this potential is ultimately for good or for evil remains unclear to him. When he defined AI to us, he also added that 'he was seeing some extremely scary things already' (Appendix 5, l. 265-277), he elaborated on this point:

"*I think that terminator is actually a very realistic scenario for now. I think it's scary because people are joking about ((it)), you know. One of my friends he has one of those vacuum cleaners - robot vacuum cleaners - and when he makes a joke he says "Well I'm just waiting for the day it discovers who's actually creating the mess and just makes an end of it, at once. Instead of keep cleaning after you. You know, it's funny, but it's kind of true.*" (Appendix 5, l. 281-285).

It should be said that Fogel made this comment jokingly, however, the underlying sentiment clearly remains one of suspicion and fear. The original Terminator movie (1984) infamously opens with the image of an animatronic foot crushing a human skull, which, of course, makes for one of the most dystopian predictions of technological development run wild to the detriment of humans. Of course, this interpretation of the future of AI technology leaves little hope for anything that is not AI. This point of view may leave you wondering why Fogel has engaged in a business venture that is so heavily reliant on AI when he foresees the future as dystopian. However, Fogel does not see that his company can be responsible for such a dystopian development:

"*The human mind is not able to foresee that ((future development)). It is not able to connect the dots, so I cannot see that what I'm using AI for, is going to lead to that. But I can see that ((happening)) if the wrong people gets a hold of it and use it, by mistake - who knows.*" (Appendix 5, l. 862-864).

Fogel believes that AI has negative potential and that it could be used to the detriment of humans. However, he does not see any negative use of the technology as hampering his use of AI. In his opinion, he will use it for positive improvements of a workplace. At the same time, he implies that he cannot predict the future with accuracy, but he is still convinced that Frontliners use of AI will be of benefit.

In fact, Fogel additionally argues for a perspective running parallel to the rather negative one mentioned above. He believes that AI holds a great potential for enhancement of the individual - he talks about human enhancers (Appendix 5, l. 674-675), which we understand to mean personalised AI that would be used on an everyday basis. Of course, this interpretation of AI recognises the technology as something, which will be of great benefit to humanity rather than something, which will overpower us. This counter perspective is an even more socio-materialistic perspective as AI is understood to grant us abilities that we did not otherwise have, it does not exist on its own, but in unison with whomever is using it. Fogel has additional perceptions of an AI acting intelligently:

"*It's in my opinion, it's just when it ((AI)) solves problems for me. You know, maybe in a more clever way then a calculator, but it's more or less it.*" (Appendix 5, l. 716-717).

An AI is intelligent when it can solve a problem for you, presumably a problem which you could not find the solution on your own. It is therefore no surprise that what makes an AI valuable to Fogel is anything that saves time, or provides you with a novel insight (Appendix 5, l. 778). This more positive perspective is socio-materialistic, as the technology is understood to be something, which enhances the user. However, the point remains that Fogel is slightly inconsistent in terms of whether the

technology developments in AI will have an overall positive or negative impact on the human species. On one hand, he makes a case that the technological developments are already out of control, and that it is only a matter of time before the automatic vacuum cleaner starts to question whether it should carry out the task it is given. On the other hand, Fogel believes that AI technology will help to enhance the individual human being to unprecedented abilities and insights.

#### *5.2.2.4 Sub conclusion*

To Fogel, intelligence is the ability to think logical which can, in principle, be done both by a machine and a human. Intelligence is an absolute concept, which can be measured on a scale. He believes that an AI's ability to process information is essentially limitless. Therefore, AI will eventually have the ability to outsmart humans - despite that it is not currently the case.

Fogel's belief in AI's absolute intelligence is also somewhat inconsistent, as he believes that AI acts intelligently when it solves problems. His belief is inconsistent, as he cannot seem to decide whether intelligence is a quality inherent to thought or whether it is a display of intelligent actions. Thinking is a process, which might not be directly observed, whereas actions are. This begs the question, is it the ability to think or the ability to act that makes you intelligent? Fogel provides no clear answer to this question. The inconsistency of his answers are pronounced by the fact that he also believes that an AI will become intelligent enough to question the tasks it is given, and ultimately give itself its own tasks to solve. According to this line of reasoning, it can be argued that not solving a given problem is equally an act of intelligence, as it displays the ability to think critically about the task one is given. Fogel never definitively answers whether thinking or acting is ultimately intelligence, making the line between thinking intelligently and acting intelligently even more obscure.

Ultimately, it is hard to determine to what extent Fogel understands AI's socio-materialistically. On one hand, he argues that AI currently requires human interaction, but that might not be the case in future which may be to the detriment or the improvement of the human species. We will argue that Frontliners use of AI is socio-materialistic, since the technology is being used to measure and improve human performance in an organisation. The AI platform learns from the people in the organisation and based on its input it gives suggestions to the organisation's members on how to improve itself. It is a clear example of something social influencing the use of the material and vice versa.

However, Fogel's general understanding of AI is, in our opinion, not socio-materialistic. Fogel seems to believe that AI is already, or will shortly, become semi or fully sentient which would make our interactions with AI fully social rather than social-materialistic, as both parties, man and machine, would act with absolute agency. This idea of a soon-to-be fully independent AI also

explains why he often indicates that AI in general should be feared. However, the topic is outside the scope of this assignment and we will therefore not address it further. We simply what to acknowledge that Fogel makes an argument, which can best be described in terms of sentience and that this belief gives rise to the fears he expresses.

### 5.2.3 Bestseller

#### *5.2.3.1. Nature of Technology*

To Lars Hjørnholm, intelligence consists of several aspects. He provided this multifaceted definition:

"*Knowledge of specific topics, but also how those topics and things within that area interact with others. So, intelligence is taking a lot of different pieces of a puzzle and putting them together and seeing the bigger picture.*" (Appendix 6, l. 140-142).

To Hjørnholm, intelligence is first and foremost associated with knowledge. In our understanding, knowledge in this context means a fundamental perception of the elements around you and the properties of these elements. According to Hjørnholm, what makes something intelligent is not simply knowledge of the elements, but also the ability to understand how these different elements interact with one another. As he puts it, it is putting together different pieces of the puzzle. Intelligence is therefore dependent on a holistic understanding of your surroundings.

When you recognise the elements around you, the way you perceive them also becomes important as it influences your ability to manipulate these elements. Hjørnholm explained the importance of perception as follows:

"*I think intelligence is also very much about perception and being able to take information, take data and put it into information. Really, taking different chunks of, whatever it might be, and figuring out how it's connected. How you can you interact with it, whatever it might be.*" (Appendix 6, l. 143-145).

To Hjørnholm there is a difference between data and information - the difference being that data is simply the input that you're given, whereas information only comes about as a result of an active interpretation of the data. The way you understand and interpret the data is dependent on your perception of it. Therefore, intelligence is an emergent phenomenon, which comes about when an entity is sufficiently perceptive to gain a holistic understanding of its surroundings and interpret the data in that environment into information.

The power of interpretation is also what makes an AI intelligent to Hjørnholm, he described AI as follows:

"*An entity able to make information out of a chunk of data, really. Look at something and explain what it is (.) pull-out strings of information that will explain. That will (.) kind of put together the puzzle for you. That is the way that I see artificial intelligence.*" (Appendix 6, l. 150-152).

An AI is therefore something, which creates information from complex data, something which can extract information out of what Hjørnholm calls 'chunks of data'. We understand chunks to mean large amounts of indiscernible pieces of input material, which does not provide any clear information. The ability to interpret these large amounts of indiscernible pieces of input and create information out of them is what makes an AI intelligent.

Given this definition of intelligence, it begs the question: is artificial intelligence and general intelligence the same thing? Hjørnholm does not believe so, he recognises a distinction between the two:

"*I think artificial intelligence, yes to some degree, it got a lot of common ground with intelligence, but then again (.) when you really put it into the long-term perspective - will we ever achieve, you know, genuine artificial intelligence? Well, we probably might. But many years down the road from now.*" (Appendix 6, l. 160-162).

His scepticism is best summed up in the question he possess - will we ever achieve genuine AI? We understand genuine to mean human or above human level of intelligence. Hjørnholm does not exclude the possibility that we might one day achieve such AI, but he also acknowledges that he does not believe that we currently are anywhere near such a level of AI. AI technology today may share aspects of what we broadly associate with general intelligence, but it is still missing something:

"*We haven't seen where it ((AI)) can take emotions, ethics, morals, whatever. It doesn't take that into account, it doesn't beat human intuition, whatever that is. (.) Yeah, it makes artificially intelligent decisions, but intelligent, no! I don't think it does - I think it provides us with maybe a clearer picture. Not the clearest - but it's a step of the way.*" (Appendix 6, l. 520-524).

As he says, AI does not beat human intuition - at least not currently. We believe intuition in this context refers to the faculty of attaining an action without a clear rationale for why this action was taken. Hjørnholm's belief that any AI is limited in its intelligence when it lacks intuition also explains why there is, to him, a difference between apparent and actual intelligence:

"*Well it ((the AI)) might seem intelligent, that it goes through 100,000 tickets and it distributes them, but then again, is that intelligence? Well it is pattern recognition, it's (.) you could call it intelligence.*" (Appendix 6, l. 530-532).

To the untrained eye, it might seem intelligent that an AI is able to go through amounts of data that are incomprehensible for any human, but that does not constitute intelligence is Hjørnholm's understanding. As an example, he mentioned the Amazon Echo game: The user thinks of an animal, which the Echo/AI needs to guess. The Echo/AI will ask questions, to which the user can answer yes or no, until it has narrowed down its search sufficiently enough to guess the animal in question.

Both the automatic dispatching system and the animal game, as examples, highlights Hjørnholm's underlying belief that there is a large difference between apparent and actual intelligence. To him, neither the pattern recognition nor the animal game are examples of true intelligence as they are both merely executions of given programs. The AI might seem intelligent, but there is nothing intuitive about it - meaning there is actually not anything truly intelligent occurring, because what is occurring can be explained in terms of the technicalities of the AI itself.

In fact, what is missing is not a mechanical explanation of what is happening within the AI, but a proper definition of when something is intelligent. To Hjørnholm, the philosophical question of what intelligence is at the moment remains too fluffy to make any real applicable sense (Appendix 6, l. 529-534). Therefore, he believes that Bestseller's AI, or any AI for that matter, can only be considered partly intelligent as it was built by humans according to our own flawed, or at the very least incomplete, understanding of what constitutes intelligence (Appendix 6, l. 529-534). Until a complete definition of intelligence is given, AI will only ever be partly intelligent. Neither does he believe that AI will ever achieve the competence of human intelligence:

"*When we talk human intelligence, no I don't think so. I think we will get close ((to human intelligence)), but I think there is something - not that I'm a spiritual or religious person in any way - but I think the complexity of our mind and how it works just, is just crazy. (.) Right now, I think we're talking about single digits percentage wise the competence of a human brain.*" (Appendix 6, l. 570-573).

The human mind is simply too complex to replicate according to Hjørnholm. It is therefore unlikely that any AI will become truly intelligent as a human being. Despite that it might be the case, it seems that human intelligence is the benchmark for measuring an AI's level of intelligence - although it should be said that Hjørnholm never explicitly said so - it seems to be the consistent underlying comparison he makes:

*"We won't be able to put everything of the intelligent world, as we as humans perceive it ((into the AI)). We won't be able to put everything into code. But we might be able to put elements of it - like describing an image."* (Appendix 6, l. 164-165).

This statement should not be seen as an acknowledgement of the technical challenge of coding genuine AI. Rather, it should be seen as an argument for why AI might never become genuinely intelligent, since everything in this context includes both ethics and morals, something which Hjørnholm is sceptical that any AI will ever have the power to interpret or understand (Appendix 6, l. 158-168). His interpretation also recognises human intelligence as the superior standard because only with a human degree of intelligence will you have the power of interpretation to understand such metaphysical concepts - as morals and ethics. He therefore believes that AI shares some common ground with humans, but that there will always be something that only humans will be able to interpret, such as morals and ethics (Appendix 6, l. 158-168).

This belief also explains why he does not see anything about AI technology that would justify any form of special distinction for the technology:

"*It's ((AI)) a technology just as a lot of other things. It's explainable. It's math. Its data (.) the models that you build within deep learning, neural networks, it's math. It's statistics. It's patterns.*" (Appendix 6, l. 172-174).

Hjørnholm understands AI to be a technology like any other. In fact, seven times during the interview he mentioned how AI is not magic (Appendix 6, l. 114, 172, 189, 555, 617, 661, 773). He used the word magic to highlight how AI might be a powerful technology, but not the philosopher's stone that will magically solve any problem it is given:

"*I really think we should stop talking about AI as something incredible, magical almost. To me it's not (.) it's a new, well, old technology, but we haven't got the computational power as before as we have today, right.*" (Appendix 6, l. 177-179).

Clearly, Hjørnholm is critical about the hype surrounding AI, as he does not see anything profoundly new about the technology. His point is, that the principles that AI is built upon are not new in any way it is simply our ability to use the principles that are unprecedented.

What is a quite surprising, is that Hjørnholm does not understand AI technology to have any limitations in itself:

"*Well, I think AI in itself doesn't have that much ((limitation)), as a technology, I don't see a lot of limits. I see the limit being with us using the technology.*" (Appendix 6, l. 185-186).

When Hjørnholm says that AI technology does not have any limits that is not to say that an AI is a self-contained entity. Rather, it is a tool to be used, which will not provide more than the user is able to retrieve from it. AI will still be able to provide humans with pieces of the puzzle that were otherwise unavailable. However, for Hjørnholm, the quality of the output always comes down to the utilisation of the AI and not the technology itself (Appendix 6, l. 185-194). Meaning, that AI can display elements of general intelligence but it should not, at least currently, be understood as something genuinely intelligent.

A genuine intelligence should be something, which recognises and understands ethics and morals, as part of its holistic understanding of its environment - that is to say a human level intelligence. Hjørnholm does not have a clear sense of scale in his understanding of intelligence, however human intelligence seems at the very least to be the standard by which you measure intelligence in general. Although Hjørnholm never makes any direct comparison between human and artificial intelligence it is clear that there is an underlying comparison as genuine intelligence is a display of qualities readily associated with the general intelligence of a human being.

#### *5.2.3.2. Technology Strategy*

Bestseller is in the phase of developing the AI technology for the ticket system and the project has not yet been implemented. In order for Bestseller to even develop and later implement the technology into their organisation, they have had to acquire specific technical infrastructure, namely the cloud:

*"Cloud. Really, because that (.) this is where you got the resource pool, you know, if you really want to crunch data - if you really want to deal with huge chunks of data and you don't want to break the budget and buying, you know, old school data centres. Well, then the cloud is where it happens."* (Appendix 6, l. 278-280).

Hjørnholm was aware that the cloud was a necessary investment to facilitate the development of AI technology. Hjørnholm was aware that AI is not a straightforward technology to develop, quite reversely, AI will need specific requirements in order to even be developed, but he recognises this investment to be beneficial for Bestseller (Appendix 6, l. 290-303).

Interestingly, the organisational infrastructure that was needed was a technical necessity and not additional human capital or establishment of a human capital entity - e.g. a new HR

department to handle the cases involving AI and their employees. This clearly reflects that the development of AI has so far not had a tendency to influence the employees to such a degree that there has been a need to actively restructure organisational departments. AI is by definition not an exceptionally different technology to Bestseller, but merely a tool to aid specific processes - as Hjørnholm also explicitly states (Appendix 6, l. 185-194).

It should be noted that developing AI was not a general strategic decision to begin with:

*"No it wasn't ((a strategic decision to begin with)). The idea was to create the fundamental understanding of AI. How is it fitting into the portfolio of technologies that will help a business thrive. Will it, at this point in time, at all, thrust the business forward?" (*Appendix 6, l. 307-309*).*

Bestseller had an overall IT strategy that was concerning how the company could utilise technologies to benefit the business and extend its successful operations. AI happened to be a technology that could have the potential of support their strategy and the IT management began to explore the opportunities of AI (Appendix 6, l. 318-331). Hjørnholm did not see a point of developing AI technology for the company if it did not have return on investment they set out for it. They were interested in exploring the capabilities of AI and present facts before taking the idea into action (Appendix 6, l. 318-331).

After looking into the potentials of AI, it became a strategic decision to keep thrust the business forward:

*"So yes, it's a strategic decision. But I think we are aware that we need to do this in a smart way."* (Appendix 6, l. 303).

When Hjørnholm uses the word smart, we understand it as him referring to the mindset of being open towards other possibilities that can aid the company to achieve its goals. Meaning, the decision to use AI is not based on the hype surrounding the technology, but based on factual and proven benefits that can aid the company in its goals. The business plan activities was what identified the technology as a beneficial investment Bestseller should make. They recognised that their peers were also taking use of AI technologies, so it then became a strategic decision (Appendix 6, l. 307-313).

However, Hjørnholm recognises AI's limitations and maturity curve, which he believes should be taken into account in order to not get blindsided. As described earlier, he sees AI as any other technology and does not believe it requires any special distinction. The approach should be to adopt AI stepwise instead of full on as he recognises the limitations being within data:

*"So, let's not go rushing into fully, I think this is stepwise adaptation, as the technology matures, as their service providers mature the platform, as a data improves. Because that is the main concern I have. The main focus we should have right now, is really the data culture"*. (Appendix 6, l. 298-300).

Hjørnholm does not specifically define what he understand by the term data culture, however, we define data culture to be the ensuring of qualified data in terms of labelled data, as described in chapter 2.1.3.1 Machine Learning, and hygienic data, meaning that there is a certain standard of quality of the data being used (Eckerson, 2002).

Hjørnholm admits that the data was a main part of the strategic decision of using/not using AI, as the amount of labelled and hygienic data was highly necessary for the development. If they did not have the necessary data, the AI technology would not help the business and he emphasised that the organisation will keep its investment on data because it will be the cornerstone in how the AI will deliver results. If Bestseller does not have qualified data, the result would most likely be invaluable to work with, as the results would be based on the unqualified data. However, Hjørnholm recognises the potential of AI - if Bestseller has qualified data - and how it can help the business forward, but as mentioned, the AI will respond to the input it is given:

*"AI won't fix your mistakes. It will help emphasise. It will help thrust whatever you have in a good orderly fashion. It will help to multiply that, in terms of outcome. But it won't magically cure bad data."* (Appendix 6, l. 301-302).

In fact, it is a strategic risk for Bestseller not to invest in their data culture and they are therefore focused on turning the data into structured and hygienic data that can be used to optimise processes. The data being used for the development of AI would have a direct impact on Bestseller and the automated dispatching system. Therefore, if the required data for the AI was not within the capabilities of the IT department at present, it would have too great of a risk as a disadvantage - thereby, it would be a strategic decision not to use AI technology.

Hjørnholm admits that investing in data is time consuming and might be a step back despite that the company are interested in moving forward. However, he recognises that a step backwards can be necessary to keep progressing:

*"You really need to slow down in a period, make the effort, make the investment, and then to speed up again." (*Appendix 6, l. 62-63*).*

The time spent on qualifying their data to be used for AI technology is seen as time well spent, as it will help advance the business and reach the goals for Bestseller. Thereby, Bestseller has a long-term focus on their optimisation processes and the decision on investing in the future rather than the present, underlines the strategic decision of using AI for the ticket system.

However, Hjørnholm admits that the IT department had difficulties with convincing other departments of the benefit of AI, as they needed other departments to collaborate - e.g. the service department of the ticket system (Appendix 6, l. 379-395). Not all departments prioritised the long-term investment of AI and the IT department had to spend resources on political work in order to convince other departments of the benefits (Appendix 6, l. 379-395). As mentioned earlier, the IT department spent time on exploring the capabilities and opportunities of AI before developing the technology. This underlines that the IT department made sure that AI had strategic benefits before they suggested that AI should be incorporated as part of a strategic decision.

#### *5.2.3.3. AI in Action*

Hjørnholm believes that AI can become a valuable tool, which can help Bestseller make better, more data driven and precise decisions (Appendix 6, l. 471-495). It refers to his idea of AI being something, which can make information out of vast and complex amounts of data (Appendix 6, l. 139-145). Hjørnholm highlighted time-consumption as an example that made an AI valuable:

"*Definitely time-consuming or helping us spend time more wisely is a value, making good economic decisions, making the health sector function better, making the traffic going better or whatever it might be. Yes, I think a lot of value in AI. I actually only see value, I see some risks also.*" (Appendix 6, l. 742-745).

Hjørnholm understands AI to be a valuable technology when it is used to optimise existing structures and procedures to facilitate a better use of your time. AI holds no value in itself, but must be applied to create value. Therefore, he kept coming back to the importance of directing the use of AI correctly (Appendix 6, l. 499-511). Again, referring to his point that AI is not magical and that it will therefore need supervised programming to provide valuable results. It is therefore no surprise that Hjørnholm recognises the barrier for AI within the user, not the technology itself:

"*Right now, I think the barrier is really the utilisation of AI. Like I said, if you look into our organisation, a small group of people are aware of what AI can do. And that small group of people are only aware of a fraction of what AI can do*." (Appendix 6, l. 590-592) .

AI is a tool to be used and therefore it is only the users, which can enable or limit the potential of the technology. Competence in and with the technology is the biggest barrier he recognises for further use of the technology. He simply believes that the technology will never be able to act independently from humans:

"*No, only to the that extent that we have asked it to ((act independently)). But because it's still humans building it. It will (.) it might seem like it's acting on its own because it will come to a certain conclusion that we haven't thought of. But it's build upon a model that we made, some kind of logic that we made, so yes, I think it comes down to how you perceive it really.*" (Appendix 6, l. 642-645).

To Hjørnholm, an AI cannot act completely independent since it was built by humans. Therefore, any independence the AI might display is simply a consequence of its programming and thereby not true independence of action. Paradoxically, it may seem fully independent if you were not aware of the AI's programming - therefore the AI's intelligence can seemly change according to how it is being perceived. That begs the question, how will you ever know whether any entities, AI or otherwise, are actually independent? Hjørnholm's argument is that because the AI is executing a given set of instructions, any action it undertakes is not a result of free will or intuition. Hjørnholm argues that there is a difference between apparent and actual intelligence, which runs counter to the Turing test. It is not enough that the AI is able to create information out of data - the entity must also display intuition or the ability of attaining an action without a clear rationale. Therefore, as long as you can explain why an AI did something as related to its programming it cannot be considered truly artificially intelligent. The Turing test states that when you can no longer distinguish an AI's action from that of a human being, the AI must be considered intelligent. However, that is not enough for Hjørnholm, as the AI must attain actions that cannot be explained even if you know it is an AI.

According to that way of thinking, AI will forever remain dependent on human programming as the AI is actually not intelligent, but only apparently so. The AI is essentially only reactive to its programming and input, but not reflexive. An AI cannot and will never do anything it was not asked to do, whether the command is understood and know by the user is the only question worth asking. That is not to say, that Hjørnholm does not see AI as an evolving entity:

"*In the way that it will help us look at complex scenarios from a different angle. We're going to take that knowledge and we gonna improve the AI technology with it, we're going to build better models, they will be, they will enabled us to see even more complex problems or scenarios more clearly, and we're going to improve the models. So we're going to improve AI, AI is not going to improve itself.*" (Appendix 6, l. 670-673).

AI is not and will never become self-evolving - it is a tool although a sophisticated one. According to Hjørnholm, AI as a technology that will definitely improve, but as a consequence of our active development. Hjørnholm clearly states that he does not believe that an AI is capable of improving itself. Therefore, it is quite surprising that Hjørnholm still believes that AI in general is able to act with a level of agency:

"*Not 100% autonomous decisions. Because you can to a large extent, very large extent, say it's acting on its own, yes. But I can't help going back to the fact that we told it to do so. I think very much that's the definition-wise problem, yeah how do we define acting on its own. It didn't pop out of nothingness, right. We build it, we've designed artificial intelligence. So it will act on its own to that extent that we asked it.*" (Appendix 6, l. 687-691).

True independence of action and agency is therefore, to Hjørnholm, only possible if the AI undertakes actions, which cannot be explained as a consequence of its programming. As long as its limited agency is a consequence of its given instructions, the AI does not justify any specific distinction, as it is merely a machine - although it is very advanced.

It is hard to determine whether Hjørnholm has a socio-materialistic understanding of AI. He definitely believes that we actively shape an AI towards a desired performance and that this development process can be described as an evolution. However, it is less clear whether the use of AI has any impact on the user. He sees a clear distinction between apparent and actual intelligence, he does not see any AI as an actual intelligence. Therefore, we must conclude that he does not believe that AI can passively influence his behaviour, as he is aware of the mechanics at play within the AI program, at least in principle. However, he does acknowledge that the insight might not be available to everybody. Meaning, the people who do perceive the AI as truly intelligent could have their behaviour passively influenced. This distinction between those who understand the mechanics and those who do not, has led us to conclude that Hjørnholm does not see AI as fully socio-materialistic, as he does not believe the technology necessarily has the ability to influence our behaviour.

#### *5.2.3.4. Sub Conclusion*

Hjørnholm distinguishes intelligence and artificial intelligence quite differently. He believes that human intelligences is about knowledge and information, but also how these different pieces fits into "the puzzle". He believes that AI to some degree is intelligent, however, the AI is not able to comprehend metaphysical states, such as human intuition, morals and ethics. The AI does not compare to human intelligence, as it is too complex for an AI to interpret. Therefore, Hjørnholm also

perceives AI to be like any other technologies, as to him it is all mathematical calculations and pattern recognition. He does not see AI acting on its own, but only as a technology which can be used by humans. Essentially, he sees the technology as limitless, however, its limitation lies in its utilisation by humans.

At first, it was not a strategic decision to develop AI for the automated dispatching system, as Bestseller was interested in learning the foundation, capabilities and requirements of AI. However, when they were more knowledgeable about how AI could help the business move forward, they made a strategic decision to develop AI for this specific purpose. Hjørnholm was aware that Bestseller needed to waste time in order to gain time and so he emphasised the importance of the data culture for, not only for this project, but for Bestseller in general.

Hjørnholm does not believe that the AI holds complete independence - it is able to act independently to the extent that a human has programmed it to. The value the AI holds is therefore seen in terms of how much it can reduce time costly tasks and deliver results. However, it should be noted that these results might have been unattainable without the use of AI. Nonetheless, he does not believe that an AI has complete agency, as the AI will always exist on the basis of human development and utilisation. We have then concluded that Hjørnholm does not recognise AI as fully socio-materialistic because the AI will not unequivocally influence humans.

## 5.3 Comparison of Perceptions

The aim of this section is to compare Bluefragments' perception to each of their respective clients' perceptions. The various technological frames that was analysed in our findings, presented some interesting similarities and contradictions. We have contrasted Bluefragments' technological frames to each of the clients to gain a better understanding of how and where each client's perception is shared or distinct to that of Bluefragments. When we understand how the perceptions compare, we have been able to better ask questions in our second interview with Bluefragments about why the company was aligned with their clients or why they were misaligned. This particular (mis)alignment is important to acknowledge for us to further analyse how Bluefragments have succeeded in establishing a shared technological frame of reference.

We have chosen to compare the perceptions in Table 5.1, within four topics related to the three domains of technology; the first deals with how intelligence is understood and the second is how AI is distinguished from other technologies, if at all - these are related to Nature of Technology. The third is how AI are or should be used in an organisation - which is related to Technology Strategy. Finally, the fourth deals with how or whether AI is socio-materialistic - which is then related to AI in Action.

Table 5.1 The alignment and misalignment between Bluefragments and their clients

| The Companies // Topics | Bluefragments | IDA | Frontliners | Bestseller |
|---|---|---|---|---|
| **AI as intelligent** | Martinsen believes an AI is intelligent when it acts intelligently. In other words, when an AI is able to display actions, that we associate with intelligence, we must assume that it is intelligent. What is deceptively simple in this definition is actually not a definition of intelligence at all - it leaves it up to the person, observing an act by AI, to judge whether that person believes said act was intelligent or not. | Aligned<br>Bach Keldsen believes an AI is intelligent when it provides a smart solution. Despite that Bach Keldsen ultimately believes that intelligence is universally scalable, her way of testing this intelligence requires the same idiosyncratic parameters that Martinsen also believes are necessary. It is understood that there is always a specific problem with certain parameters from which you can approximate the intelligence of the solution - in effect it is aligning Bach Keldsen and Martinsen with regards to how intelligence can be detected and verified. | Misaligned<br>Fogel believes that intelligence is when someone or something thinks logically. Therefore, it is the processing of information rather than the result of processing, which defines intelligence. The immediate question with this definition is how do you prove that someone or something is thinking logically. Fogel understands intelligence as universally scalable, whereas Martinsen recognises intelligence as a local phenomenon, which can only be measured idiosyncratically - if at all. In fact, the definitions are ultimately contradictory. | Misaligned<br>Hjørnholm does not believe that AI is genuinely intelligent. He acknowledges that this definition likely makes genuine AI unattainable, therefore, if you were to test any AI according to this definition the AI would always fail. AI is a business tool and a method to solve specific problems. |

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|---|---|---|---|---|
| **Distinguishing AI from other technologies - opportunities and limitations** | Martinsen recognises a clear distinction between AI and other technologies, mainly in terms of AI's operational autonomy. For him, it is mostly a technical issue related to the amount of rules you would need to set up in order for the AI to work. It is expected that the AI will be able to act independently and intelligently, in fact it is required. He even describes the autonomy of the AI as having a life of its own.<br><br>Martinsen recognises AI's limitations to be intelligent in one specific area. Therefore, an AI is only as good as the competence it navigates with in its environment | Aligned<br>Bach Keldsen emphasis that AI has the ability to resemble the human mind. AI is able to learn and improve its performance, in contrast to RPA which does not do more than its instructions tell it to do. Martinsen and Bach Keldsen seem to agree that what makes an AI useful is its ability to operate with autonomy within a set number of programmed rules.<br><br>Bach Keldsen does see that AI has its limitations. In general, many of her considerations about AI are related to the project that IDA is conducting. | Misaligned<br>Fogel does not see any clear distinction between AI and other technologies, or at least not between AI, robotics and automation. To him, something is AI when it is able to think by itself, but he also believes that there is a lot of software that is AI, but is not able to think by itself. Therefore, we must conclude that there is properly quite a large difference in the way Fogel and Martinsen distinguishes AI from other technologies.<br><br>Fogel states that he does not believe that AI has any limitations. | Misaligned<br>Hjørnholm does not believe that AI requires any form of special distinction. To him, AI is a tool just like any other. He does not believe that AI technology will fundamentally change the way we solve intelligent problems, as he does not see AI as genuinely intelligent, whereas Martinsen thinks AI will fundamentally reshape the way we work.<br><br>Hjørnholm believes AI is only limited by the people using it. |
| **The organisational purpose of AI** | Martinsen does not believe that their clients develop AI as part of a strategic decision, but mostly because it is a buzzword and | Misaligned<br>The decision of implementing AI is highly strategic for IDA as it is part of their IT-strategy. IDA had | Aligned<br>Frontliners derives its core business value from an AI driven platform and Fogel therefore heavily underlines | Both<br>AI was not a strategic decision for Bestseller at first. Bestseller saw AI as a strategic tool in the same |

| | | | | |
|---|---|---|---|---|
| | because companies want to 'ride the wave', even though they are not sure of AI's capabilities and purpose. Martinsen understands AI to be more of a strategic tool rather than a strategic decision. Martinsen did, however, recognise Frontliners' use of AI as a strategic decision. | a specific purpose of incorporating AI in the organisation in order to optimise processes - and will continue to do so throughout the organisation. Therefore, there is a misalignment. | the strategic decision from his side. AI has been a strategic choice from the beginning, as his company would not exist if not AI was incorporated. | way that Bluefragments does, they are therefore quite aligned in this perception. However, AI became a strategic decision later in the process when Hjørnholm had more knowledge of the technology and therefore they are misaligned on this specific point. |
| **AI's interactions and its socio-materialistic implications** | Martinsen is of the belief that there is still a need for human interaction in order for the AI to reach a point where it can act more or less on its own. The AI needs a vast amount of data from humans, along with being controlled to ensure that it provides correct answers. The AI is shaped and tailored for the purpose which humans ascribe to it and how the technology influences humans - which is a socio-materialistic perspective. | Aligned<br>AI can only be independent to a certain extend because it will always be affected by the humans who programmed it. Therefore, there will always be a degree of human interaction connected to the AI. Humans develop AI for the present needs and the AI will then reflect the ambition or the parameters that humans have given the AI at the present time. Thereby, she perceives AI is socio-materialistic. | Aligned<br>AI are still in need for human interaction in order to evolve and become independent, for now. Fogel perceives AI to be used for enhancing humans and is thereby also socio-materialistic in his perception, but in a larger degree compared to Bluefragments. | Misaligned<br>AI can only be independent to a certain extend because it will always be limited by the humans who programmed it. Therefore, there will always be a degree of human interaction connected to the AI. However, Hjørnholm does not believe that humans are influenced by the AI, and is therefore not socio-materialistic in his perspective. |

### 5.3.1 Sub Conclusion

We wanted to know how our interviewees understood how an AI is intelligent. We expected that there would be an overall agreement, however we have found significant differences in the way our interviewees conceptualise the intelligence of AI. We are surprised since there was no universal agreement on what makes an AI intelligent. As evident in the table, there is also not a unanimous agreement between Bluefragments and their clients about the general distinctions and limitations of AI technology. However, we assume that the specific expectations for each specific project are aligned, since there have been a successful collaboration. Furthermore, Martinsen has knowledge within how to develop an AI solution, what is presently possible and not possible with AI, and the resources needed for the development and implementation. Therefore, he is merely focused on producing the AI solutions and not strategically planning the process and purpose for the clients. Lastly, it is interesting to see that Martinsen, Bach Keldsen and Fogel all have a socio-materialistic perspective, but differs in their opinions to what extent there is a socio-materialistic bond between AI and humans. Hjørnholm's point of view is unique, as he does not have a complete socio-materialistic perspective on AI. He does not see the technology as something, which directly influences human behaviour - unless you are unaware that you are interacting with a machine and not a human.

## 5.4 Ready-Made-AI Adjusted

In the first section of findings, we have analysed Bluefragments' technological frame along with the three client organisations' technological frame. In the previous section, we compared Bluefragments' perceptions of AI to the individual organisations' perceptions and found differences in the perceptions. This section will focus on how Bluefragments have managed to establish a common understanding of intelligence, and by extension AI, in the respective projects with the clients despite their different perceptions. Due to the differences, we are interested to find out to what extent the expectations regarding the technical requirements in the respective collaborations are aligned. Furthermore, we are interested in how Bluefragments can be aligned with their clients when they have - for the most part - different views on the strategic decision of AI. We are interested to examine how Bluefragments have successfully used Ready-Made-AI as the technological frame of reference for their clients.

### 5.4.1 IDA

In this project, Ready-Made-AI was primarily used to establish what the technical grounds for the project should be. Both Martinsen and Bach Keldsen agreed on the focus for their collaboration and this focus was chosen relatively quickly as a result of the workshop (Appendix 3, l. 158-166, Appendix 4, l. 568-569). They do, however, differ in how they believe the focus was chosen, in Bach Keldsen's opinion the focus for the chatbot was chosen due to budgetary constraints:

"*So we were very clear in what we had ((in terms of budget)), or what we wanted, and then they scoped it" (*Appendix 4, l. 181*)*.

Bach Keldsen clearly had an exploratory approach to the project as she, and by extension IDA, had limited knowledge about the possibilities within AI and were therefore not willing to commit vast financial sums into the project. This was perceived somewhat differently by Martinsen, who recognised the project as a proof of concept for IDA, but the project could have been far more reaching than it was. This became evident when Martinsen considered the budgetary constraints of the project:

"*Yeah, especially when we talk about AI and because it's still a black box for many customers a little bit afraid to say 'ok so we're gonna put in half a million' for example for this project."* (Appendix 3, l. 176-177).

Martinsen was speaking generally, however, we believe that IDA in Martinsen's view, is one of the companies, which sees AI as a black box. IDA are therefore hesitant to commit vast financial resources to an AI project - at least for the moment. Ultimately, the size of the budget limited the scope of what was possible to execute for IDA. It started with a general focus on chatbots, but was later limited to a chatbot for car insurance (Appendix 3, l. 176-180). In sum up, Bach Keldsen and Martinsen share the understanding that the project was scoped by its budget. Martinsen believes that this constraint was imposed - not due to a lack of financial means - but as evidence of a certain reluctance regarding AI on the part of IDA, whereas Bach Keldsen saw it as due diligence. Nonetheless, Ready-Made-AI has, in this case, been used as forum for scoping the project with regards to the budget available rather than a forum for discussing all possible uses of AI by IDA regardless of budget. In other words, Ready-Made-AI has not been used as a way to create a shared understanding of the two parties' aspiration for the technology - rather it was a forum in which Bluefragments presented what was possible only within AI's current technical limits.

Bach Keldsen did not immediately recall what Ready-Made-AI was, but recognized the name - so the concept was not front and centre in the way she remembered IDA's collaboration with

Bluefragments (Appendix 4, l. 193-194). It seems that the concept of Ready-made-AI might not have been a centrepiece because the collaboration was neither perceived to be a conceptual discussion about what exactly an AI is. In fairness, neither Bach Keldsen nor Martinsen mentioned the need for such a discussion. The workshop was primarily a practical discussion about IDA's technical needs for an AI. An example of such a practical need could be the use of the Azure platform. Therefore, Martinsen saw the project as a practical proof of concept, meaning the chatbot was a way to show the value of AI:

"*We can prove some cases, you can prove the business case and based on that we can actually expand the project ((with IDA))."* (Appendix 3, l. 84-85).

As evident in our findings, there was a strategic element to IDA's adherence to the Azure platform. However, Martinsen did not see Ready-Made-AI as something that would accommodate IDA's strategic need, as he did not see the strategic considerations IDA had with regards to how the AI should be developed. Nonetheless, we have found no indication that Ready-Made-AI was used as a forum for a discussion of the strategic value ascribed to the Azure platform by IDA.

What was also evident in our comparison in chapter 5.3, is that the two parties perceive general AI differently. It is not clear whether the use of Ready-Made-AI has done anything to accommodate these differences either. In fact, Bach Keldsen was not even aware whether there was any distinction between her and Martinsen's definition of AI:

"*I don't think ((there was a distinction)), I don't know. Maybe there was, I didn't pick up on it, if there was*." (Appendix 4, l. 177).

Martinsen did point to the fact that there was a difference in opinion between them:

"*I think Lisbeth ((Bach Keldsen)) has a perspective on AI where (.) well I think she is a typical user of AI. And I believe she's pretty open-minded around the AI. And hence, I think we share some of the common ideas about AI. But I'm not sure we have the same perspective on things*." (Appendix 3, l. 93-95).

A typical user in this context refers to someone who needs to first adopt and adapt a technology before fully integrating its use. Martinsen gave an example of how Facebook was first adopted by young people before eventually being adopted, adapted and integrated by older generation who now uses as much, if not even more, than the younger generation (Appendix 3, l. 105-114).

When Martinsen says that Bach Keldsen fits the description of a typical user, it would seem that he has not imposed a set definition of how and for what an AI should be used for. Martinsen's use of Ready-Made-AI, in IDA's case, has focused on the development of a practical solution that would accommodate IDA's needs and therefore a conceptual discussion has not been necessary. Nonetheless, as evident in our findings, there are differences in Martinsen's and Bach Keldsen's definitions of AI. However, due to the practical nature of the discussion these differences were never brought up, hence Bach Keldsen was not even aware that there was a difference of perception with regards to their definitions of AI, as mentioned in 5.3.

Martinsen has consciously tried to establish terminology with IDA, however, he is not sure that he and Bach Keldsen share the same terminology:

"*Well that's hard to say ((whether a successful terminology was established)), I really hope so, but I'm not sure."* (Appendix 3, l. 136).

Again, it is evident that the workshop conducted, as part of Ready-Made-AI, has created a shared understanding with regards to the technical requirements of the project. However, a more fundamental discussion of what AI actually is has been neglected, which Martinsen also acknowledges, as he is unsure that a common terminology has been established.

Despite their different perceptions, both Bach Keldsen and Martinsen believe they have had a successful collaboration, Bach Keldsen presented Bluefragments quite positively:

"*Very professional. We had a really good period of time together. It was a very interesting way of working*." (Appendix 4, l. 554-555).

Martinsen agreed that the collaboration had been successful between them:

"*Yeah I think so, we had some challenges along the way, but I think they got a pretty good result out of it"* (Appendix 3, l. 140-141).

Clearly, the project is seen as a success by both parties as they could mutually agree on a technical solution. Despite that their definitions of AI are divergent, the project has created a common understanding between the parties. However, this understanding is centred around a common technical understanding of IDA's requirements for the AI rather than a shared understanding of AI as a concept. Therefore, Ready-Made-AI was not used to discuss the strategic value IDA ascribes to AI.

### 5.4.2 Frontliners

The concept of Ready-Made-AI was not explicitly mentioned in the collaboration with Frontliners. Fogel does not recall any introduction to the concept and was not aware what the concept was about when we conducted the interview with him (Appendix 5, l. 471-478). However, he does recall that he and Bluefragments had quite a lot of meetings where they were talking about AI:

*"I haven't had a clear understanding of what it ((AI)) was. I think they ((Bluefragments)) explained that extremely well. And made sure that I knew what I was going into. (.) They were very good at explaining what to expect. And also by giving examples from other clients." (*Appendix 5, l. 517-524).

During these meetings, Bluefragments explained how ML is a part of AI, as Fogel did not know this at the time, along with what kind of AI is actually build for the platform for Frontliners (Appendix 5, l. 497-498). Martinsen confirmed that Ready-Made-AI in the case with Frontliners was mostly based on the explanation of AI and making sure that Fogel and Bluefragments shared the same view on the technology, in order to avoid misunderstandings:

*"So in this project, if you go back to what Ready-Made AI is. It is this concept where we say 'let's initially discuss the things, let's scope it really well, talk it through, making sure that the customers have the same idea about what is going to be built as we do'." (*Appendix 3, l. 206-208*).*

The part of Ready-Made-AI, which entails using some of the ready-made components were not discussed with Frontliners as Bluefragments would have to build up a completely new AI model for Frontliners (Appendix 3, l. 211-221). Instead, they used most of the time with the first part of Ready-Made-AI - talking about AI. What should be noted, is that Martinsen is quite sure that Fogel is aware that he has been introduced to the concept of Ready-Made-AI and explicitly said that Bluefragments introduced the concept to Frontliners (Appendix 3, l. 227-228). Fogel, on the other hand, quite explicitly stated that he did not know what Ready-Made-AI is and did not believe he had been introduced, as mentioned above. Therefore, there is a significance difference in perspectives between them. They both believe the collaboration have been successful. We wonder how it is possible to have a successful collaboration and result when they are not on the same page?

It would appear that the awareness of the concept has not had an influence on the successful establishment of a technological frame between them. The mentioning of the concept would not have made much difference because it is the underlying purpose of the concept, which is important for the successful collaboration - e.g. talking through what AI really is and how it can be applied to Frontliners' business case.

As seen in chapter 5.3, they both have different perceptions of what intelligence is, what artificial intelligence is and how AI compares to other technologies. However, it does not seem to have an impact on the collaboration between them either. They both believe that they are aligned in terms of AI in the project and how they see the project evolve (Appendix 3, l. 277-279 + Appendix 5, l. 400-408). Despite their different perceptions, it would appear that the Ready-Made-AI template has been the technological frame of reference, which have made the foundation for their collaboration. Bluefragments have only spent time on focusing on the first part of the concept - namely "What is AI" - to make sure that Fogel knew exactly what AI consists of, and how Frontliners could benefit from it. Meaning, Ready-Made-AI has been used as a tool to encapsulate Frontliners' strategic visions and outline the technical implications of that vision.

What Ready-Made-AI has not facilitated is a conceptual discussion of the nature of AI technology. We found that they had completely opposite opinions on the concept of AI, nonetheless, Martinsen believes that they share the same perspective:

*"Yes (...) So Danny is a (.) he's really into technology. And he sees a lot of opportunities using technologies, so I'm pretty sure that we have more or less the same perspective on AI." (*Appendix 3, l. 246-247*).*

Fogel, on the other hand, directly explain that he does not believe they have the same understanding:

*"No, I hope they have an even better understanding than I have. A lot of my understanding is primarily from inspirational talks, great inspirational talks by some of the best people in the world. But it's not the same as knowing any details." (*Appendix 5, l. 430-432*).*

The quite opposite view might be based on the fact that they are not talking about the same thing. Martinsen are more focused on AI as a technology and what purposes AI can be used for. It is clearly more about the opportunities AI can create where only the sky is the limit. Martinsen believes that he and Fogel share those ideas of AI, which makes sense, because 5.3 displayed that Fogel did not see any limitations of AI and that the technology can be applied in many areas. Fogel, on the other hand, is talking about the technicalities and building the AI. Since Fogel does not have a data scientist background, in our opinion, it makes sense that he does not know AI in details. He further elaborates that Bluefragments would have been able to tell him anything, as he would not have known what was true and what was not (Appendix 5, l. 441-442). These statements also underline the different perceptions between them, also seen in chapter 5.3.

Where they have shared the same understanding, is their strategic interpretation of Frontliners' decision to develop AI technology for their core business, as evident in 5.3. Therefore, Ready-Made-AI has been used as a forum for both Bluefragments and Frontliners, to discern Frontliners' strategic vision and provide a technical platform which would live up to that vision. It was not used as a forum to discuss their conceptual understandings of AI or as a way to deep dive on the technical detail of the project. As such, there has been a strong focus on their shared understanding of the possibilities and aspirations for the use of AI technology.

It would seem that the technological frame has been successfully established because Bluefragments have used Ready-Made-AI as a template for their work together. Bluefragments have therefore had this concept of Ready-Made-AI in mind when working with Frontliners.

### 5.4.3 Bestseller

In this project, Ready-Made-AI was initially used to narrow down exactly what Bluefragments were expected to develop for Bestseller. Hjørnholm's team started with three potential projects, but through a discussion facilitated by the Ready-Made-AI workshop, the parties narrowed the project down to the internal dispatching system (Appendix 3, l. 349-355).

The depth of the discussion regarding AI were perceived somewhat differently by the two parties. Martinsen believed that a broad understanding of AI technology was evident from the beginning:

*"They had the overall perspective. But we explained some of the core."* (Appendix 3, l. 414).

Clearly, Martinsen did not feel that Bluefragments had to explain quite as much as they might have done with other clients. Nonetheless, Hjørnholm still felt that Bluefragments needed to get the Bestseller team up to speed on the basics of AI:

*"Well, first of all being very low practical, which was also one of the things that I emphasised to Thomas, that were needed - as we are not rocket scientists or anything in that regard. We really needed to take that approach, you know, keep it simple. Try not to jump into the pool at the deep end."* (Appendix 6, l. 198-200).

Martinsen felt that Bestseller already had a high level of knowledge about the subject because they were able to deep dive into the technology quite early on in the project (Appendix 3, l. 365-367). Hjørnholm looks at it differently because Bestseller had a high working standard. Meaning that they had more technically insightful questions, as they had a high degree of initial knowledge. Bestseller's technical appreciation meant that they needed an advanced understanding of the technology to be

comfortable using AI. We believe that Ready-Made-AI has been used to discuss what was technically possible for Bestseller to implement (Appendix 3, l. 349-361), rather than as a theoretical discussion about what AI is. However, we believe there has still been a strong focus on the potential of AI technology and the aspirations both parties had in that regard. Meaning, that the discussion has not been limited to what was technically possible for Bestseller.

Since Ready-Made-AI was used to frame a discussion it was therefore mentioned during the collaboration, but Martinsen was unsure whether Hjørnholm understood that this concept was being used. In fact, he was not sure that many, if any, of his clients think about the terminology during a project:

*Again, we talked a lot about it ((Ready-Made-AI)), initially. But I think many customers they actually don't think that much about terminology. Once we are in the project. They think more about their business and how it fits in*." (Appendix 3, l. 359-361).

Martinsen's comment would seem to suggest that Ready-Made-AI has never been a forum for a conceptual discussion about various definitions of AI. Nonetheless, facilitating a conversation remains important to Martinsen, as he sees it as Bluefragments responsibility to create a common language with the client about AI. Unsurprisingly, Martinsen also remained convinced that it was necessary to create a shared terminology with Bestseller about AI (Appendix 3, l. 371-375). Martinsen's focus on creating a shared terminology has had an effect on Bestseller, as Hjørnholm acknowledges:

"*Bluefragments taught us about the importance of clean, structured data. Next AI endeavour will most likely reflect that in our approach to data capture and hygiene."* (Appendix 6, l. 805-806).

Here is a clear example of how Bluefragments have managed to create an understanding about how data should be treated and addressed when developing AI - specifically for this case. However, it remains clear that the establishment of a terminology is focused on creating a shared appreciation about the technical aspects of developing an AI, and not about the conceptual differences in Martinsen's and Hjørnholm's definitions of AI.

Nonetheless, a conceptual discussion might have been necessary as Martinsen believes that he and Hjørnholm shares the same perspective on AI, when we asked whether he thought they shared the same understanding he answered:

"*Yes. I think Lars ((Hjørnholm)) is a person that is extremely curious about technology and is super bright and understands the possibilities about technology*." (Appendix 3, l. 365-366).

Martinsen clearly endorses that there was a shared understanding, not necessarily in their definitions of AI, but in the vision they have for the technology's use. The reason for that answer is based on Hjørnholm's technical appreciation of technology itself and the possibilities found in the use of these technologies. Hjørnholm also gave the impression that he and Martinsen shared the same perspective on the project:

"*It never stood out to me, at least. As, no I think the perceptions were (.) kind of similar to a large extent.*" (Appendix 6, l. 218-219).

As was evident in our findings, they do not agree on what the definition AI is. Hjørnholm believes that genuine AI is likely unattainable, therefore it could be argued that Bluefragments might never be able to provide something, which actually lives up to Hjørnholm's definition of AI. Nonetheless, this argument has proven false, as Bluefragments have still been able to provide a solution, which has lived up to Bestseller's expectations. Despite the fact that there was no agreement on the definition of AI, Martinsen believes the project was a success:

"*Definitely a success and the fact that we did that in three days was almost unbelievable." (*Appendix 3, l. 383-384).

Bestseller share the same positive the perspective on their work with Bluefragments:

"*Professional yet down-to-earth approach to doing business. They are pragmatic and portray a sense of sticking to proven methods, which impose a feeling of quality and calmness. There is a certain "feel-good" vibe to their dealings. It made us feel comfortable and sparked a creative productiveness that we didn't foresee*." (Appendix 6, l. 808-810).

Clearly, both parties believes they have had a successful and productive collaboration with one another. As mentioned, this collaboration was first and foremost technical and so Ready-Made-AI has been used to frame a technical discussion. A conceptual discussion has simply not been part of the project. We must conclude that such a discussion has not been needed, as the project was considered a success by both parties.

### 5.4.4. Sub Conclusion

Ready-Made-AI has been used in three different projects, but to very different effects. It seems that the concept to varying degrees have centred on the current technical limitations of the technology. In IDA's case, there was a heavy focus on technical limitations whereas for Frontliners and Bestseller, current limits were important, but not necessarily at the centre of the discussion. Instead, Ready-Made-AI had in those cases been used to discuss both parties' future aspirations for the technology as much as its current limits. Martinsen perceived a shared understanding of AI to be dependent on shared aspirations for AI technology, rather than a shared conceptual understanding of AI, which we initially thought was the case.

Ready-Made-AI was also to varying degrees used as a means to discuss the strategic elements of AI. In the case of Frontliners, it was at the centre of the discussion to discern the strategic vision of the company, whereas in the case of IDA it was not addressed despite that IDA ascribed strategic value to AI. Neither with Bestseller was strategy discussed despite that Bestseller's understanding of AI technology became strategic. As mentioned, Bluefragments does not see themselves as strategic consultants, but their use of Ready-Made-AI would seem to suggest that a strategic focus could be possible in most cases.

What was consistent throughout all three cases, was that Ready-Made-AI was never used to have a conceptual discussion about the nature of AI technology. The lack of conceptual discussion is evident as there was no universal agreement between Bluefragments and any of the three clients on the definition of AI. What should be noted, is that such a conceptual discussion has not been needed to achieve a successful collaboration, in any of the cases. The success of the project was measured based on the practicality of the solution, not on the consistency of the two parties' definitions of AI.

Ready-Made-AI was in all three cases only an explicit concept to a limited degree. Martinsen insisted that he had mentioned the concept for all three clients, but none of the clients were immediately clear on what the concept was about. Therefore, we have concluded that Ready-Made-AI has functioned as a way to structure a conversation about AI, but with a focus on very different aspects. When Martinsen had a shared perspective with his clients, it was not with regards to a shared definition of AI, but rather in regards to the technical requirements of AI within the client organisation.

Ready-Made-AI is then overall about establishing a shared terminology, which might, to a certain degree, be idiosyncratic. Therefore, a universal definition of AI might actually be counter-productive to the specific project, as the clients' use of the technology might not be coherent with such a definition. The many varieties that Ready-Made-AI has been used for clearly shows that Bluefragments have adjusted the concept to be fitted to the specific organisations instead of fitting the organisation to the concept. Bluefragments' method indicate that there are not a right or wrong

footing on AI, it is about establishing a common technological frame based on discussions between Bluefragments and the client organisation.

# 6. Discussion

## 6.1. Theoretical Implications

The findings from Bluefragments and the three clients was based on a theoretical framework of technological frames to be able to also capture the materialistic perspectives of humans and technology. In order to capture specifically AI technology we need to adjust the theory in terms, as we believe that AI distinguishes itself from other technologies. With this adjustment and our specific use on an organisational level instead of an individual level, we have brought new perspectives on the general research on technological frames.

The theoretical implications we will focus on, is how we have fitted technological framing to cover an organisational level and not merely an individual level. Next, we discuss framing in relation to a result-based outcome, which is usually not within the scope of framing. In addition to this, we discuss a cross-organisational cognitive exchange between Bluefragments, as a consultancy, and their clients. Lastly, we discuss how our addition of socio-materialism to technological framework has allowed us to analyse how organisations perceive the interaction with AI.

We chose to use technological framing as our theoretical framework because it enabled us to discern the different organisational perceptions as technological framing focus on inter-subjectivity along with the interaction between man and machine. The theory allowed us to make our own adjustments to better fit the specific technology of AI and the organisational perceptions of AI across a consultancy and their clients.

As described in section 2.3, framing is focused on individual cognitive structures and an organisational frame is understood to be a constellation of different individual frames. What we have contributed is a more broad understanding of the organisational limits of a frame. According to Cornelissen and Werner (2014) macro level frames deal with cognitive structures as something, which develops partly due to what can be considered external stimuli. Whereas as meso level frames are understood as internal phenomena which occur in a closed organisational environment. We had to move that assumption to do a comparative analysis of a consultancy and their clients. Specifically, we have had to move away from Orlikowski and Gash's assumption that organisational framing is something, which occurs in a single closed corporate system. We have considered the consultancy to be an outside force whose knowledge contributes to a restructuring of the internal organisational environment of the client. What that means for technological frame research, is that you will have to understand the modern organisation as part of a larger external whole. Meaning, that the modern organisation has to be increasingly open to the business trends around it, to stay competitive in an increasingly interconnected world. This swift is needed in order to adequately analyse how

companies today seek help from outside forces - e.g. a consultancy which solves clients' internal problems. In short, the limits of organisational framing will have to be moved to make technological frames relevant in the modern day.

Another contribution of this opening, is the fact that we have been able to analyse frames in terms of successful and unsuccessful results. That has not been the aim of existing framing theory to determine whether a frame was successful or unsuccessful since framing occurs in a closed organisational environment no matter the conditions. Nonetheless, for our purpose, the frame is dependent on a collaboration between a consultant and a client - the prerequisite for that collaboration is the establishment of a successful frame. In many ways, the framing process and outcome becomes much more tangible. The two parties are often very conscious of how they are interacting with someone that does not necessarily share the same cognitive constructs as they do. All in all, we have been able to discern clear criteria for a successful frame, we will outline these criteria below.

In short, the success of the frame can be measured relative to the clients' satisfaction with the collaboration. What makes the client satisfied with the collaboration is the consultancy's ability to find solutions to the client's internal problems. The client may have the material capabilities to solve their problem, but not the know-how to solve it on their own. The whole idea of Ready-Made-AI is to provide solutions using services, which are already available. The client's contract with Bluefragments does not give them unique access to Microsoft Azure, however, it gives them the know-how to use it. Therefore, successful framing can also be understood as a cross-organisational exchange knowledge between client and consultant. Neither Cornelissen and Werner or Orlikowski and Gash, have had a transactional focus in mind when they made their frameworks, but by addressing the success of a technological frame relative to the clients' satisfaction with the knowledge exchange, we believe the application of framing can become more relevant in a business context.

Orlikowski and Gash's (1994) third category has a focus on the use of technology. We shifted the focus from use to an adjusted focus on social interaction with the technology through the addition of a socio-materialistic category. Our addition of socio-materiality to the technological framing theory has enabled us to analyse how organisations perceive the interaction with AI. Orlikowski and Gash's assumption is that technology essentially consistent of passive entities - e.g. a computer screen and keyboard. What makes AI inherently different, is its autonomy and ability to interact with its environment. By adding a socio-materialistic category we have been able to analyse the interplay between man and machine - not in terms of technological use, but rather as a

social interaction with a technology that is increasingly active, which none of the technological frames include as of yet.

## 6.2 Practical Implications

The findings presented quite some results, which we initially thought would have been of importance for the collaboration between Bluefragments and their clients, but showed to not be of great importance - namely the establishment of a definition of AI. The findings also gave us insight to some aspects, which we believe can be optimised to create an even better collaboration between Bluefragments and their clients.

First, we will discuss recommendations for Bluefragments in terms of having more focus on the conceptual discussion of AI. Secondly, we will discuss recommendations for Bluefragments in terms of focusing more on the strategic aspect for clients to adopt AI solutions.

Throughout our analysis, we found that Bluefragments had not explicitly discussed the conceptual aspects of AI with their clients. That meant there was no universal definition of AI between Bluefragments and any of their clients. Nonetheless, all collaborations had been successful, but that is not to say that the parties could not have benefitted from a conceptual discussion. We believe that a more explicit conceptual discussion of AI is one of the main areas that Bluefragments could improve their existing Ready-Made-AI framework.

If you take Fogel as an example, he believes that if AI is not already semi-sentient then it will soon be. Despite that Martinsen felt that he and Fogel shared the same perspective, it was mainly due to their shared vision for the future prospects for AI technology. They hardly saw any aspect of contemporary AI the same way. Therefore, we believe Fogel could have benefitted from an explanation about the current technological limits of AI. Meaning, that Martinsen might not achieve a complete agreement with his clients about what AI is, but at the very least they will narrow down the agreement on what it is not. Agreeing on what not to agree on, could further help both parties to avoid potential misunderstanding regarding what is possible within the current technological limits of AI. We do not believe that a conceptual discussion would have an effect on the already established and successful collaboration. However, it may help to reign in the client's technical expectation regarding future collaborations with Bluefragments. Part of establishing a shared technological frame of reference is dependent on your understanding of nature of technology, and if those understandings do not align, we expect that they will collide at some point.

Another area where we believe Bluefragments could - and probably in near future have to focus more on - is the strategic elements associated with the corporate implementation of AI

technology. As previously mentioned, we understand why Bluefragments are unwilling to focus on strategic advice associated with organisational change, as that would put them in competition with large consulting houses. Nonetheless, when IDA and Bestseller themselves regard it as a competitive advantage to adopt AI, we believe it to be reasonable that Bluefragments should be giving the clients strategic advice about how AI solutions can optimise processes that could give them a competitive advantage. Especially, when the popularity of AI is only increasing and more companies will adopt the technology. Therefore, having the best and most cutting-edge AI system might be crucial to stay competitive. When long-term survival becomes dependent on AI, its value should be considered in strategic terms. As with Frontliners, they are building the value of their business on AI and regard it to be a competitive advantage. Therefore, it has been critical that Bluefragments and Frontliners had a shared technological frame about the strategic decision of incorporating AI.

## 6.3 Future Research

The thesis was limited to analysing the organisational perspective on AI before its implementation, as all of the organisations were still in the process of feeding the developed AI solution with data. Therefore, the perceptions on AI was in relation to the development process and how the organisations had planned for the AI to fit in. The perceptions on how AI could be further implemented in the respective organisations were also based on the perceptions related to the development phase.

It could be interesting to further analyse how the perceptions have changed - or not changed - when the AI solution have been implemented into the respective organisations. The implementation of the AI might have an unexpected or different effect on the organisation, which were unknown at the development phase. On the other hand, the implementation might not have the slightest effect and everything will be as was expected. Furthermore, it could affect the three companies differently and there could be a comparison among the companies on the perception, both in the development stage and the implementation phase along with why the implementation have affected them differently. The development phase can be quite intangible because there is not an exact solution, which can be experienced - it is more an idea about what it will be like. When the phase of implementation starts, it becomes a tangible project, which can more easily be experienced. By extension, the organisation could potentially perceive AI differently because of the tangibility of the AI solution.

It would also be interesting to examine the use of AI in the respective organisations. As mentioned in 1.3 Delimitation, perception has an influence on the implementation, which then influences the use of a technology. The initial intention with the AI solution can be affected by how

the employees of the organisation use the technology when it has been implemented. Even so, the research would have to focus on the individual level of perception instead of the organisational despite that the organisational structure would be of importance as well. In extension, it could be argued that the technical capabilities of the AI would also have an effect on the use of the technology - this begs the question: what is more important, the technology, the individual perception or the organisation?

The analysis must then acknowledge that use is an emergent phenomenon that emanates from an interplay between an individual's perception, the organisational structure and the technical capabilities of the technology itself. This interplay is more or less confirmed by Karl E. Weick who highlights the combined nature of technology as being between both intellectual knowledge and the material properties. The use of the AI solution could then be analysed in relation to the respective organisations and the differences - or non-differences - could be compared to one another. A way to do this, could be to analyse the vacillating strategies within an organisation as in Stein et al. (2015)

A third point that would be interesting to further examine is the actual use of the concept of Ready-Made-AI. As the analysis has shown, the use of the concept have had quite an influence on Bluefragments and the collaboration with their clients. What we have been able to analyse is Bluefragments' perspective on the use of Ready-Made-AI and the respective clients' perspective on Ready-Made-AI and we have therefore not be able to analyse what actually have been said and done at the meetings. A further research could focus more in details about the concept and how it benefits the working process and the result of the collaboration. An examination of this focus would require access to the meetings for the different clients' of Bluefragments and observe how Bluefragments present the concept and how it affects the rest of the conversation about AI and how it affects the process between them.

Such research would allow to analyse if the concept actually have the desired effect that Bluefragments wish and how it could be adjusted to better accommodate a successful collaboration between Bluefragments and their clients.

## 6.4 Limitations

### 6.4.1 Theoretical Limitations

Framing is a broad concept, which needs precise definition before being used. As evident in Cornelissen and Werner's work, the concept of framing has been understood in many ways and subsequently applied to very different purposes. Cornelissen and Werner (2014) conclude, based on the criticism of Entman (1993), that this widespread application of the concept has led to what is described as a 'fractured paradigm'. They do, however, conclude that the paradigm remains

relevant, but the ample definition is needed before the concept is applied. Therefore, we have tried to be exact in the way we applied and chose our framing method for this project. Nonetheless, we recognise that there were different theoretical options available to us.

We could significantly have altered the focus of this project had we chosen a different level frame. In our opinion, there were two other broad options available to us - we could either have chosen a micro frame or we could have chosen another meso level frame. It would not have made sense for us to use a macro frame, as we have found no way to relate it to Bluefragments. Nonetheless, had we have chosen a micro level frame, we could have focused more narrowly on how the single employee makes sense of his or her surroundings. Cornelissen and Werner (2014) divide micro frames into either an analysis of the frame of reference - meaning the cognitive structure itself - or an analysis of the frame's effects. We would then have focused on an analysis of the frame itself, but the effect would be outside our problem area. Furthermore, we could have used March and Simon (1958) or Starbuck (1983) as both analyses organisational culture and how an individual person frames the organisational culture. We would then have to analyse the individual culture in much greater detail and the project would have focused much more on the flavours of the individual clients' culture rather than their understanding and aspirations for the use of AI - in other words, we would have lacked a focus on technology.

A more viable option would have been another meso level frame. According to Cornelissen and Werner (2014), technological frames are meso level frames and we could have applied yet another technological frame, as outlined by Davidson (2006). We chose to use Orlikowski and Gash (1994) as their focus allows for a broad analysis of perception. However, we could have gone the opposite direction and chosen a technological frame, which was more specific. As per Davidson's categories (2006) it would have been most reasonable for us to focus on the frames related to information technology's (IT) features or attributes, and also IT's incorporation into work practices. Had we used Livari & Abrahamsson (2002,) we could have made an analysis, which touched upon both of Davison's categories.

Livari and Abrahamsson's theory analyses the usability of a technology in the organisation. They use both aspects of user-centred design and organisational culture theories in how the technology is being perceived by the different sub-cultures in the organisation. Had we used this method, we would have needed wider access to the client organisations as we would need more than one perspective from said organisation. We could have chosen a specific focus on a single client company to contrast the different sub-cultures within that organisation with that of Bluefragments. We would have gained more complex understanding of how AI could potentially be perceived differently within the same organisation and whether how AI was designed was also how it was

actually being used in the client organisation. However, we would not have been able to analyse how Ready-Made-AI had been used differently with other client companies.

None of the clients we have interviewed had fully implemented the AI yet. Had we found such a company, a third theoretical option would have been available to us. We could have moved away from framing theory and focused on use instead. We could have analysed how the AI had been interpreted after its implementation and how the members of the client organisation had coped with this. For instance, Stein et al. (2015) could be used to analyse the organisational members' vacillating strategies. Nonetheless, it is uncertain how we would have contrasted the vacillating strategies of the client organisations' members with that of Bluefragments.

In principle, we could also have chosen another interpretation of AI other than socio-materiality as Leonardi and Barley (2010) presents four different approaches. In our project, it would not have made sense to use a determined approach, as we wanted to analyse how the technology has been interpreted in the various client organisations. A determined approach would have led to an unhelpful discussion about whether Bluefragments or their client's interpretation of the AI was ultimately the correct one. We wanted to analyse the differences between the interpretations, not determine the best or most correct use of the AI. Therefore, the only option left open to us, would be social-constructivism, which works perfectly well to explain how people make sense of technology. Additionally, it explains, to some extent, how people interact with each other around or through a technology. However, social-constructivism does not quite explain how a man and a machine interacts with each other, as it is not a social interaction as such.

### 6.4.2 Practical Limitations

Since it is Bluefragments' clients that we are analysing, it makes sense that Bluefragments have been the mediator between us and the respective clients. Bluefragments have put us in contact with the organisations who were interested in participating in the project. The immediate implication with this set-up, is the fact that Bluefragments have had the opportunity to choose the clients which were already positive about Bluefragments and who believed that the collaboration had been successful. All the clients we have interviewed believed the collaboration with Bluefragments had been a success, as did Martinsen. Our result might therefore be skewed towards an overly positive perception of Bluefragments and the project. The presumption of our research question is that the frame has been successfully established, but had we specifically pursued client negative perception, if such clients exist, we might have been able to analyse the frame construction process in greater detail.

As an example, in all three cases, Ready-Made-AI has been a successful concept, despite it not being clear to the client organisations. However, there could have been clients where Ready-Made-AI had been unclear and therefore resulted in an unsuccessful collaboration between Bluefragments and that client organisation.

We have chosen focused on three clients in our project as we are convinced that the perspectives of three client organisations is a minimum requirement for our comparative analysis. We are of the opinion that more client organisations would have given a more varied analysis and result. However, we believe that we have a gained a critical mass of information in the interviews conducted for the analysis, which has given us a rare and specific insight into the collaboration between Bluefragments and their clients.

We might also have been able to improve the result of the analysis, if we have had wider access to the client organisations. We only had access to a single person in each client organisation. Two or more interviews from members of the clients could have provided us with a more complex picture of each organisation. Nonetheless, there would have been the added risk that the increased complexity could potentially have led to a loss of direction for each organisational frame. In fact, we might have had too much data to gain a clear picture of the client organisation's frame.

# 7. Conclusion

This qualitative study has analysed how and why Bluefragments have succeeded in establishing a shared technological frame of reference, in terms of their own and their clients' perception of AI. We used the theoretical framework of the three domains of technology - nature of technology, technology strategy from Orlikowski & Gash (1994), and AI in action to analyse different aspects of their sense making regarding AI, to gather a holistic understanding of the organisations perceptions of AI.

First, we analysed Bluefragments' understanding of AI within the three domains to gain knowledge of their specific perception and how they believe their clients make sense of AI. We found that Bluefragments recognise AI as an enabling power, rather than a limiting force for companies. Additionally, they do not believe that their clients adopt AI because of strategic decisions but rather as a strategic tool. This perspective allows Bluefragments to focus merely on the technical aspects of AI and not the managerial consulting aspect. Bluefragments do not understand AI to be able to act independently from humans, nevertheless, Bluefragments perceive AI to be socio-materialistic because of humans increasing dependency on AI and vice versa.

Second, we analysed the three organisations separate from each other, within the three domains. We found that Bach Keldsen, and by extension IDA, recognises AI as pragmatic because it is used to optimise processes - and is thereby a strategic decision. Bach Keldsen believes that AI will always be affected by the humans who built it and she therefore does not see AI as having agency, however, she believes that AI is affected by humans and vice versa and is therefore socio-materialistic oriented. Frontliners, and in that regard Fogel, recognises AI to be able to think logically and its abilities are more or less limitless, but he is still unclear in his descriptions of his perception. However, we have defined him to be socio-materialistic because the AI solution is being used to measure humans, thereby both humans and AI are dependent on each other. Frontliners' decision to incorporate AI was a highly strategic decision, as the core value of the company is the AI platform. Hjørnholm, and by extension Bestseller, recognises AI to be nothing more than a technology like any other. Because AI is based on mathematical calculations and that it would not be able to comprehend the complexity of how humans think or behave. It was not a strategic decision to adopt AI at first, but later in the process, when they knew more details about the technicalities of AI, it became a strategic decision. Hjørnholm does not see AI as socio-materialistic because he does not think that AI can influence humans - AI is only capable of executing its tasks because it has been programmed to do so.

Third, we compared Bluefragments to each of the three clients to see where they were aligned and where they differed in their understanding of AI. Generally, we found that

Bluefragments were quite different compared to their clients and only a few aspects of their respective perceptions were aligned. For instance, there was no unanimous agreement on a definition of AI between Bluefragments and their respective clients. These findings were vital for the analysis of how and why Bluefragments have used Ready-Made-AI as the technological frame of reference.

Lastly, we analysed how Ready-Made-AI had been the determinant factor for successful collaborations despite different perceptions of AI. Ready-Made-AI has embraced the differences of their definitions and been used to create common ground between Bluefragments and their respective clients. Ready-Made-AI has not been explicitly used as the clients were not quite sure what it was, when asked. However, the awareness of Ready-Made-AI was less important as Bluefragments used the concept to discuss, with their clients, how AI could be used in the specific projects for the specific company. The actual discussion that came from using Ready-Made-AI was the reason behind the successful collaborations. Ready-Made-AI has clearly showed that a conceptual definition of AI has not been needed, as Ready-Made-AI relies on a discussion of how AI is perceived by the individual clients and how they want AI to be incorporated into the organisation.

The reason why Bluefragments have succeeded in establishing a shared technological frame of reference is because they have focused on the establishment of a shared terminology, which focuses on work coordination rather than an explicit conceptualisation of a definition of AI. This lack of definition has led us to conclude that a discussion regarding an explicit definition has not been needed since all three clients believe they have had a successful collaboration.

We initially thought that a successful collaboration was dependent on conceptual congruence, but that has proven to not be the case. There was no need for an explicit definition of AI as Ready-Made-AI has been used as a way to facilitate a discussion about what practical needs an AI should be able to fulfil in a specific company - for a specific purpose. Meaning, that what has been framed should be understood as a work coordinating terminology and not as a conceptualisation of AI. This focus on the establishment on a terminology, which facilitates a practical collaboration, should not be misunderstood as a way for Bluefragments to avoid talking about the conceptual aspects of AI. Although the conceptual aspects have not been explicitly discussed, they have been implicitly incorporated into Bluefragments' approach to a specific client, as seen with the idiosyncratic definition of a bot in a specific organisational context.

Bluefragments listen intently to their clients to decipher what their clients desire from the AI and how they imagine it working in order to provide a solution, which lives up to that expectation. Meaning, that AI is a fluid concept, which can be moulded to fit the situation and the company. As

Martinsen say, “AI is actually nothing”, for him does not matter whether he agrees with his clients on a definition as long as the terminology that has been established allows them to work together.

Bluefragments have thereby been able to succeed in establishing a shared technological frame of reference between themselves and their clients by using Ready-Made-AI to discuss the opportunities and technicalities for the specific projects for the respective clients.

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# Appendix 1

## Daniel Hardt, Associate Professor, Department of Digitalization, CBS

Note: During the writing process, Daniel Hardt has changed to the Department of Management, Society and Communication.

'Caroline' and 'Philip' are the interviewer and 'Dan' is the interviewee.

Caroline: When there's talk about machine learning they say they talk about data sets, and when it's about deep learning to talk about data resources and then we talk about neural networks they talk about input data, do you know if it's the same things or (.)?

Dan: Yes (.) it is all the same, I mean machine learning is the overall area and so neural networks and deep learning are just forms of machine learning. Right.

And so the big distinction in machine learning is supervised vs unsupervised, where supervised machine learning is sort of the typical case where you have data where the target that you want to learn is labelled in the data - so that supervised machine learning. Whether it is a neutral network or some other type of machine learning.

And there's unsupervised machine learning where you have a whole bunch of data, but there's no labelled answer, but then somehow the learning, the learning algorithm is supposed to try to find patterns, maybe by clustering things that seem similar, but in all the cases of machine learning be that a neural network, or it could be a decision tree or a linear model you have a dataset that you learn from

Caroline: So data sets, data resources and data inputs are really the same?

Dan: Yes.

Caroline: And also could we read somewhere there's like the other types of machine learning, there is as you said supervised and unsupervised learning, and then we also found out that there is also something called reinforcement learning, would you also call that a part of machine learning or is it that some something different?

Dan: That is also a part of machine learning.

Caroline: Is that also something being used?

Dan: Yeah, there has been a lot of interest in that lately.

Caroline: How is that ((reinforcement learning)) different from other types of learning? I think I've read it and then I forgot what it was about.

Dan: I know that it is used for some of these game in Google how these famous results recently learning to play these games like AlphaGO or whatever, and I'm pretty sure they used reinforcement learning for those.

So is that (.) I would say that is supervised. So (.) I haven't worked with reinforcement learning myself but it's not a new method, it has been around for a while. But I can't give you a quick explanation of the top of my head.

Caroline: Okay so we have AI - and under AI we have machine learning and we have deep learning. But where we get confused is as that we don't really know what neural networks is.
Is that under machine learning/deep learning or is deep learning based on neural networks?

Dan: Yes, so deep learning (.) neural networks are kind of machine learning and deep learning is a way of using neural networks. And it's really just kind of an arbitrary distinction.

But in neural networks, they have a bunch of nodes which are called neurons because there is an analogy with the brain. And you can organise these into layers, you have to have an input or an output layer of these. But then you can also have additional layers, and those are called hidden layers. If you have a couple of hidden layers and they call it deep learning.

I think, if you just have one hidden layer they don't call that deep learning.

Philip: My biggest question is, those layers are they pre-programmed or is that the machine learning - that it learns what layers to put on?

Dan: Yeah, so each neuron is a kind of very simple device - it is also called a perceptron - so each individual neuron is a simple learning device but they're connected to each other. And the connections have weights on them.

There is an idea that the brain is also wired that way as well. We have a whole bunch of neurons, and they are all or many of them are linked up to each other. And so when one neuron fires the other neurons will notice it.

And that is how concepts seem to spread throughout our brain. So those connections, you pre (.) you build a network you decide 'ok I'm gonna have this many layers and will be connected in these ways that pre-programmed', you could say. But then for each connection some of the connections (.) so each connection will get a weight - like how important is it for this neuron what that neuron is firing and those weights are what are learnt. That's the learning process.

Sometimes you might just make a weight zero. Which means this neuron doesn't care what this neuron says - at all, it's only what this other neurone says. And then this neuron only cares about these guys, and this neuron really cares about this one and not about this one.

And so the input could all the all different pixels in an image, and certain neurons will learn as the weights are adjusted, certain neurons will learn that 'ok I'm just watching from the left corner of that image'. Because maybe the task is to learn to recognise the letter, or something. And so the neuron will learn 'I'm just going to focus on the left corner and if there's a bunch of white there then I will then I'm happy' Because a K needs a bunch of white in that corner. But it is still those weights that get adjusted and that changes that.

And what's cool about that is in these hidden neurons (.) Can somehow adjust the weight so they become (.) abstract attributes of the input. Right!

So they would learn (.) so group of hidden neurons (.) One neuron might be the one that looks for the vertical bar that you need for an H - if you're doing letter recognition. But you don't pre-programme that, it is just that (.) as you do the learning many times, those weights will get adjusted so that different neurons in the network, the hidden neurons, might learn to recognise abstract features of the input, in a way that nobody had intended. We don't really know what they need (.)

So you could pre-programme - if you want to recognise letters - that you need some specialist that look for vertical bars, some that look for horizontal bar, some that look for diagonals, and some that just focus on the background or whatever (.) you could pre-programmed that. But]

Caroline: ]Is that what is meant by layers? One that focuses on this aspect, and this ((etc.))?

Dan: Yeah, or even one node in a layer, or a hidden layer, might focus on one thing or a group of nodes might focus. And that is kind of self-organising. So, you run it so many times it will try all sorts of different combinations and it might turn out to be very useful to have a certain combination and that's um]

Philip: ]So is the algorithm ever really defined?

Dan: So it is just a very basic learning algorithm, of just saying let's try different weights and let's see how well we do with the task. And at first it is just randomly guessing. Right?

But then it changes weights - and AHA! - like now I ((the neuron)) was correct on this one but I'm still wrong on these. But then I change the weights again, AHA! now that is even worse, so I will change the weights again. Now I'm guessing these two correctly. And still these eight I'm getting wrong. And then I change the weights again. So it is completely like random, but it can try it many times. And the (.).and maybe that sort of the way the brain learns because when the baby is looking around it doesn't know what a rattle is and what food is and what the mum is so just tries different things.

Caroline: For example, as supervised and unsupervised and reinforcement learning is part of its a type of machine learning would you say that neural network is a type of deep learning, does that work the same way?

Dan: No, deep learning is a specific (.) it describes neural networks with hidden layers, so you could have neural networks without hidden layers and they wouldn't call that deep learning.

Caroline: What do they call it then?

Dan: They just call it neural networks.

Caroline: So deep learning]

Dan: ]Deep learning is just a neural network with at least, I think it is at least 2 hidden layers.

Caroline: And so this ((pointing to drawing)) is neural networks?

Dan: Yes.

Caroline: Ok, so a neural network is not necessarily connected to deep learning?

Dan: Not necessarily, you could have a very simple neural network and then we don't call it deep learning.

Caroline: So you can say neural network without saying deep learning, but you cannot say deep learning without saying neural networks?

Dan: Right.

Caroline: Do you have a question for deep learning ((Philip))?

Philip: How do you (.) do people even know what they doing then, I mean it seems very random in many ways, it seems like you have an enormous processor and then you pretty much just see what happens, is that correct ?

Dan: Yes.

Caroline: Does deep learning need more data than machine learning to function? Because it seems like]

Dan: ]Remember deep learning is machine learning.

Caroline: But compared to the different types?

Dan: Well (.) it's hard to say in general.

Caroline: Ok, because it seems like machine learning, you give sort of like an algorithm, and then it learns, like predicts, and from what it predicts what it learns. And if you give it more data it learns (.) but it seems like with deep learning or neural networks that you kind of need to give it a lot of input for in order for it to learn better because it will try out something it might not work, and then it will try out something new. But if it had more input would be more correct?

Dan: In general, for machine learning you need lots of data. In general, the more data is better. And, that is why AI is having so much success in recent times because it's been more focus on machine learning and there's been just so much more data available as a lot of these methods are now getting good results (.) with deep learning or some other method]

Philip: ]In fact (.) because the thing is a lot of people use the word data, I don't think there is a lot of agreement on what it is. But is there something that isn't data then?

Dan: I don't know (.)

Philip: Because the thing is, a dataset would be that you numerically value something, you've measured something. Like that would be a dataset, but is there something then isn't a data
set that you can't (.) how do I put that (.) No I will come back to it (.)

Caroline: Is there types of data, that isn't usable for machine learning?

Dan: Well it depends, I mean sure, it depends on the (.) it depends on the problem you're trying to solve, it wasn't trying to learn. And I mean I guess the data has to have to be patterns in the data that can be found. But who is to say what that is.

Caroline: I just have one more question about deep learning. For me it seems like that machine learning is for predicting. And deep learning, I think I'm still figuring out what you said before. Do you only use deep learning for image, face and voice recognition? Or do you use it for other things as well?

Dan: But those ((three examples)) are also kind of predictions, right?

Caroline: Yeah, and that's why I get confused because (.) we write that machine learning and deep learning they look for patterns and they both predict. So I'm like, what is the difference between them really?

Dan: Yeah, there isn't a difference it's just, machine learning is the whole field and neural networks is just one method and it's a method which has been around for a long time. It's not new, you know. It's been (.) People have been using neural networks a lot since the 80's, they've just got a lot of interest (.) there have been good results with them lately. So all machine learning is doing the same thing. It's just taking some data trying to find some useful patterns, right. You can call that prediction.

You take an image to predict, is that a cat or is that a dog or is that image recognition, right. You can call that prediction (.) or you can look at (.) at a customer database and try to predict is this customer gonna turn or not, And those are machine learning problems, just looking at the data and finding patterns that are useful, and making decisions or predictions, or whatever you wanna call it.

Philip: So, maybe we're thinking too much in terms of business. Because the reason why we're thinking in terms of prediction, is that is because that is valuable. That is when it becomes valuable when you can predict something?

Dan: Right.

Caroline: So you're saying you can't really distinguish between machine learning and deep learning, because deep learning is machine learning

Dan: Yes.

Caroline: Is deep learning a part of one of the types of machine learning, either supervised, unsupervised or reinforcement?

Dan: Deep learning is just a way of building a model so just like support vector machines or logistic regression or (.) a decision tree these are all ways of just building a model (.) That you can learn from data, with (.) in supervised machine learning there is no particular difference about neural networks. They just have some nice properties, they are more flexible and they can learn things (.) they can find patterns that the other methods are not able to find it seems. That's for technical reason. It is not always the case but they found that to be the case lately.

Caroline: But those that mean that neural networks is also part of machine learning?

Dan: Totally, yeah! It is just another way of doing that.

Philip: It is extremely hard to understand when you're not (.) it is like having to describe the difference between a hammer and a screwdriver, but you don't know what a workshop is. How do you do that?

Dan: It is very simple, really. Machine learning is just finding these patterns, and then there are a bunch of ways we can search. All of these methods are kind of search algorithms to search for patterns, and the problem is you could just do a brute force search every single combination until you get the (right) way. If you had a million images and you wanted to figure out which ones are the letter is in which ones are not you could just look for all the combination of pixels but there are too many combinations to do a brute force search.

There are more combinations than there are atoms in the universe, so you have to do some sort of guess work, and some kind of directed search. And all these methods are ways of trying to efficiently guess where the instant parents are. And there's some good ((methods)) in neural networks that are pretty good at that that kind of stuff, in some ways they seem to be better at getting to the right patterns, quicker than some of the other methods. But it's just the technical differences, because they are all doing the same thing.

Caroline: So would that also mean that deep learning would be supervised learning because you looking for something specific, or you wanna find a cat in a picture?

Dan: Yeah I mean, you can do supervised or unsupervised learning with neural networks]

Caroline: ]How would you do unsupervised? Because how (.) how would it ((the AI)) know what it's looking for, if it doesn't have a result or a target?

Dan: Right (.) Yeah I mean (.) Unsupervised, it's true (.) I mean the unsupervised, I'm not sure (.)

Caroline: If you have the picture recognition, and it says that of all these pictures which one is a cat, and it will be like 'oh well and has ears and a nose' it must (.) it must be a cat! But if say to it, you have all these pictures what do you get out of it. Then, can it ((the AI)) even find something? Because, if it ((the AI)) doesn't have like a target, 'you have to find something specific'. Of all these pictures you have to find a pattern. Like, how would it find a pattern, if it doesn't know what it is looking for?

Philip: Well, I mean it ((the AI)) can recognise a pattern, right? So it could make a name, but it might not be 'cat'.

Dan: I'm a little uncertain about the unsupervised (.) there are (.) it's a good question.

Philip: The way I imagine it, is that you have your data of course, and then you have your algorithm find patterns, that you gave it, and then finds patterns and then it might find cats. It doesn't describe it as cats but you can always rename the category.

You might get a million different outputs, but one of them might be a cat, but of course you can't use to (.) Actually if we can show you, that have a (.) we have made a model in order to, try to, make sense of what (.) how does it work right we had the data and then the way you train the algorithm (.) I guess that is very much our business understanding. That either it ((the algorithm)) is predict or it's non-predictive (.) so it's whether the output is completely known or whether it's, we call that, a fragmented output. The accuracy is often better but you don't exactly know what you're going to get it out (.) and then you have in the end you just have pattern recognition, but I can't say that is accurate because you never said what it was supposed to find, it just finds stuff.

But is that completely out of]

Dan: ]No, that all makes sense. I wouldn't - so we haven't talked about semi-supervised. And you're absolutely right that's exactly what it is. You have some label in some unlabelled data, and of course the idea is that, you would like to have all labelled data. That's what you would like, but it's very expensive to label data.

Philip: Yeah, because you manually need someone to label it]

Dan: ]A lot of times you can find data, that you can somehow you can consider it is labelled, and that is exactly what this gaming stuff is in a way, that you can think of the game as labelling your moves, in a way - like you do a sequence of moves and then either win or lose, right.

And that's why these systems can.. and, that's how the reinforcement learning works - but it's way of labelling (.) you do a bunch of moves and then you lose, and then you do a another bunch of moves and then you lose.

And then, after a thousand times you suddenly win. I mean (.) If you start a game like that, you will always lose if you did random stuff. But every once in a while you happen to win.

And the thing is the computer has the patience to play millions of times, and so that is what Google has been doing, just put the system in any kind of game you can is very difficult games and they become experts, in ways that the programmers could not be able to (.) they ((the AIs)) would totally be able to beat the programmers.

Right, because (.) But semi-supervised learning is a little more complex, because we somehow try to get a bunch of unlabelled data that we can somehow I use to help us to learn this stuff. And it's a little tricky to say how that unlabelled data is going to help you]

Philip: ]The way I understand it, and that is really a guess more than anything, is that the processing power is now so good that it doesn't even matter whether it is labelled or not, you can simply - it is so cheap to process that you can, just to go through it]

Dan: ]No, but you need the labels to tell you what the right answer is.

And the unlabelled data is never going to be as helpful as the labelled data. But the thing is, you might have huge amounts of it, and some (.) somehow (.) there are different (.) you have to be clever to find ways that the unlabelled data can give you some useful information.

Philip: Tell me about it, I don't even understand it.

Dan: But I mean, the way you have it laid out is fine]

Philip: ]That is correct ?

Dan: Yeah.

Caroline: So, In order for that model to work would we have to apply reinforcement learning, in that as well?

Dan: That would be one way to do it, yeah.

Caroline: Or is reinforcement something a bit different from supervised and unsupervised?

Dan: No, I would say that ((reinforcement learning)) is supervised.

Caroline: Ok, so reinforcements is sort of a supervised method?

Dan: I would say so (.) yeah, I'm not so good with reinforcement learning.

Caroline: McKinsey company wrote a definition, that it is like an algorithm learns to perform a task simply by trying to maximise rewards, it receives for its actions. For example, maximise points it receives for increasing returns of an investment portfolio.

Dan: I would say those rewards are a kind of labelling.

Philip: It seems like there is a lot of crossover between computer science and biology. As far as I understand reinforcement is also a theory from biology, where you reinforce behaviour with monkeys, right, you give them a candy every time they do something]

Caroline:]Is that the same with the dog when it pushes the bell it gets a cookie?

Dan: kind of. Yeah, that is definitely an analogy. I mean there are these theories about learning, that you know predate the computer, of course so there have been theories like that.

Caroline: I do have one ((question)) for machine learning, cause a lot of different places and also here from this McKinsey guy that talk about classification and regression analysis. But is know the book ((by Provost & Fawcett, 2013)) talks about (.) like the picture ((from the McKinsey report)) has a lot of different ones ((forms of analysis)), But when you talk about machine learning, is it only classification and regression analysis you use? Is those the only two]

Dan: ]There are other categories]

Caroline: ]Okay, but those are the two main ones?

Dan: I would say those are the two main ones.

Caroline: Okay, so (.) also in the book it describes, as the book you referred to, says that KKD and data mining is more or less the same thing (.) but at the same time it says, it is it similar to (.) machine learning? And it says here:

"The differences are machine learning focus on computer vision and robotics and issues concerned with agency and ignition, how will an intelligent agent use its own knowledge to reason and act in his environment, where its KDD your machine or machine (.) data mining is focused on application such as commercial application and business issues of data along with focus on the entire process of data analytics".

So I'm just thinking, if it's not entirely the same, but similar. Does that mean that data mining is a more simpler way to do it?

Dan: So you're trying to compare data mining and machine learning?

Caroline: Yes.

Dan Yeah I would say it is the same thing.

Caroline: That would also mean that data mining is also a part of AI?

Dan: Yeah, I mean, I guess you could (.) I mean machine learning as to involve building these kinds of models. So I guess (.) that is certainly a way, an important way of doing data mining. I guess, you could do data mining in other ways. Where you're not actually building a model]

Philip: ]The thing is, I'm still quite confused, what is data mining exactly? You mine data you have to figure out when it's relevant or is it?

Caroline: The way I have understood it, I don't know whether that is correct. It is like the way you interpret data. If you have a dataset and you can use machine learning or neural networks or whatever, or you can use data mining. I don't know whether that is correctly understood?

Dan: I mean, machine learning is fairly well defined when you take some data and use one of these methods, one of these specific methods to try to find a pattern and you build a model. And data mining is maybe a little more vague term, you know you're looking at the data and trying to get something valuable out of it. One of the main ways you could do that is with machine learning. But I guess, you could also just stare at the data for a while.

No I (.) That could be very valuable you could stare at the data, you can make some graphs, and you can use excel and do some queries.

Philip: That would be data mining then?

Dan: Yeah, I would call that data mining, it is not a technical term, it is just a sort of vague (.) as long as you're (.) just like a miner goes into the ground to find a diamond, right? It is kinda like you going in there trying to find some valuable stuff. But if it's big datasets you pretty much have to use machine learning, you don't have time look it all up]

Caroline: ]Okay so data mining (.) if like you use excel or whatever, you can use that for a smaller dataset?

Dan: Well, you can just (.) then you're sort of doing this more with your own intuition and manually, right? Maybe making some graphs or making some queries with SQL or something. You can call that data mining and you might find something very interesting, but if you want to automatically look for patterns using machine learning, and if you work with big data sets, that is basically what you have to do.

Caroline: And just to be sure, data science is just the overall broad term that would also cover deep learning and neural networks, and AI and all of this?

Dan: Yes.

Caroline: Ok this is completely ((different)). We more or less know the answer to this question, but we want it answered anyway, so we have a source for it. So, what is automation and is it a part of AI and why/why not?

Dan: Automation, I guess (.) well what do you think it is?

Caroline: Well I think it's more, at least with my knowledge so far - I know it is a (.) it's more standardised, so it's not learning (.) it has a process and it follows the process. But it doesn't continue learning from the process. And that's why ((I asked the question))]

Philip: ]The reason why we asked the question, is because (.) when you talk about robotics for instance, you're still talking about artificial intelligence, we're talking about machine learning, but also automation. And then robotics, it's automation rather than robotics and it's when you introduce the AI element, that's when it becomes

robotics rather than automation. But it is sort of, it's cross-field because of the things that you then use machine learning for is basically automation but really smart automation, that's why we ((asked the question)).

Caroline: I know a company for example, one of the really big telecom companies, where they said that a lot of the contracts, they have (.) they don't have people doing those contracts anymore, they use an automatic robot to do it. But as far as I understand then, the robots are given a specific task and execute that task, but they ((the robots)) can't really see above or around that task. So as where you have a robot, chatbot for example, in a customer it will learn like (.) a customer can ask this, but it might also ask this or this or this. And they will want this answer. Whereas I see automation as there not really, there is like ((starts drawing)).

This one point and that's where stays, whereas like machine learning might be like 'oh well that's also this option or this option, and from here there is like all these different options' I don't know whether that is ((correct))]

Philip: ]And it is able to process them, at once.

Caroline: So whereas automation the way I see it, it is only about this area ((pointing to drawing)).

Dan: I'm not so familiar with how the term automation is used in different contexts, but I guess I was just say, in general you can (.) I mean you can automate any kind of task (.) I mean any kind of task that you are doing manually, you can try and automate it, right? And then you would call that automation. And I guess you can automate that task by deciding ahead of time, 'Okay, the computer should do this, this, this and then if this happens you could sort of programme the task explicitly', right? Then there is no machine learning going, right?

Or you could use machine learning if you have a bunch of data, and I assume this happens a lot actually, that if you have a bunch of data about how people performing tasks then you could use machine learning to learn from that date about how to perform the task.

And (.) in either case it is automation, in one you can either use machine learning to figure out our automate it or you can explicitly programme in the steps.

Caroline: Okay, so you can actually use machine learning to do an automation and not necessarily make an algorithm.

Dan: Sure.

Caroline: Okay, that is interesting. You make a machine, make another machine.

Dan: And, I would think that would be the right way to do.

# Appendix 2

## Thomas Martinsen, CEO, Bluefragments

Note: This interview was the first of the two that we conducted.

'Caroline' and 'Philip' are the interviewers and 'Thomas' is the interviewee.

Caroline: So the first question is who are Bluefragments?

Thomas: So Bluefragments are a IT consultant company, working with a mobility, working with IT and artificial intelligence. We're located in Copenhagen, and we are about 15 guys ((people)), working in the different areas.

Caroline: What do you want to achieve with the company?

Thomas: Since we are a consultant company, what we do is building custom software for our customers. We don't own software, so achievements in the company's actually to grow the company and to build a good solution for our customers.

Caroline: Why do you think building good solutions for your customers is important?

Thomas: Well, since that is the Foundation of our company (.) this is one of the main goal for us. And it's something that we keep very much in mind. And that is actually why we at some point ((will)) look into a really discussing ((how to really discuss)) how should we approach a specific customer. Because not two customers are like and some customers, for them good software is one thing and for another customer it's another thing and another approach.

Caroline: So, how do you aligned that? Like when you have different assignments for different clients, do you have different procedures? Or do you have some methods for all of them?

Thomas: So, we have one approach that we use in most cases, and that is that, we initially have a workshop with customer typically one, two or three days, were we talk to the customer about what is it that they actually want to achieve with the things we're going to build for them. And we make sure that everybody in the group, in the customer ((client)) are well aware of what they're going to get.

Once we've done that we can actually estimate and give an offer to the customer.. And that will ensure that what we build is actually what everybody expects. Meaning that will have a good result for the customer. And that is an approach we use for most customers - for some customers we also, after the workshop, we build either a POC ((Percentage-of completion model?)) or pilot.

The POC is typically where we take a specific technical issue and make sure that we can actually do it. The pilot is a little bit longer period of time where we ((would)) try out the entire flow of the application or solution, and in the end we build the full solution.

Caro: In the market you are working in, do you experience competition?

Thomas: Yeah, so (.) since we are in 3 different areas mobility, IoT and AI. We have competitors in each of the categories. With that said, what we're trying to do, to make sure that we are unique is to keep a close focus on innovation, on the news technologies and make sure that, that is what we offer to the customers. The newest technologies! And we do that together with Microsoft. And we do all our solutions based on Microsoft technologies. So you can say that we have competitors in all of the areas - but we really try to differentiate using innovation.

Caroline: What do you mean by mobility? What is mobility for you?

Thomas: So, mobility is a term we use when building a client solutions on mobile devices.
In this case a mobile device could be a phone, could be a tablet, and could be actually ((could actually also be)) a laptop that you can carry around, that is actually also a mobile device. So the solution we build under that term is (are) business solutions. So that would be (.) that could be like an administrative app, registration app and stuff like that.

Caroline: The service you provide your clients, what is the purpose of that service?

Thomas: The purpose? (.) Yeah so many clients have developers on their own, and since what we do is look at innovation and the newest technologies, what we can do is we can take this knowledge, go to our clients and present the knowledge to the company and to the developers, meaning we can actually up-skill the IT level at the client ((company)).
So not only do we provide a software solution but we actually also upskill their ((the client's)) own developers.

Caroline: In the previous meeting we had we were talking about Ready-Made-AI, can you explain a little bit more in detail what that is?

Thomas: Yeah. So many companies would really like to get started with AI. AI is really a buzzword these days and (.) the company's know that AI is coming, they know it's actually here right now and they know that it's not going away.

So they want to get started with this, they want to try to achieve the benefits of AI. But not many companies actually know how to get started with AI, so what we have done is we've made a concept called Ready-Made-AI, where we spend some time with the customers - and actually an entire level of people at the customer's ((organisation)) - so that could be the IT department, the business department, any level in the customer ((company)).

((At the workshop we are)) Talking about what is AI actually, which terms are beneath AI, and how can they use it for something inside the company. Because it's very different from company to company, so we spent a lot of time talking to customer about that ((ambiguity)).

Once we've done that, we look at which components available in the market can they actually use. Meaning, that they can use ready-made components, Ready-Made-AI components for their problems, and by that using AI to solve it.

That means that it's a really cheap way to get started with using AI they get some insight into the organisation about how it works, if they need to change something in the organisation before really going into using AI and they get some insight, or some experience on using AI, in general.

Caroline: And you said you use some time with talking to clients or customers about what AI is for them. How long do you spend is it couple of hours, it is just a meeting, it is a day? Is it a workshop?

Thomas: So it is a workshop. And what we normally do is we take like half a day, talking about AI, in general. In society, in companies, in general. And then we spend between half a day and two days, discussing different possibilities in the company. Some ((customers)) have a lot of ideas about what they can use AI for. And others have specific problems they want to solve, using AI.

Caroline: You also said you would use tools in the market, do you mean you use tools from Microsoft, tools that are already in the market. What do you mean by market?

Thomas: Yeah so, we use components that are available from Microsoft, IBM, Google, Facebook, all of the big tech companies. We use a lot of the components that are available from them out of the box. So for Microsoft side, that could be their cognitive services, meaning that they have a more than 20 services in that toolbox that you can use almost for free, you just pay a little bit on the consumption that use, so that will give you a lot of AI knowledge if you're working with images, text or knowledge in general, searching stuff like that.

Caroline: Ready-Made-AI, as we were talking about is that different from other services that other companies provide or is it also way of differentiating yourself?

Thomas: It is a way of differentiating ourselves and it's a way for companies to say 'well we want to get started and this is the way to get started' using AI. So it's more a concept where we use other services from the Tech companies, than an actual product.

Caroline: So just a basic question why did you made Ready-Made-AI, what was the reason behind that?

Thomas: Yeah, so the reason is that, we talked to a lot of customers and they didn't know where to start with AI, so we sat down and talked it through. And we could clearly see that we needed something that we go out and present to the customers - saying this is how we start - so for example when we started working with IoT, we

created an IoT starter pack simply.. almost the same concept but just with some hardware and of course with focus on IoT instead ((of AI)). Now it is based on services from Microsoft and with a focus on AI.

Caroline: So far, using Ready-Made-AI, have you experienced success with it?

Thomas: Yup, we have. So one of the customers who have used Ready-Made-AI, is an insurance company and they had a great success with that and we actually continue to build an additional AI solution for them afterwards.

The thing is that some companies will say 'well the services within Ready-Made-AI that's good enough for us' but many companies will also experience that (.) AI is good, we can use it for something good in our company, to solve our solutions (problems) 'so let's take the next step, Let's Begin looking at our own machine learning models, let's begin looking at neural networks, stuff like that' and we've ((Bluefragments)) done that for some of the customers as well.

Caroline: So, are you satisfied with how Ready-Made-AI is used, or do you think that it could be improved?

Thomas: So of course it can be improved, but what I think it needs is to get out a lot more. We want to tell it to a lot more companies. ((tell them)) about the possibilities because many companies right now they're facing, like a 1 million kroner ((DKK)) investment, if they're going to look into AI. And if they use the concept we made it is less than one-tenth of that.

Caroline: Is that an argument you use when you discuss this ((Ready-Made-AI)) with your customers?

Thomas: Yes, it is. And we're trying to put this out through Microsoft, they of course also want this out because the more people using there AI platform the better. Obviously, so yeah.

Caroline: And do you, as Bluefragments, see yourselves as technical experts?

Thomas: Yes. So (.) well I would say experts, yes, and well first and foremost pioneers, technical pioneers. Because what we do is, we deep dive on technologies before they even get broaden into the market. So that is super expensive for us, but that means that, when the technology is emerging, we have some good knowledge about it - and can go out to customers and say 'well let us help you do this'. So technical pioneers I would say.

Caroline: Is that different from your customers? No, not your customers, your competitors?

Thomas: So, you can say many of the large consulting companies, they don't do that. So they need to have a big revenue. And so, that is why they cannot make an investment where they say 'well let's take one third of the company and let them look at a brand new technologies for the next 3-4 months and don't make any money'. But that is our edge.

Caroline: So, do you see yourself as the small and fast, like agile?

Thomas: Yes definitely!

Caroline: So what can you tell us about your clients? What kind of clients do you have? What is your client base?

Thomas: Yup. So, we don't have one specific type of clients type, the type of clients we have, are clients that have said 'Well technology, innovative technologies is something that can actually benefit our company, that can make us grow' yeah can benefit internally. So, that could be anything from manufacturing, to media companies, to (.) what is called (.) lawyers for example. So many different types of customers, but they all see technology as something positive.

Caroline: Do you also work internationally or is it only within the Denmark?

Thomas: So almost only in Denmark, we have some clients in Iceland but they are almost like Denmark.

Caroline: Do you have intentions of working internationally?

Thomas: Yes. So we really want to look into Scandinavian markets, and we have a strategy that (.) so a few years back when we looked at mobility. A lot. We invested a lot in that and we really got a good name out there ((in the market)). So when somebody in Microsoft, for example say mobility, they often say 'Bluefragments'. So that is really good! That means that in the day-to-day actually mobility is still a big part of our company. Because we still have this really good name out there ((in the market)).

And we want to have that for AI as well, but the competition in the AI is a lot tougher than it is in mobility, but you can say that our position in the AI market is different than many other companies.

Caroline: In what way?

Thomas: So, many other companies, they either have AI as part of their product. So, they have a product were AI is part of it. So, they have an intelligent product. Or, they build AI models themselves that you can purchase. We do neither of that

So, what we do we take custom solutions and we take the intelligent parts for from the Tech Giants, and put that into the customers software and make that intelligent. So, we don't own any software and we don't have any services ourselves, actually. We only put the correctly pieces together.

Caroline: Would you say that is more customised? Or than the others ((offers))?

Thomas: So yeah it is a lot more customised! It also means that, we of course can't make ((as much money)) that many money as if you sell (sold) a product. Because you can scale that up. I can only scale up for the men I have. But it also means that we can continue doing something that is totally awesome and fun.

Caroline: And compared to - just going back to - when you talked about the different sectors and your clients. Is there some sectors, or kinds of companies, that are more difficult to work with than others?

Thomas: So, of course there are some sectors that are more focused on ((their)) economy than others, of course. But I would say that many are actually willing to say 'well let's spend the initial money on this Ready-Made-AI concept and based on that get some experience'. And once they've done that most of them say 'well let's take another step ((further))'.

Caroline: Also just a basic question. How large are the companies you're usually working with? And how large do they need to be in order for it to benefit you?

Thomas: So, since we're building custom software that is expensive. As it is. So, most companies we work with are at least 100 persons, at least I would say. Some companies are 7000, but most of them are between 500 and a few thousand.

Caroline: And also like, going back to Ready-Made-AI. Is Ready-Made-AI relevant for all companies you work with?

Thomas: (.) So, I would say, I would say that AI is relevant for, well almost everybody. Even though you are in the service business or production business, or whatever sector you are in. AI has some relevance. For some more than others, but no matter where you are you would be able to see AI as a thing to provide you some benefits.

Many say that if you look at something like a psychologist and stuff like that, that is really hard to replace with computers - and of course it is - but you would still be able to benefit from it ((the introduction of AI)).

We you see manufacturing floors, they can really much benefit from AI. If you see administrations ((they can also)) really much benefit from AI.

So almost anybody can actually benefit from it ((AI)).

Caroline: And when you're working with your clients, with the concept of Ready-Made-AI, do you also think that Ready-Made-AI is suitable for all companies that you're working with?

Thomas: Yeah so, Ready-Made-AI is a concept for companies to get started with AI, so you can say that for any company that can see the idea of AI, Ready-Made-AI could be a way forward for them.

So it's a really cheap way of getting started. And actually they can make it almost as cheapest they want. Because actually, they can do is they can just say 'well we want the intro and the two days workshop

that's it.' - And then they get a report after that (workshop), saying this is where we see you can use AI and which way, and if you want to do it, you need to change these processes and work with this data inside the organisation. - And they don't need to do it!- so they just get the report, so that they actually get some insight inside their own organisation, based on the workshop.

If they want to continue they can say 'well and let's try to look at the components that we can actually use from the Tech Giants. And try to make some pilot projects while we try these new components'.

Caroline: And do you think you are successful with the concept of Ready-Made-AI?

Thomas: Yes! So, it's a concept, so it's really hard to say that it is a success. But I actually think it is! And the reason for that is, because the companies actually get it! they understand! that this is what they can benefit from it, and that that means that is the core concept of Ready-Made-AI it is to make them understand something about a really complex subject. So yeah, I would say it is a success. We just need to get it out a lot more!

Caroline: So now we talked about Bluefragments a little bit. We still want to talk about Bluefragments but a little more in depth. So just overall. What does intelligence mean to you?

Thomas: So (.) that is quite a difficult question to answer.

So you can say, well intelligence is something where (.) it's something that you do, that is smart, right?

It's something that...well it's a bit abstract, because you can say well, right now the three of us here, we see yourselves as intelligent. But that is just a perspective. You could actually say that we could have a flower that is intelligent as well (.)

If you at some point.. when we meet aliens, for example, the things were going to do at that point is really going to define what is our intelligence compared to their intelligence.

So it is really hard to get, and it is the same when we begin to talk about artificial intelligence. Because what it does is that it means that we need to define our own intelligence so that we can put it into something (.) something relative to each other. That is complex.

Caroline: So, talking about Artificial Intelligence, what do you understand by the concept of AI?

Thomas: So, what we normally do is to say 'Well AI is and what we define as a machine doing something that we would normally have an intelligent person to do'. So that is AI in our perspective.

Caroline: And also just make it clear, when you say AI do you mean both neural networks, Deep Learning and Machine learning, with supervised, unsupervised and reinforcement learning?

Thomas: Yeah so, it's really important to keep in mind that AI is actually a broad term. AI in itself is actually nothing, it's just a term. But beneath that, we have machine learning, we have neural networks and that is something! So machine learning is something pretty old, that have existed for a long time. Neural networks is pretty new, haven't existed for more than, what 20 years or so? 15 years maybe?

So, that is something! And that is actually something you can work with. AI is just a term above it all.

Caroline: How would you distinguish AI from other Technologies.

Thomas: If you look at a conventional development, what we do in our mobility for example, we do some software. Where we say 'well, this is the criteria so if this and that is present we build a function to handle that.

With AI, it's a bit more complex because we cannot do that. We cannot set up the rules for an AI environment. They are (.) I don't know if it's the right word to say that, but they have their own life. But it is an impossible task for us for humans to actually sit up the number of rules that we need to do, when working with AI. If we were going to do it as traditional software.

And that is why we have AI. And that is why it's becoming increasingly popular because we begin to see that AI can do something that we cannot do normally, with software. Even though we can do a lot with software, we cannot do what AI can do.

And in the future, what we will see is AI will begin to take a lot of jobs of course. And I guess we're going to talk a little bit about that later.

But right now you'll see an increase in developers doing software but over time will actually see a decrease in software developers because AI will also replace that. Or us (.)

Because AI would come so easy to use, so that everybody can use it even kids can use it. So today kids can program (for) themselves, they do it when they play with LEGO for example, they can program robots. And if you just look 10-15 years back - it was impossible task for kids to develop or to program. So we will most

likely see that development within AI as well. That it will be available for everybody and easy to use.

Caroline: So you talk about the capabilities of AI, but where do you think AI has its limit?

Thomas: Yeah, so it's really important to keep in mind that AI is actually just a smart as we do it. And right now, many AI engine are more stupid than humans, and the reason for that is that they are super-intelligent in one specific area, but what they cannot do is what we can. Meaning, that we can be intelligent in many different areas and levels. A machine can only be intelligent in one very narrow area - but it can instead be so intelligent, more than we can.

Caroline: Do you think this will change in the future?

Thomas: Yes! There is no doubt that over time it will get a smarter and smarter, of course. And we will see that in many aspects, we as a human ((we as humans)) will need to redefine ourselves as well, because of that. And will it happen in the next 5-10 years, I don't know. It is totally impossible to predict! But what we can predict is that it's definitely going to be more intelligent, and even more intelligent than us in many areas.

Caroline: Do you see that as an opportunity or a weakness?

Thomas: Well... for whom? For the AI or for us, as humans?

There is no doubt that we will see the involvement of AI as a thread for humans. Because many people will feel threatened by this, they will see that machines can do stuff we cannot do. And that will really give somebody (.) a lot of people (.) they will begin to doubt themselves I guess. 'Why am I even here because a machine can do what I can do, so why do I exist?' I guess, but I see the possibilities in AI as huge. And as with any other technology, it's super important that they are controlled so that companies are not allowed to evolve in area, they shouldn't evolve, within weapons for example.

Caroline: So talking about clients, what do you think your clients understand by the concept of Artificial intelligence?

Thomas: What they understand?

So I think that (.) Well of course after they have heard Ready-Made-AI concept they fully understand it.

No, I think that many companies understand that overall concept of AI. They understand that they can have a machine doing things that a human is not capable of. And hopefully the companies also understand that the strongest solution they can have is combining AI with humans - it is by far the strongest solution they can have! And that is something we talk to them lot about. Saying, don't just evolve (your) AI but also ensure that you evolve it into your organisation. So that AI will actually help your employees. Make (Making) sure that the company will actually grow as a company. So (.) and I think most companies get that.

Caroline: So you don't find it hard to explain the concept of artificial intelligence and it's capabilities and limits to your clients?

Thomas: Well when we first meet our customers many actually think that what they can do is they can go to IBM, for example buy Watson in a black box and put it in the basement, press a button and out comes artificial intelligence! That's not true. And what is (.) what we really spend a lot of time talking to customers about is that using AI is something complex, and it takes a lot of time from them to use and use it correctly. So that is why we build all of these ready-made AI projects with them. For them to understand how is it actually, we can benefit from using AI. And after that we can look into 'well what can we ((the client)) then use AI for, if we do neural networks what can we then do with AI?'

Caroline: In your experience do your clients or customers distinguish AI from other technologies, or is that blurred for them?

Thomas: Yeah so it is blurred, but that is mostly because (.) of the media I would say. Because and (.) and because of companies selling all different kinds of the solutions. Because many of them say 'well this is intelligent' even though it has nothing to do with artificial intelligence. But they just use the buzz ((word)). And that that's of course makes the entire market blurred.

Caroline: So do you find it more difficult to work with AI and your customers when the media has portrayed in a blurred way?

Thomas: No it is actually (.) I find it really good. Because really quickly we can put the things in context and especially if they say yes to the Ready-Made-AI concept where we have this workshop. Really fast we go into the depth of what does AI mean for this company. So within a day the buzzwords are gone.

Caroline: So the media actually helps you even though they are kind of disturbing the surface?

Thomas: Yeah the media is what actually right now brings us a lot of customers. Because the customers come to us and say 'we want to look into AI, we just don't know how to do it.

Caroline: And we were talking about the capabilities of AI, do you think your clients also think of the same capabilities AI, as you do? Or do you think they think of it differently?

Thomas: So, some clients have a really clear vision about what they can use AI for, but in general but also for some specific areas in their companies. And others (.) well it is a journey starting for them.

Caroline: Are they also aware of the limits of AI?

Thomas: limit?

Caroline: yeah.

Thomas: Yeah so, one thing we discuss a lot with customers is expectations about the time and the money they're going to use on this ((AI project)). Because if we stay within the boundaries of Ready-Made-AI, there's no doubt that this would be a pretty cheap solution for them. And they get some good insights into using AI. If they begin using their own machine learning models, they begin using their own neural networks, they begin a journey and that takes lot of time.

For some they need to look several years ahead when they plan this. For some, they need to say 'well we're going to invest millions in this', that is part of the - let's call that a downside of the AI, because AI is still super tough to work with. Meaning that we cannot say this will take exactly two days or two months to do. 'We can say it will take two-to-five months to do but we're not sure'. And that is because what we're working with is data and (therefore) we're working with something that is **alive,** and (therefore) can be really hard to say it will take this exact amount of time.

Caroline: Do you experience that your customers are frustrated about this?

Thomas: Yes, a lot. Because (.) We're frustrated about this as well. And for this (.) So AI is something new for us as well, right?

We haven't worked with it for that long. But what we did when we began this journey was to hire a data scientist. And normally when we do a new project for customer, we always estimate the project in pretty good detail and we never divert more than a few percent on our estimate based on what the end result will be.

But we are working with AI, what we have learnt and what we had learned the hard way from our data scientist, is that we cannot predict how long time something will take. We can say that it's this huge timeframe or time range. But it's somewhere in-between that. So the other day we gave an offer to a customer, I looked at it and said 'well I guess we can do this in a few days' and I talked to my data scientist and she said 'Well, I would say this will take about six weeks'.

Thomas: So based on that, it is pretty obvious that working with AI is something totally different - a totally different mindset of how you work, compared to us conventional software developers. That can be super frustrating, because it's really hard to say we're going to spend this exact ((hammer finger on the table)) amount of money.

Caroline: So do your customers have strong opinions about AI?

Thomas: Yes (.) so (.) back to the to the point where we talked about who in the company sees the ideas of AI. So once we talk about AI many people in the management they see the idea of AI - and they do it because they

can say ‘well, we can grow the company, we can cut down on expenses and (.) yeah it'll be a better company, we will produce more’ stuff like that.

But of course, many employees in companies they also see the danger of AI, I’ll say that, because they can see that ‘Well, what I'm doing right now could be replaced by an intelligent machine’. Maybe not even intelligent just a machine. So we have companies, where I have worked with them I have been out (organising) for the Ready-Made-AI workshops. And as part of that, I've been talking to different persons (people) in the organisation and it's pretty clear that they (.) fear AI. And they fear it because they most likely will lose their job, if AI is introduced in the company.

Caroline: Like, so what effect does this have on the company? Where some employees have a fear of it and some part of the company is excited about it.

Thomas: So I think that, in many organisations they actually don't talk about it. I actually think that they try to keep it (.) I don’t know what it's called but they don't talk that much about it, at least. But what they hopefully we'll do is actually share it. Because what we're trying to talk to the management of the companies about is to say ‘Well don’t cut down on your employees, but instead grow your company! Make sure that you use this possibility to say let’s produce more’. And then maybe some employees need to get another job internally in the company or be re-schooled to do something else. But grow the company instead of cutting down on the employees, and just make the same outcome, make a higher outcome

And if the companies do that, they will ensure that the employees are not afraid. Because if they (.) if the company management go out and say ‘we're going to introduce intelligent machines in the company - but we're only going to do it as a support for you ((employees)), so you can work smarter, so that you have better time to do your job and so that we can actually produce more - we will not fire anybody because of this’.

That will make everybody happy, because they have happier employees because they can work smarter, they can produce the same or more within the time without being stressed, and their customers will be happier because they will get a better result.

Caroline: That fear, is that justified do you think?

Thomas: There is no doubt that many companies will actually cut down on employees because of AI. We've seen a lot of cases of this already. Was it Nordea that a few months back that fired thousands of people because intelligent machines could do what they do.

So yeah, we’ll definitely see that. But again, ((getting)) back to some companies, it's not possible to re-school, replace and move around with the employees - it's not possible in all companies. So in that case they have to fire people - and that's fair, that's part of the evolution.

But I don't see a general perspective, I don't see that we will have a mass unemployment. ((It’s)) the other way around actually, because what we will see is that we will do more and more and more. Because we’ll produce more. So I see that we’ll have more people in jobs but they will not be that stressed actually.

Caroline: So going back to the question I remembered before, we were talking about how some of your customers can be frustrated about AI because of the unknown time range, is it your experience that the customers feel more/less frustrated when the plan is detailed? You just said before that you usually make very detailed plans about the process and how you’re going to incorporate the whole AI, does it make them feel less frustrated?

Thomas: So (.) that they understand the process makes them less frustrated. The fact that they still look into a unknown future makes them frustrated. But because they can see the goal, the end goal, and because they know what is going to happen during that time period they often say ‘Okay, let’s take a look at it’. We have customers whose end goal is years ahead. So yeah..

Caroline: It that more workable when they have ((a long term goal)) ]?

Thomas: ]It's workable but still what we do, is we have a lot of milestones in between. To ensure that at all points ((people)) have insights into what's going on. What do they have benefited now, or for the last two months for example, so that we can make sure that they see the value of continuing the process.

Caroline: So you believe the concept of Ready-Made-AI helps to create a common understanding of the technology of AI, between you and the customer?

Thomas: One more time?

Caroline: So Ready-Made-AI do you think it creates a common understanding of the technology of the technology of AI, between you and the customer?

Thomas: Yeah it does, and that's the core concept of Ready-Made-AI, is to make a common understanding of AI. And again, what's important is that in some companies AI is defined in one way and another companies it is defined in another way. And then that's back to ((the fact that)) some companies can use the AI, some don't use it a lot. So it's really important o focus on what makes sense for this company. And what is their area of AI.

Some companies might not even know - need to know about neural networks because it will never be relevant for them. But they need to know something about Big Data for example, and what can be done with that inside the AI ((concept)).

Caroline: Yeah, so what organisational infrastructure is needed in order for AI to be implemented, in the customer (client)?

Thomas: Yeah, so one of the one of the reasons that AI has become increasingly popular in the last couple of years. We have the infrastructure ready for that being the cloud. AI is really demanding on processing data, and processing data can take a long time.

For example, if you - and this is a sample that is a year old so it might have changed - but if you if you're building a model that can recognise the number 3, if your using normal computers like this ((pointing at his computer)), when you have a lot of them connected it will take two-to-three days for that model to complete. Just to be able to recognise, or the model that can recognise the number 3.Then when you give it the input it'll respond immediately but building the model behind it (is the real challenge). And if you do it in the Cloud, you're down to like 2 hours! Because you can just upscale it. And you can just say 'Well, let's run on the graphic card, the GPU ((Graphics Processing Units)) instead of the CPUs ((Central Processing units)) in the cloud', and that's a huge change! That has happened within the last couple of years.

And since the cloud is now available to everybody and all companies. That is what makes it possible to push AI into all companies.

Caroline: So, is adapting AI always a strategic decision?

Thomas: No, it's actually not. We've just started a new project for a customer, where they have people working with data and they just said 'Well, at this point we as a human cannot solve this, because the data is too unstructured for us to do it, and therefore we can use a machine to do it instead.

So, that's actually not a strategic way of using AI. It is just, a tool in the toolbox. ((In the same way as saying)) To say like, you have Excel, and now you have AI. Those two combined gives me the solution.

Caroline: Is that common for your customers or is that more the exception rather than the rule?

Thomas: Yeah, so right now at the current state AI is a strategic tool, for many companies. Because they want to ensure that they don't miss out on anything and they want to ensure that they can ride the wave, right now. ((jokingly)) And say 'Well, we have AI in our company, we're smart', stuff like that.

Caroline: But will it always have a strategic impact on the company? Even though it's a tool?
Thomas: Yeah ((acknowledging the question)), No I guess not. Because let's go back to the solution, where we just took AI as a tool and used it together with Excel. It actually didn't have any strategic input (impact). It was just a way to solve a problem and found ((presented)) a valid solution. And I actually doubt that even the managers of that department of the company knew that were going to use AI.

Caroline: So was it more out of a basic need, actually?

Thomas: Yeah, Yeah the thing is they have accepted that AI is a tool. So they know that AI is something they can have in the toolbox. And that is a strategic point, that you accept AI as a tool and not necessarily something you roll out in the entire organisation. But you just accept that 'Well, we're going to use AI as tool, just like you would use the ((Microsoft)) Office package.

Caroline: So also talking about time, what kind of assignments can be carried out in, let's say a few weeks and month and what needs to be carried out in a couple of years?

Thomas: So, the smallest project, when talking about custom AI solutions, that is, after you talk about Ready-Made-AI concepts that is between one and two months, that is the minimum you need to use.

What we have done at some points, is to say well, once we have the Ready-Made-AI workshops in place and talk that through, we don't need to use the Ready-Made-AI Media components, but we can actually go directly into using a custom AI model, using machine learning, using neural network - stuff like that. And we have actually done that in just a few days, but we've been (through) a lot doing it (.) so that (.) we did ((implemented)) one model in just 3 days, but the effort (.) the man hours that we put into it was something that would normally take 6 weeks to do.

Caroline: And what kind of task is usually for the lesser amount of time and for the large amount of time?

Thomas: Yeah so, that all depends on your data. And what we have experienced is that if you have your data in order, doing something intelligent on top of that can be done pretty fast.

If you don't have order in your data or you have chaotic data, and maybe intentionally, that will take some time. And that often takes weeks or months.

And then and if we look ahead and we say well if you look into something like being able to advise employees for example with something it takes a lot of time.

So we have a customer that have a lot of documents and for that customers, what they want to do is have a machine reading all of the documents, understanding all of the documents and be able to give a brief text about what did the 1000 pages say, in one page. And that is super complex, and what makes it complex is that the data is not structured.

So if we knew that all of the pages were following this exact template that would be pretty easy, or easier at least. But what they have right now is documents from a lot of various sources, so the data can be very different and that'll take a lot of time to figure out.

So we can… If we get this type of letter, ok let's handle this way, this type, and this way and so on. So that is super complex.

And you can say, what you're doing here is using AI to provide information. Because it will give you a lot of good information based on the 1000 pages.

But one of the other areas where we see AI is of course, when it support you with advice or predictions. And that is also really tough to do, to predict something, so if you just going to predict how many vegetables can I grow in a greenhouse - well if you have enough data that is pretty trivial to predict. But if you're going to predict whether you're going to win or lose a case in law firm that is super hard to predict. Because you have extremely many variables that are going to affect you. And you have a human of sides of that case as well - from that is super complex, and that will take a long time, years!

Caroline: So, what has been the biggest challenge for you when integrating AI into a client organisation?

Thomas: The time, definitely the time! Accepting that things cannot be done super fast. Because normally, what we can do is we can say 'well, we need to have this done in 2 weeks and then just off scale on the number of developers, well more or else, that does it. And we can ensure that we reach our goal.

We cannot do that data, we cannot say 'Well, we just upscale the machine learning model and make it better'. That is hard work, that is a based on good insight into the data. So, that is pretty hard to scale!

What we can do though is to scale that the actual processing, as I mentioned before. If you just use normal computers of take a few days if we use cloud GPUs we can do it in hours, that we can scale up. But understanding the pre-processing of data, we cannot do that.

Caroline: Do you also think that is it also the biggest challenge for your customers, like with time?

Thomas: Yes, and the money they're going to spend on it.

Caroline: So, we did talk a bit about this before, but why do you think your clients adopt an AI solution?

Thomas: Yeah so, hopefully they do it because they want to grow their company. And because, they can see that I can provide the tool that they need to be able to do this. Also to ensure that and the employees they have, actually do interesting stuff.

Without a doubt everybody in a company would say 'Well, at what I do cannot be done by machine, but over time we will see it can be done' and they will say 'Well, I love my job but there's no doubt that they can also love another job!' Well most likely right?

So, it was in the same company most hopefully and (.) I see it yeah.

Caroline: Do you think you're clients, it is properly different from which level you're looking at. But do they see it as a threat or opportunity themselves, with ((regards to)) implementing AI.

Thomas: Well obviously, as an opportunity to the company, right!

But I also think that many companies do look at the AI because they don't want to get "underdoged" because their competitors use AI.

Caroline: So you think the threat is not them using AI, but actually not, not using AI? ((refraining from using AI)). Because others do it?

Thomas: Yeah.

Caroline: So also talking about the clients. What is the clients' typical perspective of on Bluefragments?

Thomas: Well actually, that's not quite far from the truth. Because what we do is often, go out to clients talking about - Well what is actually possible using technology.

In some cases, customers will see that as magic, and we can do things for them that they didn't think they could do, using AI. And we can actually help them have a better company and have a better organization.

Based on that we often get really good feedback from our customers.

Caroline: Have you worked with the same customer twice? where they re-assign you for a new assignment?

Thomas: Yeah, most customers do.

Caroline: So how often do you see work with a client? Two times or more than two times?

Thomas: So, it depends a little bit. So, if you look at AI only, for example. AI is still brand new for many companies. But already here we see that the clients are actually coming back. Because they knew 'Ok, so they could do something for us using this new tool. this innovation, this technology, so let's try that in another department as well.'

And yeah actually, to answer your question. So well, most customers come back multiple times, especially when we work with them around mobility, and data, and IoT, that have been for (on) the market for many years. They continue to come back.

(For) some we do a project in 6 months, have like half a year break, come back to something in a few months, break, come back. Stuff like that.

Caroline: And do you feel that, their positive view on you has an effect when you're working with them?

Thomas: On the company?

Caroline: Yes.

Thomas: Yeah definitely! If we don't (.) If we don't provide professional services and if we don't serve the solution ((the problem)) in a really good manner, we will lose the customer, definitely! So we have really high demands for our Development Team.

Caroline: Do you also experience - we also talked a bit about this before but to elaborate - Do you're clients believe it is easy to implement AI into the organisation, when they first meet you?

Thomas: If they think it's easy? No. Because many clients are still not quite sure what is AI. So they wanna understand that. And they wanna see what can they actually use AI for. And then some clients have the Vision - and most don't - and based on the Workshops in the Ready-Made-AI concept, they will get some insight into what AI can do for them.

Caroline: And so do you think - is it your experience - that your client have a different view on AI before introducing Ready-Made-AI for them? And afterwards?

Thomas: Hum yeah definitely! Well I really hope so, because the entire purpose of Ready-Made-AI is to clarify what is AI to the client. And we had this one client that I had a brief conversation with on phone saying 'Well

Thomas, I know I'm gonna use AI but I have no idea where start, and no idea what AI is. But I know we're going to us it.'

And then I had a presentation for them. And today we have solved two AI tasks for them.

Caroline: Do your clients often feel that the adoption of AI changes the organization?

Thomas: (.) I think that AI is still so new in many organisations, that we haven't seen many companies where is actually affect the companies or the clients, or at least the clients we're working with. But again, as we talked about before some companies already saying 'Well, we're gonna cut down on jobs and (.) because of AI, the introduction of AI. And digital processes in general, right.

Caroline When I asked you what the attitudes from them ((the clients)) are about a change, they're not really aware themselves of a change, or is that is that not a part of their mindset, when they contact you?

Thomas: So some companies say 'well, we want to do things smarter'. And that is something, or one thing. Other companies contact us and say 'Well, to be honest we want to have a more lean organisation, meaning that we're going to cut down on some areas, and we wanna to make more money, to be honest'. Of course, that is not something that is leaving the room, when I talk to the management about it, but they have that opinion in some cases.

And that of course, will course a strategic look at how we use AI, in that organisation. Because it has to be really implemented correctly, because we know it is going to affect people.

Caroline: And when you have your customers, as you said, what you both mentioned here and also before, when somebody calls you say 'I don't know what AI is, and I don't know anything about it, but can you help me anyway' Do you feel that the companies put a lot of trust in you, when you're working with them?

Thomas So we get customers from two different sources. One of them is from Microsoft. Meaning that Microsoft have said to the clients 'These guys know what they're doing, you can trust them' Meaning that when they call us, they trust us.

Of course we still need to prove it, but bottom line they trust us. And the second source of getting customers, is based on other projects. Either for the same customer in different departments ((of their organisation)). Or that they have heard about us in (.) from other clients. And that also generates trust, that means that when they call us they will in most cases trust us.

Also meaning that when we go out and talk to them, we are a trusted advisor to them.

Caroline: And can you also feel this (trust) when you're working with them?

Thomas: Yes definitely! And we're little bit different, again from many other organizations, because what we do is, is doing pioneer stuff. Meaning that we come with new technologies but we also put that new knowledge into their own organisation. And many organizations really like that. That we actually skill up their employees.

Caroline Before we're talking about a common understanding of the technical side of AI. But do you also think that there is a common understanding of the organizational capabilities of AI? Between you and the customer?

Thomas: What do you mean by that?

Caroline: So one thing is the technical aspects of AI. But also besides that, AI has some capabilities you were mentioning earlier. Is it your experience, that you have a common with your customer about what these capabilities are, when you're working with them, or is it something you have to explain to them?

Thomas: Well, so we talked a lot with our customers, especially the management when we are going to implement AI in a strategic level. At the customer's ((organisation)). ((We talk)) About how we do it both technically but definitely also in the organisation.

Because if you do a strategically it's not just a tool, but it's another way to think about the entire processes, of maybe different departments. But maybe also the entire organization.

So yeah that is something we talked a lot about, what it will mean to the organization.

Caroline: Is it your experience that Ready-Made-AI is contributing to this understanding? Of the capabilities?

Thomas: Uh No, actually because Ready-Made AI is a tool for getting insights into the overall use of AI. So what can we use it for.

And also an overview and insight into what is possible using ready-made components. On the organisational level it's more a custom thing from organization to organization.

Caroline: So, you don't have a specific concept for the capabilities or have intention of having a anything that specifies this ((the organizational capabilities)). Is it even needed by the customers?

Thomas: Is would say it is so different from company to company, that you almost cannot make a concept of it.

Caroline: When you working with your customers, have you experienced a case where the adjustment between the client ((and you)) has not been successful? When using Ready-Made-AI?

Thomas: Yeah so, we have some cases, and that is back to some of the frustrations that we talked about earlier, it's about the time that it takes to do. And that is something that the customers really tried to get the heads around, that things take a lot of time when we do custom made AI.

So that is after the Ready-Made-AI and so the ready-made AI, because we use pre-build services and we know exactly what's in them ((the services)). That we can do that really fast. But it's when we look into the custom AI afterwards, that is something that is hard. And that has also cost us a lot of money.

Caroline: So I don't know if I missed this or you said it already. Is time a part of Ready-Made-AI, discussing time, not just AI?

Thomas: Yeah so, what we do is, in the Ready-Made-AI as mentioned before we have the workshops, we have - they want to - we have pilots where they can work with the predefined or Ready-Made-AI components. And as part of that we're talking about how all of this fit into their organisation.

But part of that is also talking about the time aspects. If they continue to the next step, creating their own machine learning models, their neural networks, how long time will it take, if they go with is this approach or that approach.

And what we always do is, we build a report for them, saying 'so if you're going to do this, it will take you around six months, if you're going to do this you will need to look at 1-2 years ahead' and that can be (.) for small organisations, that can be pretty tough saying 'Ok, so now we have a plan looking 2 years ahead' - that is a lot of time (for them).

Caroline: How do you believe AI can be used in everyday work, in relation to companies?

Thomas: Okay, so that is a long list.

But if we take administrations, for example, there are multiple ways that AI can be used. And in that perspective AI is also mature. So that could be like handling emails, could be doing an archive, doing stuff that you normally would have somebody doing, that you can actually have a machine doing.

And in some cases it actually don't need to be intelligent, it's just the machine, it's just a process that you put power to - that can do all this.

And that is actually also what we're doing in Ready-Made-AI, making sure that they understand the difference between just have a machine doing it, and have an intelligent machine doing it, because that is a huge difference. Especially the time manner in that.

And if we have an intelligent machine doing it, you begin looking into so what can we do of predictions, what can we have advice ((what advice can we provide)) for our employees, so that they can do the job even better. How can we reply even better to our customers, in the customer service for example. How can we respond better as a company when we communicate. All of that!

Caroline: And you say that automation is just one area which is mature, is there other areas? Which you see will be the next mature area, where AI will be used?

Thomas: So, you also have manufacturing. There you're also see that AI is definitely mature. And you will see it grow in many areas. It's still some of the areas where it is not mature yet, is the areas where you have people's opinions that matters. ((are areas where people's' opinions matter)).

So going to be (.) could be (.) Yeah so of course I doing something like a haircut you cannot do that, because that is really complex.

But also if you're going to a doctor, you can have a machine, an intelligent machine saying, well what is wrong with you. But if you have deathly cancer you cannot have a machine telling you that - you need a

person to do that, in the correct manner! And that is where it is super difficult to replace a human with a machine,

But the combination of the doctor and the machine that can ensure that you ((as a doctor)) have a way better facts and arguments, when you're talking to patient because you know you have gone through 10,000 more images, then you normally would have. And you can specify a way better solution for the cure. Because the machine can say that it has contained this area and we can do this exact way of solving or curing the cancer.

Caroline: So, do you see autonomous improvement in the performance of AI over time?

Thomas: Sorry?

Caroline: Do you see autonomous improvement when acting with AI over time? Is it able to act on its own overtime?

Thomas Yes it is. Yeah so right now intelligent machine are intelligent, but again within their area they are intelligent, within a broader area they are pretty stupid.

You can see that, an example is you have many chatbots you can talk to. And if you ask them a specific question within the area, they can guarantee, guarantee give you the answer ((they can guarantee you an answer)). But if you ask them, if you ask a chatbot that knows about furniture you ask 'how's is the weather', it doesn't know so in that sense it's pretty stupid.

But over time you will see that things will merge together, you'll see that multiple intelligence will hook up together, so if it doesn't know the answer it can I ask a swarm of other intelligence. And based on that, it can answer your questions. And become even more intelligent and overtime maybe even learn on its own better.

Caroline: In addition to this, do you think this improvement is a result of the interaction with AI?

Thomas: If it is an interaction?

Caroline: Yeah so the way it improves is that based on the interaction with AI?

Thomas: Yes, so the way that many AIs work, is that it's grows based on an input, and that's also what we saw like a year ago ((or)) year and a half ago, when we had a chatbot that was released, and it was only learning from what was communicated with it, and within a few hours it was a racist and yeah (.) talked really bad, so they had to shut it down within one day because of course that didn't go ((that was not appropriate)).

If you see it in general, will AI learn based on inputs - yeah that is I guess the only way for it to learn.

Caroline: Also when you say inputs, do you mean human input or is it (.) could it be]

Thomas: ]Learn from itself?

Caroline: Yes.

Thomas: So that's quite tough because, of course, you can learn, but again it's limited into some specific areas.

So if you have an intelligence that is super smart within manufacturing a car, it cannot learn how to build a chair (.) Well not right now at least.

But then again we have to look 10 years ahead and look at quantum computing that is going to change something, in that perspective ((respect)). But we're not sure what.

I think very few people know what. Right now quantum computing is still magic for the most people even the guys working with it.

Caroline: So, we talked about the how you believe AI can be used in everyday work - but how do you think your clients imagine AI being used in everyday work?

Thomas: So, as we talked about before, some clients, they have the 'vision' ready. They can see AI is a way ahead. Some customers or clients, they will definitely say 'Well, I can see that a machine can do something for us, obviously'. Other clients will say 'a machine can never do what we do'.

And that is what we are trying to conceptualize in Ready-Made-AI, to talk about anything in general and then say 'Well, ok so let's let's deep dive on you as a client, your company and your processes, and then what can we (.) how can you use AI (.) so (.) That is really different from client to client.

Caroline: And have you also experienced that your client use AI differently, than what you intended?

Thomas: Not right now, not at this stage. But I'm pretty sure, that over time we'll see that - but not right now.

Caroline: But do you think, it would come in future or?

Thomas: Yeah, because right now, they listen a lot to what we do and what we recommend them to do. But that's no doubt when receive the involvement in AI and they can say 'Well we can easily do this and that' And they will do that. As we see right now with the building of normal software solutions. They miss use that in many ways, so that it fits into something else and that's perfectly fine! But we will most definitely also see that within in AI, in a few years.

Caroline: How does AI act intelligently when your clients use it?

Thomas: So, it is really important to bear in mind what the actual business value of AI is for the company.
And we define it in three different types of business value, so one of them is automation. One ((Second)) of them is information. And the third one is support.
And there's no doubt that doing the automation, even though in some cases it's not intelligent, but this is where we often see a lot of benefit really fast. Because just doing some of the processes automatically, and even adding a little bit of intelligence into that can create a huge value for the customer.
And then on the other end we have the support, where it is definitely the most difficult. Where you have the prediction and stuff like that. That is by far the most difficult thing to work with. But you'll also see a huge business value, if you are going to do that that.

Caroline: And, have you experienced a connection or disconnection between how your clients understand the technology and how they actually use the technology?

Thomas: Not yet, we will most likely see that in the future - but not yet.

Caroline: A connection or a disconnection?

Thomas: So where they (.) disconnection.

Caroline: Okay so you think that right now there is a connection between how they understand it and how they use it?

Thomas: Yeah, because the aspects are still pretty narrow. But in the future when you say 'Well, ok let's have AI in entire organisation, everybody works with AI'. You'll see that it will have their own lives, in different aspects.

Caroline: Is that related to what you said before, that some people might just start making their own AI in the future, do think that is related to this?

Thomas: Yeah, in the future, and pretty soon, we will see that everybody will have their own AI. Unique. We will have our own AI, our own little tool box. That we can just say 'Well do this do that, show me this, give me this information'. And we will get that (in the future). Right now we all have our mobile phones, that are semi-intelligent in some aspects, but in future they will be way more intelligent. So yeah, you see that all the way into the organisations, and connected.

Caroline: And what is the client's' reaction to the self-learning improvement of AI, do they react positively or negatively?

Thomas: So they actually do want that, that is one part of the AI, that they want because they want to have an AI that actually does learn by itself, not learn new stuff, but learn better in the area, that it is within.
So, we have a case, where we have a model that predicts where a specific support ticket is going - and they, of course, want to do that better and better. So right now, it's in a 83% that it hits, but they of course over time will have it even better.

Caroline: We're actually done now. We just have a few follow up questions, that I just remembered. You were talking about a client - we were talking about clients, they want to implement AI because of the fear of not implementing it. So, do you experience companies just want to make AI fit in to their organisation, just for the sake of fitting it in?

Thomas: Yeah, so we had clients that said 'Well, we need to have AI as part of our organisation, partly because we are the kind of organisation we are, and partly because our, their clients expect it'. So they needed that, there is no way out, they just need that. So yeah definitely.

Caroline: So you said before that AI could be fitted into anything but do you think sometimes that is (.) how do you call it that (.) it is a barrier or difficult to implement AI in their organisation, just because they want it so they can stay on top of their competitors? Or is it just easy peasy?

Thomas: No, no. So what is really important to understand is that AI can fit into any organisation but in some organisations it'll make good sense, in some organisations it won't, in some organisations their not ready for it. So even though that AI would fit really good into it, they're just not ready for that.

Caroline: So if a company is just not ready for it, do they perceive themselves as ready for it?

Thomas: No, I don't think so actually, I think that many (.) in most cases the clients have a pretty good insight into themselves, of course, they don't know all of the aspects of AI. So, that is one of the discussion we have with them. But they do see the possibilities, they do see the visions of what can be done.

And in some cases we just need to accept that we need to look, like, 3, 5, 10 years ahead before we really see the idea of having AI in this organisation.

It could be people giving a massage, for example, where would you use AI there? Well you wouldn't! But let's imagine that everybody had a chip in their body, so that the person giving the massage can see that 'Well, I can see that the muscles that are (.) that need to be massaged is here, and you have this little injury that if you don't do something about it now then in two weeks you'll have pain, so I can fix that right now'.

That is where you can see AI. But you won't see that tomorrow, you will see that in 10 years maybe right. So, AI can fit into any organisation but some will be years ahead.

Caroline: Before we were talking about something as just a machine, or AI or robot, or whatever you call it, or automation. Or many names I guess, so are your clients aware of the difference between automation and AI, or is that something you also need to explain?

Thomas: Yeah. That is something we spend a lot of time ((explaining)). Again, what's important is what a company define as a AI within the company. And they all need to agree on that, we have customers saying well when we have something that is automated and done by machine 'we call a bot' Okay fair. Then everybody in that organisation knows that when we have a bot to do something, it's a machine doing something. Okay, then we know that.
In my terms a bot is more intelligent but in this case is just a stupid machine doing what a person could do. But a machine can do it, because it's just a process that it's doing.

Caroline: And just to be sure, you do not work with automation but only]

Thomas: ]We also do automation, because that is part of the process when we talk to customers about doing AI. In many cases, we actually need to have like, two, three steps initially where it's automation before we can start working with AI. So that's part of it.

Caroline: But would you also work with automation without also doing the AI, or do you only do automation because you have to do the AI?

Thomas: So, you can say that we have worked with automation for many years now, because well having a phone doing things for you, that's automation.

Caroline: Okay (.) One last thing (.) So we were talking about, when figuring it all out, that the way we understood it, that Ready-Made-AI when you do that for companies you've already made a sale for your customers - and then the Ready-Made-AI is the pre-phase before implementing AI, is that correctly understood?

Thomas: No. So see Ready-Made-AI as a concept that companies buy into. As the initial step into AI. Some companies take the short version of Ready-Made-AI, were they only do the workshop, some actually do the pilot, within Ready-Made AI and try to use the components. And once they have all of them in place, some of them say 'Ok, so we want to go deeper into AI, and that is when they are going to use machine learning models, neural network, stuff like that.

# Appendix 3

## Thomas Martinsen, CEO, Bluefragments

Note: This interview was the second interview conducted with Bluefragments. By the time the interview was conducted Frontliners had not changed their name yet and are therefore referred to here as Optisquare.

'Caroline' and 'Philip' are the interviewer and 'Thomas' are the interviewee.

Caroline: In the previous interview you used an example where AI had been used in combination with Excel, to solve an otherwise unsolvable problem. But you said, that was not a strategic decision to employ AI. Do you remember that?

Thomas: With excel?

Caroline: Yes.

Thomas: Which one was that?

Caroline: I think it was the]

Philip: ]Well you never explicitly mentioned which one it was but, as far as I understood, it was very quantitative analysis, but they needed AI to solve a problem which that was otherwise unsolvable.

Thomas: Okay yeah yeah.

Caroline: And our question was: How can AI not be strategic when it solves a problem which is otherwise unsolvable?

Thomas: Yeah okay. So that is actually also a Bestseller case. So we have done two projects for Bestseller. So you talked to Lars about one of the them and we have actually also made another project for them after the one we made for Lars. Where they had a lot of data about all of these support cases and the classification of those. That they tried to solve using excel and they had tried to in many different ways to solve that using excel but couldn't find a simply way to (.)

- BREAK -

Thomas: So, we made two different projects for Bestseller, one of the project was about classification of their support cases and the other project was about saying all of the support cases that are put into this a misc ((miscellaneous)) bucket how can we try to categorise that even more. They had tried to use Excel to solve that but couldn't, in an easy manner at least.

So your question was; How can AI not be a strategic tool when it's ((the problem)) not possible to solve in excel? Well, I would say of course you can consider it a strategic tool but it's not (.) so you would be able to hire a guy who could do it in excel and solve it that way around. It would most likely be harder, it would most likely take more time than when you use AI, and the good thing about using AI is that even though you put even more parameters into the model it would be able to solve it. It's not clear if you could do that using excel. In that way you can say AI (.) I wouldn't call it a strategic tool, in that manner, I would say it's making their work easier.

So they can still actually do their job but it's not strategic. Does that make sense ?

Caroline: Yeah but, so do you see a difference between strategic decision and a strategic tool? Or is that the same for you?

Thomas: So you can say well, if we know (.) No, it's two very different things from my perspective. A strategic tool, is a tool where you say well, this is how we solve some stuff. A strategic decision is a direction you take. So if you say 'ok so we're going down this path and we are gonna use AI to solve a lot of things then you have the strategic decision', and then you can say 'well the way we solve this is by using AI '.

Caroline: So you don’t see it as a strategic tool, but do you see it as a strategic decision? Or is that still not a strategic decision?

Thomas: So you can say that their departments said; the way we want to solve issues going forward is using AI because we can see that in the long run it will save money and the result will be better most likely. Hence it is a strategic decision. Whether in that particular case its strategic tool I wouldn’t say, but because you would be able to solve it, if you found the right guy as a consultant or something.

Caroline: So how would you classify a strategic tool when using AI?

Thomas: I would say, a strategic tool could be if you make a model that classifies, if you want to talk about Bestseller, right. You have this classification using AI, I will call that a strategic tool for the business because what they do is that they actually make some organisational changes in their business because of this. So based on their strategic decision they make some implementation of strategic tools like classification of how to put in support cases, stuff like that so that is how I see a strategic tool.

Caroline: So, We’re going to talk about IDA. How was ready-made AI used in this project?

Thomas: One of the core concepts about Ready-Made-AI is using components, using stuff that is already ready made - that stuff we can take and use. In this particular case we used existing components for example text recognition , so when people type in something in the chat. We have an existing component that reads the text and understands what is the actual intent in this text, and also finds the keywords - and based on that we would be able to find the correct answer for the user.

Caroline: Do you think Lisbeth was aware that you were using Ready-Made-AI?

Thomas: Most likely not, in the way we have discussed it. She had been introduced to it but I'm not sure that she actually saw the whole idea, the whole picture. About saying, well instead of - we're going to sit down and invent how we understand what the user saying. We actually just gonna use a component that is available, that is most likely free and build most of the case around that. So that when we move on, we can prove some cases, you can prove the business case and based on that we can actually expand the project.

Caroline: Do you think that you and Lisbeth share same understanding of AI?

Thomas: Lisbeth and me?

Caroline: Yes.

Thomas: Well that is a good question, I would say - I think Lisbeth has a perspective on AI where (.) well I think she is a typical user of AI. And I believe she's pretty open-minded around the AI. And hence, I think we share some of the common ideas about AI. But I'm not sure we have the same perspective on things.

Caroline: Where do you think you differ?

Thomas: In this case, I think that I have more faith in AI then she does. I wouldn't be that afraid to try to do something, that I think (.) That she and the business in general have, and I that her perspective on things is really common. So being a little bit afraid what would happen if we set this loose.

Caroline: And you mentioned typical user, can you define what you mean by that?

Thomas: So a typical user is somebody who can see the idea of doing this ((AI)) And well, after a while they get hooked on the idea and like it, and adapt it. Just like Facebook, in the beginning it was just the young ones that actually used Facebook, right. Because they saw the idea instantly. but our parents didn't use it. And then after a period of time, while they got used to it, they heard it again and again in the media, and then they tried it out and actually saw the benefits. And now, we cannot take them away from Facebook because the use it all the time, right. And I think it's the exact same here, where we see in the beginning, they have a little bit of a (.) they are a little bit nervous about getting into this chatbot and AI, and what does it do and why should I talk to machine, when I can actually pick up the phone and talk to a human. But pretty fast, they learn some of the benefits of doing it, they see the big picture, they see the idea of doing it and then you won't be able to stop it again. So I think that's the common end user, when we talk chatbots, AI and stuff like that.

Caroline: Was it necessary to create a shared terminology of AI with Lisbeth?

Thomas: Yes.

Caroline: How come?

Thomas: So again, many people are a little bit afraid of artificial intelligence it sounds scary because it's been associated with movies and robots taking over the earth right, so people are little bit afraid of the term. What we try to do initially, when we talk to companies. And that is also part of the ready-made AI process is to define what is AI. And say, well AI is actually just a term and below that we have a lot of different technologies that we use, machine learning, big data and stuff like that. It is actually not that scary. You actually use AI everyday and it helps a lot when people actually see that, well they are already using AI it's here right now, it's been here for a while and it's just getting bigger and bigger, in their everyday. So right now we see that, especially in the States right, that a lot of people have these Amazon Alexa, Google home and stuff like that. And slowly they begin to come to the Danish market and people start using them and actually see 'ok, so I can actually have a benefit of using this little thing' and I don't think they see it as artificial intelligence but it is. Having a machine that understands what you're saying to it, is artificial intelligence. It's not super complicated but it's still AI.

Caroline: And do you think you succeeded in establishing a shared terminology?

Thomas: Well that's hard to say, I really hope so, but I'm not sure.

Caroline: And do you think there was a successful collaboration between you and IDA?

Thomas: Yeah I think so, we had some challenges along the way, but I think they got a pretty good result out of it. We build something for them that (.) We hadn't build it before so it was also a learning path for us doing that kind of AI. So of course there were some issues doing that, but in the full perspective, I think we had a pretty good project.

Caroline: What kind of challenges did you have?

Thomas: Yeah so, we wanted to build (.) so one thing was building the chatbot. That in itself was pretty straight-forward, and using all the components we had for that. Afterwards we built a custom AI model, where we tried to read all of the email correspondence between customer support and the members, based on that, extract all of the questions and answers, that was pretty complicated. And it's not something that has been done before, from what I've heard. Most likely it is but not in this perspective at least.

We have had so many customers asking for it ((the same solution)) afterwards when we talked about it, and they say 'we want to do exactly that, if we can do that, we wanna do that'.

Caroline: So we know you did a chatbot for car insurances for IDA. And then how did you agree on a specific solution?

Thomas: Yeah so, one of the things we always start with is, and that's also part of the Ready-Made-AI, right. Is having a workshop where we define the scope of the project. And when we discuss chatbots it's really important to have a limited scope. Because if you try to invent a chatbot that can answer like everything in the world, you will fail. But if you try to make it understand a little business area, you will succeed or while most likely you will, if you know what you're doing. You will be able to succeed, right. Because in this particular case we ended up having a 26,000 different answers for the chatbot. Just imagine we expanded that to other areas, right! It would be super large, so being able to say with this chatbot you can ask these questions, this chatbot and you can ask these questions, and what you can do then is actually just make a little layer on top of multiple chatbots saying, if you ask that question it will automatically find the group chat. And forward the question to that one.

If you take the case about Ernst and Young, they have made, I think it's around 700 chatbots internally, that they use so it's a lot right, and one of them they use in HR and they expect to save 2.1 million man hours per year because of their chatbot.

So that's really much, and that is some of the benefits. But that specific chatbot knows about HR, it has no idea about, if you ask about time restriction it's clueless, but it knows everything about HR.

Caroline: She ((Lisbeth)) was mentioning some budgetary issues, and that was one of the reasons - I think (.) the car insurance chatbot. Is that your perspective on it as well, or do you have a different perspective?

Thomas: Yeah, especially when we talk about AI and because it's still a black box for many customers a little bit afraid to say ‘ok so we're gonna put in half a million’ for example for this project.

In this particular case they said ‘well we have this amount of money’ and we said to them then we have to limit the scope even more. so instead of covering insurance for IDA, we covered car insurance. So we limited the scope down to a really narrow one.

Caroline: And was it you who suggested that? Or was it her that came to that suggestion?

Thomas: So we did that on the workshop where we talked to each other.

Caroline: So the way that AI, the way that IDA has chosen to use AI, has that had an effect on how you developed it for them ?

Thomas: So you can say that (.)

Caroline: If any?

Thomas: Yeah, so you can say in general, that the way we develop the chatbot, that was actually pretty straight forward, regarding the chatbot. The other part where we did this extraction of question and answers in communication, that was a little bit more tricky and of course that happened in a really close relationship to IDA. Whereas the chatbot was a bit more, well we can easily do that for them, we can easily deliver a package. But the other one was really customised, and we wouldn't be able to take that model we made for them and just replicated to another customer for example.

So there's no doubt that the way we built that was in a really close relationship. And I'm not sure I would say it changed the way we work, but it at least (.) well I would say that it was an eye-opener for me because at that point we hadn’t done that many a machine learning projects. So it was quite an eye-opener for me about how we estimate things and how we set the expectations for customers.

Caroline: So you are going to talk about Optisquare. So again, how was Ready-Made.AI used in this project?

Thomas: So in this project, if you go back to what Ready-Made AI is. It is this concept where we say ‘let’s initially discuss the things, let’s scope it really well, talk it through, making sure that the customers have the same idea about what is going to be built as we do’. Let's take a look at if you can use some of the ready-made components that we can use and do that. And let’s implement it pretty small ((some of it)), and if all of that is a success we can have a good business case and be able to expand the project.

So in this case, we weren’t able to actually use any ready-made components because what they wanted was a custom solution from the very beginning. But what we did, was that we spend - and we actually learnt that from the Bestseller case - we spend a lot of time discussing what is it exactly that they wanted. So you can say the initial part where we have these workshops, where it is me and it is one of our project managers and it's our data scientist and it’s the customer, we spend a lot of time discussing, just discussing, drawing on a whiteboard - stuff like that. Making sure that what we see is what they see. Because what we having experienced previously, is that we can have our data scientists say ‘well, I can make this categorisation’ and the customer says categorisation sounds fine let’s do that and when we’re done, it ends up that the terms that we use in data science, is some other terms then we understand as normal humans, when we ((normal humans)) talk about categorisation for example. So that's why it's really, really important that our data scientist and our customer have the same idea about categorisation, for example.

So we spend a lot of time talking to them about this. And then after that we built this custom model for them, which is a pretty complex model. Pretty big it's got some huge potential for them.

Caroline: And do you think Optisquare were aware that you were using Ready-Made-AI.

Thomas: So again, we introduced them to Ready-Made-AI, if they (.) I’m not sure they saw themselves being part of that flow, but yeah they were.

Philip: When you say Ready-Made-AI, do you say ‘Ready-Made-AI’ to the customer?

Thomas: So yeah, we always go through this slide we have ((appendix 7). I think I have sent it to you, the little dots and the big dots. Have you seen that?

Philip: Yes.

Thomas: We always go through that with the customer in our initial meetings, and saying this is how we solve AI projects.

Caroline: Okay, and do you think that you and Danny ((Optisquare)) share the same understanding of AI?

Thomas: Yes.

Caroline: How so?

Thomas: So Danny is a (.) he's really into technology. And he sees a lot of opportunities using technologies, so I'm pretty sure that we have more or less the same perspective on AI. And that is also why you see a guy who is in his start-up phase, right. He almost doesn't have any money, the money he has is extremely limited and yet he invest all of them in building an AI platform. What he could have done was to sell a lot and then once he had a million in the bank you could say 'well now I do the AI part. But he knew that if he is gonna have a great success, he wants to have AI from the very beginning.

Caroline: Do you also think you share the same technical aspects of AI, as well?

Thomas: Yeah, I think so, I think.

Caroline: Do you think that was both before and after working with him?

Thomas: Yeah I do. I think he learnt a lot during this process (.) from the very beginning we had more less the same ideas about how can you use technology. He has never worked with AI before, so I think he learnt a lot about terms and how to do stuff, when you work with AI. So I think he also learned from that.

Caroline: Was it necessary to create a shared terminology of AI with Optisquare?

Thomas: Yeah so again, as always we spend some time, again back into the initial workshop, we define what is AI, AI is just a term and then we begin talking about machine learning, and all the terms below that, the big data and stuff like that. And we spent a lot of time making sure that the terminology was correct. Because we knew that that would be a big thing in a project where the money is super limited, as they were in this case right.

Caroline: What do you mean by big thing?

Thomas: So, if things go just a little bit wrong in machine learning that can have a huge effect. So if we weren't sure upfront that this is the goal you put in this and you get this, if you're not 100% sure what the outcome is, and what type and what format it should be in then we would not have a success. Because his money was so limited we knew that it wasn't an option to say 'well then we corrected and do something'.

Caroline: And do you think there was a successful collaboration between you and Optisquare?

Thomas: Yeah

Caroline: How come?

Thomas: (.) Because of two things. (.) So the thing is, I really saw his idea of his business. So we actually agreed to say to him: we gonna lower price, to our it cost price, so didn't make any money on the project. But we saw the idea. And I'm pretty sure that he's gonna make a lot of money and then, hopefully, he'll come back to us and buy some more.

But I really saw the idea for this project and we also got a good case out of it. So that's also worth something from outside. In that term, I think it was a success and on the other term, on the other side, he got something that he would never have had with that amount of money he had. And he can now use that as a foundation to go out to some big companies and say 'I have this platform and its ready'. Just bring your customers. So I think it was a success.

Caroline: We know that Bluefragments are currently developing a platform heavily relied on AI services for Optisquare. We imaging that this is quite a complicated process, to what degree has it been possible to accommodate all of Optisquare's wishes of development of the AI platform?

Thomas: So Danny had some big visions. I would say that during this workshop we had, initially, we again talked about scope and stuff like that. And I actually think that what we built in the first phase is something that actually exceeded what he expected to have in the first phase.

Caroline: How many phases do you think there will be?

Thomas: If his business is gonna have success, multiple. So this initial phase is where he says 'this is the bare foundation'. That I'm going to build here. Then afterwards he will get some customers on board and get a lot of learnings from that and he can build the next layer get some new customers build another layer. And then after a year, two maybe, he can begin saying 'ok, so now I begin to say 'ok so if I can do this I can actually pride an extra add-on'. So, but that will take some time for him.

Philip: But the phases are technical? IT's technical in the AI that will come out?

Thomas: Yes it's phases in the technical development, but actually also in his business, I believe. Right now he's in the very initial steps of his company and he needs to on-board customers.
Caroline: Danny mentioned, in the interview we had with him, that the AI would not take such a long time to developed. He believed it would be done within a few weeks. Have you experienced any difficulties in this project related to cost or time?

Thomas: No so, well it took more than a few weeks. I think we ended up with a few months. But still extremely limited ((short time)). And I wouldn't say we had any charges. We had an open and totally honest dialogue from the very beginning of this ((project)). That is also why we said to him, to be totally fair and open, we like the idea of this. Our investment, is that we get a really good case, hopefully, you will succeed and bring this out to huge companies and then you can say 'well, it was made by Bluefragments'.

Caroline: He also mentioned that the project required a significant amount of data, and he was currently working on gathering the needed data. Have you, up until now, had access to enough data to go forward with the project?

Thomas: That was, from the very beginning, our challenge. Because he's a start-up. And what you build machine learning models on is data, historical data. And when you're a start-up, well unless you can find some online data, then you don't have any data. And he didn't. Well, he had extremely limited amount of data.
So we said this to him, right away 'we can build the AI for you, with machine learning models, but there will be some level of uncertainty in the result. Because of the limited amount of data. And once he had on-boarded a big company, we can get some more data - then we can refine the model and make an even better result. So right now, it's like the chicken and the egg: He needs to get customers on his platform to make money, and for the customers to really benefit from it, the results needs to be good for customers.

Caroline: Danny believed acquiring data might be a future challenge for Optisquare, is that also your impression?

Thomas: Yes.

Caroline: Is it your impression that Optisquare's use of AI as a strategic decision or tool, or how do you see it?

Thomas: So actually, in this case it's both. It's a strategic decision to say 'I'm going to build my entire business on AI because I know that would be able to comprehend all of the variables that the many different retail stores have'. And it's also a strategic tool because it's one of the core components inside his platform. If you didn't have AI he wouldn't be able to deliver a result as he does.

Caroline: So we're gonna move on to Bestseller. How as Ready-Made-AI used in this project?

Thomas: That was used to a really high degree (.) So again, we had a initial meeting where we discussed how do we solve AI projects, and again, they saw the two slides about how we do it. And then we had a workshop meeting where we discussed 'so what', we had actually three different projects for them. And we discussed which project would be the best to try to solve. And we found out that this case in the support department,

would be the best. And based on that, we came up with ‘so which component can be used for solving this case’ and planned that. And then we had this three days on-site workshop with them where we actually did the whole thing. So we use Ready-Made-AI a lot.

Caroline: And do you think they were aware that you were using Ready-Made-AI?

Thomas: (.) Not necessarily. Again, we talked a lot about it, initially. But I think many customers they actually they don't think that much about terminology. Once we are in the project. they think more about their business and how it fits in.

Caroline: Do you think that you and Lars shared the same understanding of artificial intelligence?

Thomas: Yes. I think Lars is a person that is extremely curious about technology and is super bright and understands the possibilities about technology. He does that for many different technologies, so of course he cannot dive deep into AI, for example. But when we do a project like this, he deep dives into it.

Caroline: Was it necessary to create a shared terminology of AI with Lars?

Thomas: Yes, again (.) When will build this project, we only had the three days to build it, this machine learning model. And that was extremely hard to do and we had to try out multiple different components to be sure we got the best result. And as part of that, we discussed those terminologies with Bestseller - what is machine learning model what is a neural network, how does it work? How can we change tiny, tiny parameters in the neural network that will actually increase its understanding of this support case.

Caroline: Do you think there was a successful collaboration between you and Bestseller?

Thomas: Yes, definitely. We had goal saying we need to reach, I can’t remember the exact number was it 60%? I think, at least. And have a 60% success rate when the AI should do a classification of a support case. And we ended up on 83% and that actually, well if not unpair, then better than their own existing human department doing the exact same.

So yeah, definitely a success and the fact that we did that in three days was almost unbelievable. And I think they share that perspective.

Caroline: So we know you make this solution for an automatic dispatching system for a internal tickets. How did you agree on this specific solution?

Thomas: So we did that on the workshop where we had the three different cases we discussed. And we had to find a project, first of all, fitted into something we could solve in three days, that fitted into the budget. Also, what fitted into what would make value in the business so that they could take that project and use it as a business case for the next AI project.

Caroline: Can you explain a bit more about what kind of AI you develop for them?

Thomas: It was a machine learning model that, for training it we build a model that read 10,000 different support cases and we had the results on those ((they had historical data that could be used)). So what we did, was that it is used that portion as training to understand what is a support ticket. And in the model that decides where to put a support case, so what does is that when you get a support case in translates into English, remove all garbage text - like footer, intro stuff like that - so we have the bare support case. And then we use natural language to understand that text and put it into a neural network where it is deciding where it ((the support ticket)) should go based on its training.

Caroline: How much of the technicalities did you need to explain to Lars?

Thomas: So they have been on this course on AI, and actually my very first meeting with them we actually deep dived a bit on the AI terms. I think they saw a great value on that and on the workshop we also deep dived in some of the terminologies - and I think that was actually the part where they said ‘ok so we believe you are the right guy to actually do this for us’.

Caroline: Did you in some way have to explain more about the technicalities of AI to Bestseller or do you think you had more or less the same understanding of the technicalities?

Thomas: They had the overall perspective. But we explained some of the core.

Philip: Lars talked about them having three different projects, did he present three or did he present one that he wanted you to do?

Thomas: No, so he present three. And we discussed those and which one would be the best to solve in the budget and the time frame he had. So they also had a project - you most likely should not right about that - but they had a project where they wanted to say ‘so I'm this kind of person which outfit fits me best’

Caroline: That was the cognitive fashion, wasn’t it?

Thomas: Most likely, I can’t remember. Super exciting, but wouldn’t be able to do that in three days.

# Appendix 4

## Interview with Lisbeth Michela Bach Keldsen, Digital Project Manager, IDA

Note: After the conducted interview, we had follow-up questions which were emailed to Lisbeth Bach Keldse. The follow-up questions are at the end of the document.

‘Caroline’ and ‘Philip’ are the interviewer and ‘Lisbeth’ is the interviewee.

Philip: So we're just going to jump right into it, you just explaining how you ((IDA)) use the resources, directing ((them)).

Lisbeth: Yes,basically what we need, what we started looking at about a year ago, is how we can optimise the use of our resources. Because we're in a growth of the membership growth, we have an ambition of 175,000 members of by 2025, 110,000 members today. We've been growing gradually for the last 10 years but obviously, if we need to be able to deal with 175,000 members we're gonna need to look a lot more into AI and RPA ((Robotic Process Automation)) solutions.

So what we did a year ago was to look into the potential of - we had two scopes, one was looking into potential of making some sort of AI, robotics within the legal department with overseeing contracts. We go through a lot of contracts. Our members they get a new job, they want us to review their contract. And the other one was to look at the insurance part. IDA has insurance, IDA Forsikring ((IDA Insurance) is quite a big part ((of the company)).

We ended up just looking at the insurance part, because that was what we had the finances for and we choose Bluefragments as a contractor. The potential was to build a chatbot, and intelligent chatbot based on AI and machine learning. So that the people we have working here - guiding people through which insurance should I buy ‘this is my car, and what about my 20 year old son can he drive it’. All these things, if they could have that same conversation with a machine, we could save a lot of time on these sort of very typical questions, but obviously individual for each member.

And I don't know how much you know from Bluefragments, but we build a prototype and we haven't done much about it since, it's working but we haven't released it. It works now but it still needs a lot of training and it still needs a lot of data put into it.

Philip: So is it a general purpose one ((chatbot)) or is it a specific department?[

Lisbeth: ]Is very specific, it is only in the insurance department, and just regarding car insurance. So we kept the scope very slim, and that was the purpose because we didn't have (.) a we had, I had a bag of money that I was allowed to spend, and this was sort what I could get for this type of money.

Philip: And in car insurance, there must be quite a lot of competition, so is it a competitive edge?

Lisbeth: Not at the moment, it hasn't been scoped as a competitive edge. It's been scoped more as (.) an extra gadget towards our members. We have been looking into few of our competitors. We have quite a strong brand, we have quite a strong pricing in marketing or market price. So in that sense (.) We have competition obviously, everybody has competition, but we have, due to are quite large group of members were able to keep the prices quite good so.

We haven’t been using it ((as a competitive edge)). We haven’t been using, we didn't go into looking into AI with competitive edge in mind.

Philip: So, what does your collaboration with Bluefragments entail?

Lisbeth: They build the prototype for us. A along with (.) it was quite an interesting experience, we were two project managers, I was from the IDA and they had Kate from Bluefragments. So, we're co-worked on scoping and planning, and then we had Thomas ((IDA)) and the other Thomas from Bluefragments, and there was another guy at some point, I don't remember. And then we had a few of our own developers. The reason why we chose Bluefragments was because we, they worked with Microsoft, and we ((IDA)) already works a lot with Microsoft Azure.

So we weren't interested in going out buying a new system. Having somebody build something for us, and then every time we needed to fix a gadget, we had to call in the consultant. So we wanted to (.) somebody to help us build our own machinery that we will be able to maintain and keep developing.

Philip: So your able to maintain the[

Lisbeth: ]That's the general idea. So, where we are right now, is that we have a prototype that's not finished we've tried them ML ((Machine learning)) components we've tried that, we build the interface and everything. But we have actually released it because we need to keep training. And that's on your (.) the whole collaboration with Bluefragments has come to an end. And the plan is that we're gonna keep, hopefully continue working on it, within our own resources.

Philip: So, that is a little bit about what the current project is about. But what we really want to understand, also in the broader term, what artificial intelligence is. So just from your own perspective, what does intelligence mean to you?

Lisbeth: Artificial intelligence?

Philip: No, just intelligence.

Lisbeth: Uh Well. Always looking for a smarter solution than the one you've been using. Or being able to add your experiences or wisdom or whatever to the current problem, that you need to solve.

Philip: Right, so what do you understand by the concept of Artificial intelligence?

Lisbeth: Well basically having a machine that more or less does that. Takes several things into consideration, it's not just a (.) Maybe I need to explain, in a different way, because we already also been looking into RPA ((Robotic Process Automation)) solutions, which are very generic, you know. Like, you get the Machine, you tell do the same thing over and over and over. That has great potential also, especially in a business like ours.

But with the Artificial Intelligence we would like to try and imitate some of the solutions that today are very time-consuming, because you can't really know which way this conversation is going to go. Take for instance one of our lawyers consulting, whatever member, on a contract. It can take anything from five minutes to an hour. We can't know this, ((as)) it also depends on how talkative is this person, how much knowledge does this person have upfront, how green are they, how experienced are they. So this is something that is really hard to estimate, how much, how many resources do we need to have just to deal with these contracts

Whereas, what we could hope for in the future is a machine that they can actually give the same guidance or the same (.) yeah guidance on how to look at your contract and that would take anything from an hour, 5 minutes to an hour, from a real person who can actually use that time on some more complex legal counselling.

Philip: So, how would you distinguish artificial intelligence from other technologies?

Lisbeth: Probably the ability to resemble the human mind, in a greater way then, then for instance RPA, RPA is very - it does what it is told.

What I expect and hope and (.) Think we will be getting with the AI is that we can in a much larger sense copy the human mind. We can get a machine to actually tell me whether, should I go left or should I go right. Based on the algorithms, based on all the other data we have filled this ((the AI)) with yeah.

Philip: And that leads a little bit into the next question. Which is where do you think AI has its limits and capabilities. Because when you say left and right, do you think it at some time - at some point be able to actually make the right decision? Like should we go left or right? Or is it always a person who is supposed to be ((in charge)).

Lisbeth: We talked very much about how to monitor a machine like this. Because you can. I think there was an example, was in the IBM machine? That started becoming very sexist and racist, you know, because if you start down one path it is going to continue down that path. Because it keeps teaching itself based on what it knows already. So, I don't see the perspective in the nearer future, that we can just not let the machines handle these things.

And we talking about this with our own experts, that we need a person to monitor, quite closely, what are the answers it's giving out, what is it - how does it - what does the base its answers on, and so forth.

So I don't see in the near future that artificial intelligence is a complete replacement of the human mind. Because that will also give us (.)

We've taken ethical considerations, we have had ethical considerations. Not so much in practice, but

just in theory, how would we deal with this, and this, and this. For instance again the legal department. We have a legal responsibility to give our members the right legal counselling, and if a machine is giving the same counselling. Well, who is liable? If this person takes the job and it turns out that this contract is not good enough. Or he or she ends up in trouble one day being fired or whatever. So obviously completely letting go, and just letting machines deal with this, is properly not there quite yet.

Philip: But do you think you will get there? Do you think the limits will change?

Lisbeth: I think I'm hoping so, in a sense. Because I see a lot of perspective in taking a lot of these - is not a generic - it's not a generic assignment dealing with, for instance, with a contract. Or advising people on their car insurance. But it's still so generic that is very much the same people need to hear, but they need to hear it from the somebody today.

Yeah, whereas sending an email and changing your address or something like that. That is a whole different field.

I'm hoping that will get to point where we can actually have machines do these generic, but still human task. And we can focus our resources on the more complex legal issues. Where there is actually a need to assess and evaluate, and yeah put together a lot of facts, and look at the law - or I was just mentioning one department[

Philip: ]So where do you see that AI could be used in the organisation, besides car insurance?

Lisbeth: Other car insurances, I see them some of the lighter legal counselling. I see a potential - and we have a whole area of (.) it is called 'teknologi og netværk' ((technology and networks)). We have these technical networks for people. They sign up if say, 'I was a bioengineer and I want to be in a community with other bioengineers. Well I'll join IDA bioengineer, or whatever it's called, and they'll arrange different courses or lectures or trips I can go on, that has the perspective of me being a bioengineer.'.

I see potential in actually directing the right information, the right courses, the right lectures towards people. Based on the interest they have rather than they having to look up 'ok what can I actually, what does IDA have' rather do it the other way round 'we know what do you need'. I see potential in this.

I see potential. Those were the outward bound. Things we have, but I see potential also internally in corporation.

Could I in my job, I need help with, well there is something ((wrong)) with my computer. Today I'll run up and ask one in the support team 'can you fix my computer there's a buck, or I can't it - won't start or I don't know this thing popped up'. Perhaps a machine could help me with that instead.

So in the whole finance department, I think there's a lot of potential. We use a lot of time and resources on auditing and keeping the books. So yeah, I think there's a huge potential in[

Philip: So that is also the value it brings now, time management?

Lisbeth: I think what we look at mostly, is time consumed and how we can save time from real human being, to do other tasks.

And that is our, and I keep repeating this, because we're really ((in the)) beginner stage, and we're not actually working with anything at the moment. But we have an ambition of working with these, new technologies.

But, I think our main goal is constantly optimising how can we use our human resources the best. And how can we service 175,000 members, as opposed to a 140,000 ((110,000)) today, with maybe 10 maybe, 20 but not exponentially, equally more employees in IDA.

Philip: Just coming back to your cooperation with Bluefragments. How did Bluefragments present the concept of artificial intelligence to you?

Lisbeth: Well we came to them. Our CIO has worked with Bluefragments in his previous job. So, he was - he knew a little bit about what they were doing. So we approached them. We were very specific that we wanted to work with some sort of artificial intelligence. So we presented the idea to them, that we wanted to look at some sort of artificial intelligence within insurance. And they presented us with the idea of a chatbot, an intelligent chatbot.

We have Messenger chatbots and things like this, you probably know them. But we wanted to do - to get a feel of the artificial intelligence, and just the whole machine learning concept.

Philip: So was there a distinction between yours and Bluefragments definition of AI, in the beginning?

Lisbeth: I don't think, I don't know. Maybe there was, I didn't pick up on it, if there was.

Philip: It was more that you came with a specific need and then they[

Lisbeth: ]Yes! So we were very clear in what we had, or what we wanted, and then they scoped it. That we just came and said that - or maybe we weren't that specific. We wanted to do something; we want to start working with artificial intelligence using Microsoft platforms within IDA insurance, what can you offer us? And they suggested we try to build a chatbot. And we scoped it to just doing car insurance, because it would be too big, to do the whole insurance area.

Philip: Make sense. So you already had quite a good idea of what ((you wanted))?[

Lisbeth: ]Yes. We did.

Philip: Okay, fair enough. Did you talk about something called Ready-Made-AI, in that meaning?

Lisbeth: Yes, I think we did. Uh it is so long ago! I don't know, what the conclusion was I'm thinking that some - what they build us - was some of it was Ready-Made-AI. We didn't get the[

Philip: ]I can give a recap. For Bluefragments it is quite essential to have this idea of Ready-Made-AI. Were you come with ready-made solutions. Where you can just get going, they don't have to develop anything it's Microsoft Azure mostly, so you have a specific solution with something that works in a specific context. So in the sense that it is something you can just use from the get go, do you think that was more successful than if they had started developing something, for you ((IDA)) specifically?

Lisbeth: I didn't know, I was under the impression that they did develop quite a bit for us. So I don't think, I'm not sure we got the Ready-made package.

They spend a lot of hours training. Obviously they had the Azure platform, they had the components that applied to that. OK I see what you mean now!

We didn't just start from scratch, we had the whole Microsoft platform. I think basically it was quite a good thing to start with, I mean, to have a foundation. And not just start from scratch. Because we weren't experienced in what we wanted and what we needed. So in that sense, it was probably a good idea[

Philip: ]So, do you think the sort of ready-made concept was relevant to the company, to IDA?

Lisbeth: Uh yeah. Yeah I think it was. Because as I explained earlier, we didn't want to end up in a situation, where we were depend on external contractor, every time we needed to make an add-on or fix a bug or something.

So I think was quite a good thing that we worked with something that was already developed, that we had easy access to the Microsoft Azure platforms.

Philip: Make sense. So do you believe that having this Ready-Made-AI also helped create a common understanding of the technology of AI, between Bluefragments and IDA? Sort of the capabilities and limits and?

Lisbeth: If it helps - let me have the question again?

Philip: Do believe that ready-made helps to create a common understanding between ((the parties))[

Lisbeth: ]Yeah, I guess. I think maybe, I think basically, you have a foundation to work from. ((Which)) gives you a sense of what direction you can actually move in. It limits, probably limits, you in going in. I mean, we very soon narrowed it into a chatbot. Basically I don't know, there could have been a thousand other solutions, things we could have done. Maybe not a thousand, but there might have been other solutions. We quickly narrowed it down to a chatbot.

We might have pursued other ideas, if we have not started with the ready-made solution. But then on the other hand, we didn't. We didn't come with a lot of experience. I mean, We didn't have people in house, who knew a lot about AI, could say well this, and this and this and this could be good for us. So[

Philip: That is actually part of the next question that I wanted to ask you: What organisational infrastructure is needed, in order, for you to adopt AI?

Lisbeth: Uh (.)

Philip: Here, we're thinking in terms of, is there special staff needed, structure, management?

Lisbeth: Yeah, the way we did it, was we just - it was very ad hoc. I was put down as the project manager. I've picked some people from the organisation, primarily IT developers and people from the insurance department, and that's basically how we work.

We have project managers like me, and then we have the rest of the house. And for each project we set a new team. And they worked on this project for a period of time. So we don't have a specific AI department or a specific department working on this and that. We sort of set the team from project to project. And we did the same for this project as well.

Philip: Ok, so in that sense, adopting AI was just another project?[

Lisbeth: ]Yes it was and we never, well it was a qualification project, we just wanted to look at what are the options, what can we actually use. As I said, we never actually put it into development, so we never reached that stage or we haven't reached that stage yet.

So that's sort of the gates we usually go through with projects in IDA.

Philip: Ok, so it is a set structure you?[

Lisbeth: ]It is a set structure. We work - We have been working with the very old fashioned, you could say, the waterfall method, you know, you start with an idea and then you qualify it, and then if it works, then you start developing and implementing. We also started working in a more agile - we're testing working with more agile structures. But this is usually what we do you know, does this work, do we have the resources to develop it, is the house ready for it, so forth.

So these gates, these safe gates you need to go through - ok going from this to this, yes or no.

Philip: Make sense. So has adopting AI been a strategic decision for the company?

Lisbeth: Uh, a strategic in the sense that they need to get optimisation of resources, so yes. It's definitely a part of our IT strategy, digitalisation strategy which is connected to our corporate strategy. Looking into AI solutions is one way of optimising resources, in order, to be able to take care of all members and give them[

Philip: So, it is more of a way of doing a specific thing rather than - it is just there is a lot of hype about artificial intelligence.

Lisbeth: We're not doing it because it could be fun to have a machine that says 'Hello' when you walk in the door. We're doing it basically to optimise resources.

Yeah. Or we have a potential of doing it, in order to optimise resources.

Philip: Okay, that makes sense. But has there been been any challenges of integrating AI into your organisation?

Lisbeth: Well, we haven't integrated it really yet, so.

Philip: Well in the development at least?

Lisbeth: Uh, challenges let me think (.) I think we have reached the step yet, where we - because we haven't integrated - we haven't implemented the new chatbots or RPA solution. So we haven't met the resistance that you would commonly expect from co-workers. Some people are afraid that what they used to do is going to be taken over by robots and so forth. So we haven't actually met that barrier yet. Because we haven't really implemented things.

We expect to begin looking into more RPA solutions and process optimisation throughout the house, over the next couple of years. So if you ask me in a year or two, I might have enough for you. But at the moment we haven't actually met any obstacles, because we haven't really implemented ((it)). We're in a stage were people still think it's interesting and well a little fascinating working with the robot in this department, and so forth.

Philip: But that's the vibe you generally get from people in the building, that it's exciting rather than?[

Lisbeth: ]Yeah.

Philip: Okay. So what kind if opinions would they express, if any?

Lisbeth: Uh, well it's fun new technology, is it's different it's.

Well, ok I said before that we haven't met ((obstacles)), most people find it interesting, you have always a category of people who think it's a waste of time, waste of money, you can never 'a machine can never do this, as well as I do' or yeah. So we have those ((people)) of course as well.

But mostly - what's that thing if people find it quite exciting now and I get the sense that in each department in the house people, most people are looking at potentials 'uh could, this could be something that we could use the robot for'[

Philip: ]But isn't there someone right now answering the question that the chatbot is supposed to answer?

Lisbeth: uh'um ((yes))

Philip: And they don't feel threatened by the fact, that something being developed to potentially replace them?

Lisbeth: I don't know, it is a hard question to answer. It is not so much one person doing the exact same job and the chatbot, that we've been trying to develop. It a group of people who do a lot of different counselling including the specific topic, as this one chatbot. So I don't think anybody seen near future potential of them being out.

But I haven't heard that version. I haven't heard anybody 'say oh my god it's coming'. On the contrary I've heard people say 'uh, that would be great because I will have more time to actually do this, and this, and this, that I never have time to do or I have to work overtime to do'. So we're busy like every other company in the world basically, some people don't have always have enough time to do their tasks so I think most people see a great potential in using things, computers to solve things.

Philip: Is there a difference in opinions between management and employees in terms of AI?

Lisbeth: When I say people in general, I mean staff (.) I think management have ambitions that we will be a lot more roboticized or whatever over the next few years. I can't speak for the whole management, but I think any management would see potential in optimisation when implementing robot technology. That would be the main gold for most companies more than just something fun to play with. So I think that's definitely the potential of the ambition that our management has. Because they have been said to us that we have 110,000 members and we're going to be 125 ((125,000). We need to be able to deal with this increase in members with more or less the same stuff we have today.

Philip: Right, is there a common understanding of the organisational purpose of AI between you and the other employees? So you talking about the ambition of growth, is AI a part of that ambition?

Lisbeth: Yes. I think everybody can see that in order to reach this goal, if we're not going to run everybody down, we need help from machinery. We need help from computers and robots in order to be able to deal with this increase. So pretty much more less. More or less all projects that we launch these days have to have, at least taken into consideration, is something that will help us in our in the path towards increasing our members and also been able to actually handle this increase. So you can ask anybody who works here, it's very much in everybody's radar that we're going to have this increase and we're not going to be exponentially equally more staff. So we need help from other - from computers, from robots.

Philip: So that sort of what, would people say that there's both, like you know the growth, but would people then also say and we have AI to help us with growth or is that really a specific]

Lisbeth: ]I don't think people will say we have it yet. I think people are more impatient that we don't have enough of it yet. Because they already see, a lot of people are quite busy. So I think maybe we're looking at a different scenario, that a lot of us would wish that we had already more AI to help us get through the day, so to speak. Or get our tasks done. Because we have]

Philip: ]Is IDA sort of a very tech enthusiastic company?

Lisbeth: (.) Yes and no. We have a, you can find IDA's vision on the website, but we want to be the voice of technology number one. Which is just as much intervening in in the public opinion on technology and being in the right places. And we started, we were co-founders of the Siri Commission and all these things. So in that sense we're very pro-technology and want to be seen as the place for corporate life for the government to seek counselling on technology.

But In-House, working with it, we're not necessarily Top of the Pops, when it comes to new technology. So it's sort of, there are two sides of that we don't always have, I mean we have computers as many other people. We have Office 365. You know, it's not like, we're not in that sense the ground breaking in the technology, that we use in our everyday work. But we have an ambition of]

Philip: ]The only reason I'm asking is that we have experienced that there's quite a lot of fear surrounding AI. And it's usually from people who actually don't know what it is. Whereas here it seems that people, if any, one thing is that they might not think about it or even if they do, they don't really care much. They see it as a benefit, not a threat. That's sort of why I'm asking, sort of generally, is the company very sort of tech?

Lisbeth: Well, I think in the sense that we work for people who work with technology. Obviously, if we have more inside - you can go down every hall ((hallway)) here and can find people who are afraid of the "What will happen to my job if the computers come". I'm sure you would. And I'm speaking for myself - I can't speak for the whole ((organisation)).

But my feeling is that a lot of people also anticipate this, because most people see a potential in making the stack smaller. And it's also the ground, the story we're telling about AI is "Well, AI is not coming to take your jobs away. AI is coming to help us actually be able to carry a bigger load".

Philip: Okay, so you're telling that story?

Lisbeth: Yes. That story is more or less officially the story that we need. We need technology to be able to sustain memberships and growth. And we can't do it with the hands of people we have. And obviously, some new jobs will arise and some will disappear, it's not an equal in math piece. I don't know. I'm sure there are people in this house who are afraid, like you experience in other places, but I think most people see potential in this.

Philip: But I have to ask, do you think people will change their attitude when AI has been implemented?

Lisbeth: Maybe. When they feel it on their own body. If they feel ((threatened)), I think it's human if they feel threatened. In there own livelihoods, so to speak. Perhaps, maybe because we're not on the brink of actually implementing anything right now. (.)

I don't feel that the house is shaking because AI it's on its way. I don't think we're there yet.

Philip: But do you have, what has your previous experience has been with integrating technologies into to the organisation?

Lisbeth: Oh very varied. Depends very much on which part of the house you go to. Some departments just welcome it with open arms. Other departments are more critical. (.) It's not always easy to implement ((a new technology)). It could be a new phoning system, it could be a new system. Many people are depending on being able to do their job, via the telephone system or the computer systems on logging system, or whatever. And if (.) I just love this old picture of these two old stone men and they're caring all these stones and here's a guy with the wheel and they ((the stone men)) said "No, we don't have time. No thank you, we don't have time".

So it's sort of you know, sometimes you actually have to stop and waste time in order to actually gain time. And definitely, we have that here, as well. We're not different from anyone else, I think so. We have a lot of people who, we meet resistance when we try to bring on new things. So it's probably, I haven't given this a lot of thought until you asked me, but I think it's two faced. Cause I think people do generally get annoyed when they need to deal with new technology. But on the other hand they see potential in "Oh my God, I don't have to do this and this and this because we can get a machine to do this in the future and that will give me more time". So it's not black and white. (.) Yeah I think that's basically it.

Philip: So you're talking about wheel as a new technology that could potentially revolutionize in a way that stone men will handle it.[=

Lisbeth: =Maybe a little.=

Philip: =And one of the big things about artificial intelligence, is the fact that it is intelligent. So, in your opinion how does AI act intelligently when you use it?

Lisbeth: (.) Well, as I said earlier, I think it's the ability to resemble a human mind. That is both intriguing and scary because (.) I think - we have a whole department of Lawyers. And I think people like lawyers have felt quite safe. Accountants and lawyers and, you know, people who took long educations felt quite safe because, well you need my head to deal with this. And there's actually realisation that you're not necessarily safe just because you have a good long education: doctors. You don't really need doctors because you can have machines do surgeries much better and diagnose and all this. So there's also an awareness (.) beginning awareness from some other groups in the house that 'Okay, so this would usually be a task that we need human intelligence to deal with ((the tasks)). Maybe actually, we don't need human intelligence to solve this in the future'. I don't know if I answered the question?

Philip: Yeah, it's a total open question, so you can]

Lisbeth: ]Yea it is. The ability to not just - cause we were thinking very much in process, and you know, you get an email and we need to change the member numbers in the system blah blah blah. That's the whole process you can use ((AI for)). Obviously using machine for - well I say obviously, but it's just very much more generic. Whereas, it's beginning to draw on people that the things that we use today, we use our head, we think "Okay, should I do this, or should I do this and what's the best answer for this". We might actually have machines doing that. And we will definitely get in some areas of IDA, I'm pretty sure of it. But I don't know when.

Philip: Right, especially for the chatbot you're using, does the AI react to the way that people use it? You were talking about that horrible example of chatbot ? ((previous IBM chatbot example))

Lisbeth: Well we've only tested it internally. (.) That's why we can't, we actually don't have a product we can launch yet, because what we need. The way I have been explained this without knowing anything about the technology, is that you have a very short, a very long (.) it gets gradually more and more intelligent based on the date that get in, based on the data you feed it and based on the way people ask questions. And then, okay, it'll remember that and then "What did I answer". It'll be going slowly increasing for a long time and then suddenly it would peak because you have enough data to, you know.

That's what we've been working with. We haven't reached this point yet ((referring to the peak)) and the problem is that you don't know, when you reach that point. You keep training it ((the AI)) asking questions, you keep monitoring it and then hopefully someday you will experience that increase. That's the whole machine learning part, as I understand it. It will continuously learn from previous answers it gave and previous questions it was asked. The nuance is the sentiments in the way we ask, for instance, somebody would say 'I need an insurance for my bike'. Well, in Danish you would say "min slæde", for instance for my car 'I need an insurance for my slæde'.

But the machine won't know what a "slæde" is to begin with, but after while 'Okay, "slæde" is equivalent to a car. Okay, so I learnt ((talking about the AI)) that from this question that blah blah' and so forth. Hopefully, as I've been told that's how the machine smarten itself through each question and answer. And that's why you need to monitor it for awhile. At some point, somebody needs to tell them ((AI)) that "slæde" is same as a car until it reaches a point where it can actually draw that conclusion itself. 'Okay, so based on what this person is asking and within this context, I am ((the AI)) guessing that "slæde" is a car' and then it will answer equivalent to that.

Philip: So do you see AI act more independently overtime?

Lisbeth: Yes definitely. And that's the ambition with the machine learning part of it, so to speak. And that's also where (.) The example with the IBM bot. Cause, you know, it goes out in one tangent where it shouldn't go out. And then it'll keep continue because it will make itself more and more intelligent, but going in the wrong direction. So in some way we need to monitor it or change the future for how you build algorithms to prevent that from ((happening)), I don't know. I don't see how, the solution for that. But it will be necessary.

Philip: Do you think this, well improvement in at least performance, is a result of interaction with the AI?

Lisbeth: Yes, definitely. I think that's the whole purpose of the AI that it (.) All the machine-ing. I don't know. Both I guess is AI. (.)

We're working with something that a machine that will just, you know, be as smart as we tell it to be.

We were trying to work on a system that would gradually make itself smarter. So it's definitely, yeah. The perspective on the AI, it's not just what we tell them - the machine can keep going out the same direction it's been led and accumulate more and more information. And start to use it.

Philip: Would you describe as AI as an evolving entity?

Lisbeth: (.) I hope so. I think so and I hope so.

Philip: In what way do you hope?

Lisbeth: (.) Well (.) Basically (.) In the example of our car insurance thing. If I'm looking at an optimization perspective, if I need people to look at it all the time, I need people to go in and write the different answers. If I need people to monitor in which direction, that it's actually answering the correct question with the correct answer. Then I don't see much gain. I would need a machine that can be more or less self-run ((independent)) after a while at least.

You make it a heavy investment in the beginning, but you reap the fruits ((benefits)) after while. So if I'm not going to actually gain something that's just going to be another media to counselling our members in. They can talk to personnel, they can talk to computer, but essentially, it's the same because I need to have the person behind the computer all the time.

The potential is to reach the point where I don't need to have a person behind the computer. Or the machine. To give more or less the same as this person could give. So that's probably why I say "I hope" that it will be an evolving entity that will have the ability to keep developing and be more independent. If you can say that about a machine.

Philip: So what do you believe makes an AI valuable?

Lisbeth: Exactly that. This part that you can take out, at least in some areas you can take out the human being. And I don't, I think, probably, maybe I'm just naive maybe I'm just positive - I just see that if you take some jobs or tasks away from a person and put it into machine that gives a window to actually the human ((to the actual human)) being and spend time and resources on other tasks that are perhaps more fun for the individual or more giving for the receiver or just. If we could all take away the boring and, like if you didn't have to sit and transcribe all your ((interviews)). There are actually machines that transcribe so you don't have to do it yourself. That would leave all the fun stuff left.

Philip: you have quite a positive (.) view]

Lisbeth: ] Personally, I do. Yes. I think, I am of the opinion that if I stay curious and open minded, it's not going to eat me up It's gonna leave me possibilities for me. Continuously. That's my experience, so far with my career, that if you stay open minded then possibilities will open up.

Philip: But what might make AI a bit scary for people is that some people believe it has agency, but do you believe that an AI has agency? Do you believe an AI can exist and is capable of acting independently of human input?

Lisbeth: (.) This is a classic horror movie like future horror movie. Robocop. (.) I want to say I don't think it can. But don't think I can say that 100% and believe that because, well. I think that AI will always reflect the people that built it and that you can create it to, a certain extent, be independent or self-sufficient, or whatever. But it will always reflect the sentiments or the ambition or the goal that has been put into it from a human being. So, to put it simply, if the person who build the robot is a mean human being you will get a mean robot. If you have a nice person build a robot you'll get ((a nice robot)).

I don't think you will take the person, or the human being and the sentiment of the human being and the ambition of the human being out. I think that will be the ground stone for what you're building. Cause we will be building, based on the needs right here and right now. So when we have an idea of how it's based on 'Okay, how can we do this better or different' it's not something taken out of the blue or just, you know, build a machine to do whatever. You build a machine with a purpose, in my opinion. I think and I hope so. But I don't know maybe one day we'll have machines building machines, I don't know. Robocop.

Philip: So the machine isn't able to act on decisions, it's made for a specific purpose in which it knows there's a right and a wrong action it doesn't choose?

Lisbeth: Probably. I think. But I don't know. I can't predict the future. But at least that's how we're doing it now. So what the future brings ((I don't know)), but that's the general idea when you're building AI machines now. It's to solve a specific problem. Have a solution to specific issues that you need.

Philip: Will your company use AI differently than what you intended, after meeting Bluefragments?

Lisbeth: I don't think so. Because I think our meeting with Bluefragments was just a way of, let's say let's calling it "sniffing around see what options are there". And we definitely still see the technology that Bluefragments work with and chatbots as a potential in IDA. We see a different line of other different technologies as a potential. And I don't see IDA going down one path, just using one technology. I think will be using different technologies for different purposes - that's at least part of the plan at the moment. So, as I mentioned earlier we're looking into obviously robotics and chatbot, but we're also very interested on RPA solutions because we have a lot of generic tasks in this house, that could save us a lot of time if we had machines doing these things. So we're looking into a lot of different technologies that could optimise our organisation.

Philip: And the very last question, I promise, is that what does your perspective on Bluefragments? How do you perceive them?

Lisbeth: Very professional. We had a really good period of time together. It was a very interesting way of working. We were sitting in the same room, they came here two-three days of the week. I had a very close interaction with Kate and our developers and Thomas and his crew. I think the fact that they didn't just deliver a solution to us, but they sat down and made a solution together with our in-house developers, was a really good experience for the whole team. So we have really good opinions of Bluefragments. It was a good working experience.

## Follow-up questions

Caroline: You were talking about the decision to only focus on AI in car insurance. Did BlueFragments suggests this, was it your team or did you all make the decision together?

Lisbeth: We came to this conclusion together, as it was within budget. We had a set amount for the project and this was what made sense within the scope.

Caroline: Right now you're only using AI in one department, but you were talking about that you saw the potential of using it in multiple/all departments in future. How many departments does IDA have? And just to be sure, is insurance one department which car insurance is part of?

Lisbeth: Car insurance is just one product that is being sold and developed in our Insurance department. IDA consist of approximately 15-20 departments, depending on how you count it. You can always see an overview on ida.dk

Caroline: How have you communicated the intentional implementation of AI in the organisation? And has there been differentiation in the way you communicated with different parts of the organisation**?**

Lisbeth: As we have not yet launched any AI technologies we have not officially branded as such. During the project we invited all employees to participate in stand ups to learn more about the prospects of AI in IDA. I think every department talks about AI in general terms – how could we use technology to help us? – but not in specific terms. We do not have an AI strategy, but and IT strategy that suggests that AI is an option to be looked in to, whenever creating new services or looking into optimisation.

Caroline: When did you begin the collaboration with BlueFragments?

Lisbeth: June 2017

# Appendix 5

## Interview with Dany Fabricius Fogel, CEO, Frontliners

Note: The company was initially called Optisquare when the interview was conducted, but changed name to Frontliners during the writing process.

'Caroline' and 'Philip' are the interviewer and 'Danny' is the interviewee.

Caroline: Who is Optisquare?

Danny: We're a start-up, a tech start-up. So we're building a platform for stores and restaurants hotels etc. All kind of businesses that are staff meeting consumers and we make sure that the staff that they have are actually the right staff and perform fantastic every time they meet the consumers.

Caroline: And what you want to achieve with the company?

Danny: Well, world domination. We want to achieve (.) well, we want to make the world a better place, so that every time you interact with someone in a store or in a restaurant, café, whatever, that you actually go from there with a smile on your face. Instead of 'Oh my God, she was just staring into her phone all the time' or she was rude or whatever. So we actually want people to walk around with smiles because of the great service that they received everywhere they go.

Caroline: And why do you think this is important?

Danny: I think it's important because, there's several reasons. But one of the reasons is that the there's a lot of talk about e-commerce, shopping online and a lot of things happening online. So I think it's important that the offline things like shopping and being social and stuff life like that, it's fun and engaging and exciting and pleasant. So it's not something that you actually avoid just because it sucks.

And I think a Danish comedian once made a joke, that when he visited 7-Eleven he had to steal just to avoid the queue. So, you know, that's kind of weird, but it's almost, sometimes it's almost the same if you want to go shopping at H&M. You're much more likely to find what you're searching for online then if you go to the store. So they might have the product at the store, but you won't find it. So, if you know exactly what you want you won't find it in the store, but if you're just browsing then fine, but then you also have to wait like an hour before getting in the changing rooms and you know.

There's a lot of things so you need to, we need to make great experiences everywhere we go. In shops, in restaurants, hotels, auto repair shops - where ever! And that's where the main thing in there is the human interactions and the staff in these places, so we want to improve that staff to give great experiences.

Caroline: So what exactly is that you sell to your customers?

Danny: Well, it's a software platform that they can subscribe to. Where they will be able to test applicants before hiring them to see, how to predict how this person will perform if we hire them. And then, when they're hired, there's some training and motivational elements that make the staff performance. Yeah, every time.

Caroline: And what is the element?

Danny: It's just plain software. So it's different elements, so it's a personality test to see what personality the applicants have. And then they also do personality testing on their current staff. And we also measure the performance of the current staff, so we know who are the best performers and then artificial intelligence will predict if the applicant will perform as a high performing employee or a low-performer employer.

And when they predict that, then the manager of the store can say "okay, the machine predicts that his will be a very good employee, so we'll hire this person". And then there's scheduling in the system and we have different training elements: videos, texts, quizzes and motivational things, competitions. We're also able to register offline things like one on one the manager and stuff like that. And every day we measure performance as well in the system.

So then, so we can see which of the elements actually increases the staff performance and the which do not. And when do we need to do it and how do we need to do it. How does a video work and how does it work if

we let the employee see it an hour before his shift compared to two hours before his shift, compared to the day before his shift. What if he reads a text and see a video. What if you sees a video instead and reads the text afterwards. What happens to performance? All the time, what happens what happens to performance.

Then the system will keep improving and make the staff employees see what the system wanted to see, at the time the system want them to see it to be at their best when they have their shift and have to perform a great service for the customers.

Caroline: And who will be the operator of the program or the platform?

Danny: Optisquare.

Caroline: Optisquare? But will it be you or would it be the AI or some other?

Danny: When you say operator, what do you mean?

Caroline: So who would look at these different ]=

Danny: =AI. So our opinion is that, except for the hiring, then we want the AI to make the decisions. So we don't (.) as I see it, there's three different stages: so you have data - a lot of data. That was stage one, okay, now we have a lot of data. Then you have AI where you use data to build some actions based on AI. And then you have automation. And automation is this where are you use AI, as well. The output from the AI to just do things, making the system do things. Instead of just giving "Oh now you have this nice board with a lot of key performance indicators make a lot of decisions dear manager". Why? Because you know, AI knows what to do - so just do it.

Caroline: So there would not be so much human interaction with the front staff or =?

Danny: = No. There will be a human interaction, but a human will not be able to evaluate what is working and what is not working and when it's working and when it's working. And that's just far too complicated and will take too much time. So of course we can show a human "Okay so this is working and this is working and it's better if you do it at this time". But you don't want the human to know everything "So now it's 11. Now I have to do this and this for this employee. And now it's 12 now I have to do this and this" and so fourth.

You want a machine to just push the things that are relevant for each staff member. And then eventually if the machine says "Okay so now it's actually a one-on-one talk you should have with your employee", then the machine will let the manager know that they should have, within the next 5 days, should have a one-on-one with this person, because it will increase service level by, I don't know, 0.2% or whatever. And then a person will be involved. But a person should not be involved in in in decisions that are above their (.) you know, what they can actually ((above their knowledge)). Then you would have, you know, a thousand people sitting with the spreadsheet and calculators, instead of just letting the machine do its work. That would be silly.

Caroline: Do you think the AI can evolve itself without human interaction?

Danny: (.) Not in this project. But in some projects, it depends on what you want to evolve. ]=

Caroline: =What kind of projects do you see an AI evolve in without human interaction?

Danny: Well you know. What I think is interesting about this, is that we have some human behaviour and we measure that in some ways and measures what is influencing the behaviour and stuff like that. And then AI make some decisions based on that, to help people become better at something. So it demands human interaction.

But if it was a chess game, who cares? Because a computer can play against a computer. Maybe it would be a weird computer game, but maybe it would be a perfect computer, perfect chess game, because the way humans learn to play chess might not be the right way of playing. The optimal - the perfect game - so when we already know that there are certain games where are computers have changed the way of looking at them.

You know, it changes the whole strategy for a game. Because a humans though that his was the right strategy, but you started artificial intelligence to play against players and started to teach themselves to play the game.

And when it's done using machine learning, without learning from previous games, but actually just learning from playing itself. Then it actually comes up some things that are, that can be quite different, than the

strategies that humans discovered. And even in games, humans has played for thousands of years. So that's quite interesting.

Caroline: Do you experience a lot of competition in the area you're in with Optisquare?

Danny: I don't think. Well, yes and no. I don't think there's a lot of AI. And when I mention it to people, a lot of people are thinking about it and talking about it but there's actually not a lot of businesses doing anything about it. I don't think that's a lot of businesses who thought this through. And a lot of people I talk to say "Don't do this. It sounds far too complicated. Don't do that, you'll never, it'll take so much time you'll never get into the market and sell your product" and stuff like that. But I think it's important because my product is not possible without the AI. What I want to achieve is not possible without it.

Caroline: So why do you think the other companies have not incorporated AI?

Danny: I think it's just easier not to. So if you don't know how to do it then, you know, it's just not an option. I didn't know how to do it, so I reach out to BlueFragments. But I'm quite inspired because I have a close relationship with Google. And I've been there visiting Google in San Francisco a few times. And also, I'm actually, I own a company who helps Google do all their events in Denmark. So when they invite C-level people to inspire them within what's possible in "now", in the real world.

I actually, I can attend, you know, and get inspired as well. So I know some basic things about it. I know that it's there. I know that Google has an AI platform. I know that Amazon has it. I know that Microsoft has it. I know that, so that you actually need people who can actually take your data and feed them to those machines and get something out of it, that's what we need. Instead of, I'm not thinking "Oh, we need to know to build it from scratch". I know that's not necessary. I have basic knowledge which might be enough to dare to take that step. I might also just be naive, and I always, you know, throw myself into things that are a bit difficult.

Caroline: So, are you a technical expert as well, or a technical insider?

Danny: No not really. I'm not a technical expert, that's for sure. So I think, I'm more of a entrepreneur and I have basic knowledge of a wide range of things. I've done a few start-ups before and I've started a tech consultancy many years ago that I sold 10 years ago. So I also have a tech background, but just selling tech than doing tech.

But I have a basic knowledge from a lot of different things and that's just what I'm using. Just like Steve Jobs said "It's like connecting the dots" but I'm not really deep into tech at all. And I've done so many mistakes in this project that it's crazy. If I had had a CTO from the beginning. You know, a partnership: a tech guy, a commercial guy and entrepreneurial guy, like me, it would be beautiful. But I just started myself. And now I just hired a CTO, a freelance CTO. But it also point out a lot of those things I did wrong. I think we're getting closer.

Caroline: And also, you talk a bit about the customers, and also new website you talk about it. But can you tell more about who your customers to be?

Danny: Basically it's every shop, in the world, every auto repair, every hotel, every, restaurant, every cafe. So it's a kind of a big market, which I like. Because it has a huge potential. So it's basically everywhere where they have people meeting consumers.

I'm not selling to businesses that do B2B, I'm selling to businesses that engages with consumers and does it personal - so it's not through a website or something - it's personal service. That's my customers and we have two different ways of selling.

We target large chains of stores, so if you have like Specsavers or Walmart or something like that. It would be great, you know, to make a deal with a chain with a thousand stores or 1500 stores and just rolled this thing out. So that's one way of selling it. That's one way of doing it, but we know that it takes a lot of time to engage with clients like that. And it's a lot of time and many years to close a deal with companies like that. Another way of doing it is also targeting small businesses with just one shop, two shops, something like that.

So, we're working on a strategy where we have a social media strategy, where we do some social media marketing and then we have a landing page. And then we actually expect people who owns one store two stores to land on our landing page and say "Hey, this sounds exciting. Let's try this". And just enroll for free for a month or two. And then when they start using it and find out what difference it can make for their stores then they're hooked. And they gladly pay a small fee to us every month for using it.

Caroline: So, now we talked a bit about your company and we also want to talk about you and BlueFragments. What does the collaboration between you and BlueFragments entail?

Danny: We just started a project so it's all new, but we have we have our own development team and then we have BlueFragments. So we basically have someone who creates the front-end, which is, you know, the look and feel and what the user is experiences. And then we have some developers who created the back-end, which is where some calculations happens and data stored and the house-stored data and stuff like that. And then we have BlueFragments.

And BlueFragments they kind of go somewhere in both areas. Because they pick something, some data, from our back-end and then they return some data. And the data they return they can return it to the front or the back-end. I haven't decided, I don't know what you decide on that yet. My CTO might want to have a word on that. Everything that has to do with taking the data that we have from our back-end and putting them through the AI engine.

They are using the Microsoft AI engine. And, you know, how to set up the calculations and whatever they're doing, that's their part of the job. Everything that has to do with AI and that's including machine learning and whatever different parts of AI there is.

Caroline: How many employees do you have in the company? Is it just you and this CTO?

Danny: Well, I actually have one full-time employees, no we have a few, but we have actually just one full time employee, that's me. And then we have, we believe a lot in the freelance economy - so we use a lot of freelancers. We have two back-end developers working full-time, as freelancers. We have one front-end developer working full-time, but as a freelancer. And then we have the CTO, but he's not full-time and he's a freelancer as well. And we have also student helper, freelance student helper. So when we can turn up and down things, if needed.

But I think it's more important to gain access to the real good people than to spend a lot of time finding someone who can work for you full-time. It's not as a normal employee. Because the world is changing and a lot of people they want, you to know, work with a project they found find it exciting. So as long as our project is exciting then it's fine, we can get the best freelancers and stuff like that. When one projects done or one part of the project is done, we might need another type who finds the next phase exciting. And then we find other freelancers for that part.

So it's, you know, it's just about having access to the right knowledge, to the right people at the right time. Not owning the staff. So I think it works well. It demands a different kind of work structure and some different tools, but you know, it's getting quite normal so all those things are available.

Caroline: So just to be sure, which part of the organisation have you implemented or are planning to implement AI? Was it for the screening or for the staff [

Danny: Both. Right now we're working with two things. Actually the screening part, is the first part that we're looking at. But to be able to figure out who will fit in to the company, we need to know who performs best in the company. Right now, we are using two parts, one thing is to figure out which employee is the best employee. And we do that also using artificial intelligence, I don't know which part if they're using machine learning or whatever they do, but the thing is, that normally when you decide who is a good employee, it's all about the sales. If you look at their lot of stores and cafes etc. and you have a lot of people tapping in on their Ipads or cash register and the people who does that are the one who are selling.

So when you type something in on the cash register then you type in your employee number or by name and then the system registers "Okay, this person sold this" and then they compare "Okay, this is a great salesperson because they really typed in a lot of sales on this cash register". We don't believe in that. Because we believe that there's a lot of things going on in the store that you can't measure on who is typing in, you know, who's handling the customer at the cash register.

An example could be a café, if you have a lot of tables that are not cleared no new customers is going to the cafe, sit down and on a cup of coffee. But, you know, the one who's actually changing the tables is not standing at the cash register. So it's just, one of those might be faster than another one of those and that might have a quite big influence on the sales.

So we're inventing a new way of measuring these things. And we do that by just having them the turnover of the day, on the cafe for example, and then we have the work schedule so we know exactly who was working at what times. And we have the turnover. And looking at how the different people are working together with different people from the day to day - and taking weather and different things into account - we want the machine to tell us who is actually having a positive influence on the sales. So that's one part. Figuring out who is

actually making this company doing well. And the second part is when we know that, then we let all the staff fill out a personality test.

Based on their basic data, like age, gender, where they live, basic things like that and the personality test -a combination of those. When we have a new applicant we want the machine, as well, to tell us where would this applicant score? Based on gender, you know, the same things and the same personality test and so forth. The machine will then predict on a scale from 1 to 100, where 100 is the best, so it's like a percentage: top 1%, top 2 %, 3 & etc. Where exactly will this applicant score if we hire them. By comparing the people.

So that's the two things going on right now. Later on we will be working on the timing the whole timing thing in the training elements in the system. But the will be maybe in Fall or something like that.

Caroline: We're gonna focus a little bit more on your perspective. So what does intelligence mean to you? What [

Danny: [Intelligence?[

Caroline: [Yeah, what do you understand by, what do you think intelligence means? Or is?

Danny: I think it means something capable of thinking (.) And the more capable you are of thinking, the more logical you think, the more intelligent you are. I think, yeah.

Caroline: And also, I see on your web page you say "We use big data, artificial intelligence and machine learning". How do you distinguish between AI and machine learning?

Dany: I think machine learning is actually a part of AI. It's just, you know, a kind of AI. But I think, it's just, so on the website is just to, you know, to flag to two words which are the most common words that people would know. The website is not only for clients, actually where we are now, it maybe even more for, you know, to inspire. To have potential investors, people who want to cooperate in some way, something like that. To react on it, it's to engage, make people want to engage in a dialogue with us and find our project exciting. Because most people most of our clients, they wouldn't really understand this.

Caroline: Talking about artificial intelligence, what do you understand by the concept of artificial intelligence?

Danny: Well, that it's a machine and an intelligence that is built, somehow. So it's not a human intelligence, it's a machine. So that's it. What people want to gain with this is to make a machine think like a human being, you can say. So that's why it's artificial intelligence. And how far we are? ((rhetorical question)) actually quite far. I'm seeing some extremely scary things already.

So if you just, you know, look at the phone calls that the Google did to a hairdresser and restaurant. It's already, you know, quite crazy and you know that the only thing considered here - you know the main motivation is that 60 or 70% of all companies taking reservations in the US they don't have an online booking platform. For me, as a mobile user, it's sucks because it so difficult to get a table, I have to actually do phone call myself so much easier just to ask Google to do it for me. They had to, that's what creating, but it is very scary and those people talking about it, they say that within the next 30 years one, you know, one machine - or what you want to call it - with one, one AI thing will have the same knowledge as all humanity has in common.

So everything that everyone knows on this planet knows one machine will have all that knowledge. Including, you know, knowing how to handle that knowledge - which is extremely scary.

Caroline: What do you mean by scary?

Danny: I think that terminator is actually a very realistic scenario for now. I think it's scary because people are joking about ((it)), you know.

One of my friends he has one of those vacuum cleaners - robot vacuum cleaners - and when he makes a joke he says "Well I'm just waiting for the day it discovers who's actually creating the mess and just makes an end of it, at once. Instead of keep cleaning after you. You know, it's funny, but it's kind of true.

Caroline: Making as mess itself so it can clean even more]

Danny: Maybe it should make its own mess. It's just so much easier just to kill the one who was doing the mess and then just stop cleaning after him. (.)

So I think there is a lot of things, a lot of ethical things a lot of (.) a lot of things to consider, unleashing these powers because it is incredible powers. And we're seeing it within a lot of different Industries at the same

time, so we're talking about software, but somebody is sitting in the next room creating robots that can run and we have drones and we have self driving cars and we have. So it all, you know, melts together at one point and that's what makes it so crazy and a bit scary.

Because you have a lot of rules and you can do a lot of things to prevent things from going wrong, but you also you always have people with different interests in mind and, you know, where a 15 year old mad teenager can sit in a basement somewhere and get a melt down at some point and spent 3 weeks creating something very malicious because it's also getting easier and easier, to you know, code and (.) there's just a lot of things going. (.)

Nobody knows for sure, but think you have to be a bit naive if you don't believe that a lot of states, or also testing a lot of artificial intelligence and robots and stuff like that, for warfare and things like that. There's just a lot, a lot of things going on and we can't really - we're just not capable of grabbing ((grasping)) where it's going as a human beings.

So before we grab ((grasp)) it, it can be a really dark scenario. Without sounding too dark. But we've seen a lot of bad things and bad people will also have their hands on this.

Caroline: So how do you distinguish AI from other technologies?

Danny: Which technologies?

Caroline: Automation or robotics ]

Danny: I think it's all the same somehow. So if something can do their own thinking then it's intelligence. If it's not a human or an animal, whatever, then it's artificial intelligence. There's a lot of different software that's AI, but it has to be able to think by itself.

I think what you called AI 20 years ago was very different than what you call AI today. So an example is, I don't know if you know the story about the board game called GO? So you know that story as well. That's just a huge difference in teaching a computer to play GO and letting a computer teach himself - himself? - itself how to play GO. And I think both has been considered artificial intelligence. So Deep Blue, I don't know what the real definition is, if it has something to do with neural networks or something like that.

I played a lot of Backgammon when I was young and at some point they invented, I think it was called Jellyfish, which was the first backgammon computer that was on a neural network. So it taught, it learnt from, you know, when people played with it, it learned moves and got better. And it quite fast became something you couldn't beat.

So it's been there for a while, but I don't know the definition, but I think it's just something that gets thing. And if it's a software or a robot or if it's the software in the machine in a hospital or a drone, or wherever it is, or in in 10 million computers standing somewhere in a data centre - you know. Those things in a data centre are just to make normal people like me being able to access it. Before it was just, you know, IBM's Deep Blue in their own most closed circle.

Caroline: How do you distinguish AI intelligence from human intelligence?

Danny: I distinguishes it in that way that it's something not stored in the mind of a human. And that's almost about it. It's something that's facilitated by a human.

Caroline: You mean artificial intelligence?

Danny: Yes. It's something that's facilitated by someone who actually created it. But the thing is, that within a short time machines will be better at facilitating AI than humans will. And that's when humans are not needed. Humans are like rats, just more clever. Not compared to the machine. The machine can learn so much faster than the computer ((human)), we've seen so many examples. It's so naive to say we will be necessary forever and ever because we will not be necessary. The computer learn so much faster and we've seen so many examples of it now. It's real and it will just, you know, continue and it will be faster and faster and faster.

Caroline: So where do you see AI has its limits? If you believe it has limits.

Danny: I don't think it has.

Caroline: Why not?

Danny: Because it's self-educating. So (.) the limit is if we unplug it. If stop all (.) You need some things: you need, you need connectivity - those two things are necessary. Because if you don't have data, there's nothing to work with and if you don't have connectivity you cut off. Basically it can be power, it can be data - access to data. But as long as it has, as we give it today, we give it unlimited access to data, to internet. So there's no limits - as long as these things are available, there's not really any limits.

Caroline: Do you think the AI technology itself has changed or do you simply think the results of the AI has changed?

Danny: I think the technology has (.) I don't know if it has changed, I just think that, just like machines are learning, the humans started learning before the machines. So it's just regular people who evolved. So they started working with AI in one way and learned from that, and then they found out there was a smarter way of doing things, and then they learned that. And it will continue like that. The thing is, at some point the machines will be able to do the same things they already do, within things we're asking it to do it within. But it will also be able to do it regarding programming itself and stuff like that. They are already doing machine learning, it just depends what you tell it the rules are.

Caroline: We want to talk a bit about BlueFragments. How did BlueFragments present the concept of AI to you?

Danny: (.) How did they do that? Actually I met BlueFragments from reading a thread ((conversation)) on LinkedIn where somebody asked who were the leading experts in
machine learning or in AI in Denmark and a saw a few names, and BlueFragments were one of them, and I wrote to some of them because I also had an interesting project that I wanted to discuss with them. Then we had a meeting and I think they are much more modest when presenting AI than what I am when you talk to me about AI. Because, well they are still using the approach "humans are really still needed and they will always be needed" and somebody has to do some programming or do some things and stuff like that. So I think they're just, I think they want to limit your expectations, somehow. They presented by giving a few client cases as well and, you know, giving examples where they talk about machine learning something going to maybe 80-85% score, not a 100% correct, but 85%. So quite modest, because, of course, 100 almost unrealistic. But 85 might be far better than humans, who knows?

They are just talking about it in a simple way, as something that are just there and needs to be programmed by very, very clever people, like Hazel. Thomas always pointed at her "she's soo clever". I think he's right, but who knows because I don't know what she's saying.

Caroline: So you're talking about the technical terms?

Danny: Well, oh my God. At the last meeting, when we started the project, there was a project manager who was interpreting, so that helped. But otherwise, no somethings I understand of course. They actually also had a great focus on me understanding, so they think it's extremely important that the client understand. So even though the language can be a bit rough and the calculations can be very tough. It's very important to understand what's going on. It took awhile.

And I don't think we need to understand the details. And even when Hazel tried to come up with some examples, that were like almost embarrassing simple, because this is not how she would do it, it was just, you know, to make us understand and a small part of what she was doing. It was things I had a hard time understanding. Because the human mind doesn't really work like that - unless you really train it to understand those things. So the human mind is two-dimensional, so it's not even exponential. We don't even understand anything going on right now.

Caroline: Was there a distinction between your definition of AI and Bluefragments' definition of AI?

Danny: Well we didn't compare definitions.

Caroline: So in your perspective, do you think there was a ]=

Danny: =No actually it was Bluefragments that said Machine Learning was just a part of AI. So in that way, I got more clever from talking to them. But I don't think there's a distinction. No I think we're (.) Sometimes I'm like "is this possible?" and they are like "Yes that's possible".
And I'm happy with that because all those things that I thought was possible, I met a lot of people saying "that's probably not possible" "How do you do that? I just don't understand how will you do that?". And I'll try to explain "Well I will" regarding to the performance break down, I tried to explain that if it's not the same five

people working every day, then when you change one person and another day you change another one and so forth. Then the system will be able to know, figure out, how big an influence they had, have on the turnover each person. The people I talked to didn't understand.

But it just makes sense to me that when you change a form, a shape or whatever and you have another shape then you will be able to measure the performance of the missing part of the shape. Or the added part of the shape and so forth. And fortunately BlueFragments confirmed that I'm not crazy that this is possible. And now they're working on it and that's quite exciting. And then they wanted me to get a lot of data. And I was like ((sound of choking)) "Are you serious?! And I was about to cancel everything, no. And then I've had some test customers for a while, which I haven't really asked for much. But after that meeting, I started to ask for a lot. A lot of data. And they been very kind, so I think we have the data we need very soon.

Caroline: Do you also think, that now after talking to Bluefragments, that you have the same understanding of AI as they do?

Danny: I'm not sure.

Caroline: But the concept of AI?

Danny: No, I hope they have an even better understanding than I have. A lot of my understanding is primarily from inspirational talks, great inspirational talks by some of the best people in the world.

But it's not the same as knowing any details, so I just know I have to give them access to Azure, where Microsoft's AI platform is a part of.

Where they do something with the tools, in there, that I need to do. And we have a lot of other tools there. You know, we have two databases and we have different things there as well and it all comes together, hopefully, into something normal people just see as a user interface with some interesting things.

Caroline: So did you have knowledge about some of the technical capabilities of AI before talking to Bluefragments?

Danny: No, and if they had just filled me with bullshit, they would have managed to do that. It was more like "Well, we ((Bluefragments)) can do that, no problem".

Caroline: So what opportunities of AI did you discuss?

Danny: WelI, don't think we (.) we just discussed it from my point of view - you know, from the particular things that I needed to get done. And Hazel ((programmer for Bluefragments)) talked about some of these timing things, you know when putting things on a timeline and see how a timeline influences a result. To know, if you can do something at 10:30 is a difference that if we do it at 10:32 or 10:33 and so forth.

So, that was interesting, but we didn't talk about if we should use machine learning, or should we use whatever else is in that toolbox, because I just want a solution that works.

Caroline: But did you talk about the limits of AI also?

Danny: No. Well, we talked about the need for data and we also talked about that it's not always ideal to have a lot of data. Well, it might be ideal to have a lot of data within the same area, of the same data.

But finding the best solutions, it is not always important with a lot of parameters. So even if we have like a hundred parameters on our personality profile thing, whatever, we might just use 74 of them or 25 of them. Because, if Hazel finds out that the remaining 60 or 75 are not doing anything positive to create the result that is accurate, then they would not need to use it.

So things like that, I thought the more data the better "'So, if I know this, this and this". But what if we find out that weather has nothing to do with it. Or if we found out that the result is the same if we removed the weather as an option. So even if it ((the weather)) might be able to influence it ((the result)), it just doesn't in this case. So, there is no reason for using it. So, maybe if we missed some of the other data, that data would be relevant, but so I think it's so things like that. We have discussed things like that. And we of course discussed that they ((Bluefragments)) wanted to use this search Microsoft engine or tool box for the solution.

Caroline: When talking to you, Bluefragments, did they mention Ready-Made-AI, the concept of Ready-Made-AI?

Danny: They didn't.

Caroline: So how about after you talked to them about Ready-Made-AI. Because you have done that now?

Danny: I don't think so, I'm not sure. I know you keep saying it. But I am not sure, what you mean about it ((Ready-Made-AI)). If we if you mean, that it's the engine that Microsoft or Amazon or something like that are providing businesses with to be able to do something, then they talked to me about it. But if it's something else, then they didn't. Or I have forgotten.

Caroline: It's about talking about AI and introducing the clients to AI and the capabilities and limits. And have an common understanding of what AI is, so you can work together from the same perspective.

Danny: So it is more like aligning (.)

Caroline: The [expectations and definitions.

Danny: Yeah. If they did, I don't think (.) they just didn't use any special expressions about it.

Caroline: They might not have said Ready-Made-AI

Danny: Actually. But I think, we think (.) we had a few long meetings, and we got to talk about a lot of different things, regarding AI. And I think, we are aligned.

Caroline: So do you feel like after you have been having these meetings with them that you have a better understanding of AI - after you met with them than before?

Danny: Yes, absolutely. Just knowing that machine learning is a part of AI. And also knowing what actually comes out - what kind of product will they deliver.

Caroline: Do you also have a feeling that they understand your perspective?

Danny: Absolutely!

Caroline: And your capabilities and limit of knowledges?

Danny: As I said before, I have had an IT consultancy company as well. And, I think you know, the most important thing is actually to talk about the client. To listen to the client and understand what are the challenges. And then, you know, have your own toolbox and let the client know "Okay, so this is your challenge, we can solve it using those tools in this way, which will make this project work". And I think that was also their approach. And it was very professional and very trustworthy.

Caroline: So, I'm going to call it Ready-Made-AI, even though they might not have used it. Just to sum up, do you believe that the Ready-Made-AI concept has helped to create a common understanding of the technology of AI, between you and Bluefragments?

Danny: Absolutely, I believe that. I think it is, you know, they changed - I had all those top level briefs on the on AI. And I haven't had a clear understanding of what it was. I think they explained that extremely well. And made sure that I knew what I was going into.

And also their way of, you know, taking it down to earth. And maybe underestimating in a bit - acting like it's a bit less efficient than it might be. Instead of putting it on a pedestal, making my experiences high ((rising my expectations to a point where I believe)) that I will get some kind of rocket ships, that will solve all the third world problems.

Then they were very good at explaining what to expect. And also by giving examples from other clients.

Caroline: Okay, so we talked a bit about Bluefragments now, and your relationship to them. Now we wanna talk a bit more about AI in the company or the challenges and successes.What organisational infrastructure has been needed, in order for you to be able to implement AI.

Danny: Well, tough question. The thing is that, we are not using AI to solve internal problems. So a lot of companies - and that's quite interesting actually - lot of companies have some things that take time or are just not done efficiently enough, or something like that. And they find out "Ok maybe we can, you know, use AI to improve those things when we can find people or a department ((to improve)), and that will be all good. We invest a million and save a million a year, and it is a good, good proposition". I think a lot of companies ((do that)). And all of Thomas' ((CEO of BlueFragments)) examples are from companies like that.

So we're quite different, because we're not in it to save time for ourselves or be more efficient ourselves. We're in it, because we want to offer small businesses, all stores, around the world a solution, you know, some elements to use AI actually without them even having to engage in it themselves. Because we provide a platform with some things that are made by AI. And they can buy it through us, and we deliver some answers that are extremely important to them, hopefully.

So for us, it's more like, you know, we're more like selling it to other companies. Getting out there saying, "Okay, you might not be able to, you know, do an AI project yourself. But by engaging in this platform we have it for you. So you just, you know, do whatever you use to do, and make your time schedules and upload a few training videos and stuff like. And we will give you the answers".

Caroline: Has adopting AI been a strategic decision?

Danny: Absolutely, so I don't think, without AI this would not be a project. I don't think we would have done this at all. Because you wouldn't be able to achieve what we want to achieve, basically. So that is not fun, if you want to start a project where you want to achieve something.

When I was a kid, George Lucas, he said that he had made nine episodes, he had written nine episode of Star Wars. So now we knew three of them, but he said it what he actually said was "The technology in movie making is not developed enough yet for me to release the remaining movies, so we'll have to wait and see if, it ever". And now there is nine Star Wars movies.

So it's also like that sometimes, you just have to wait for something to happen, before you're able to do what you want. And this is possible ((his idea of incorporation AI)). I might have been able to do this a year ago, I also started this project almost two years ago. And I did a lot of wrong things. So I'm glad that I have done those now so I can move forward.

Caroline: Talking about mistakes. Has there been challenges in integrating AI, or do you see where there could possibly become challenges?

Danny: We haven't integrated anything yet. I don't know. There hasn't been any. And I think that again, some of the challenges will definitely be about data. Right now we have a few clients who deliver a lot of data - and then thanks to GDPR, it is quite a hassle to get that data, and work with that data, that is fine.

I actually think it is very important, maybe even a few years too late for that ((GDPR)), we just have to, you know, get used to it, and then we will be very happy that we did it. I would need a lot of more, of those kinds of things to, you know, live in the electronic world we live in today. But that's a totally different talk.

But I think that data might be a problem - the things that I want to (.) when we talk about AI. And, I want, you know, small coffee shops and so forth to use our system. No coffee shop with 10 employees will have enough data to get something clever from Artificial Intelligence. I'm sorry to say so, but the statistical foundation, of coffee shop that size, is just not big enough. But if I have a 1.000 coffee shops in my system, with five to ten employers each, with of course anonymised data. When a coffee shop wants to hire a new person, they will need to find out, will this person perform well in my coffee shop. The decision, you know, the data, the score is based on a thousand coffee shops. So it's like ((making a decision based on)) 5.000, 10.000 or 20.000 people's scores are based on. Instead of 10 people, which would make it a problem.

So I think that the data might be a challenge, depending on how the customers react to ((the idea)) of shared data. So it's not like it's not like one coffee shop will know who is employed in another or anything like that. But they will know that - as a lot of other big systems in this world - we have a lot of data and we use them. And maybe at the smaller clients, it will not be a problem ((of data sharing)). But if we get Power and Elgiganten ((two Danish electronics retailers)), both to wanna use this system. They ((Power)) will definitely have an opinion on Elgiganten getting the pleasure of Power's data and vice versa.

And that might be a ((challenge)). Because of course you can do some AI ((with them)) - they're big enough, both of them, to get their own data and just use it isolated. But it's just so much more beautiful if we share. It will be a problem for me to explain to them, that it won't matter to them that we share. It just won't.

Caroline: Do you think AI will change your organisation, in the future?

Danny: My organisation?

Caroline: Yes.

Danny: I think so, yeah. Our organisation will hopefully be a lot like Facebook's organisation, lot of developers, and a few sales staff, support and stuff like that. I think the amount of engineers and developers. The different kind of employees that we will have, that the amount of people are working with AI will increase.

So we might have fewer front-end developers, fewer back-end developer, and, you know, more data analysts and more AI people. I think so (.)

But right now, our AI people are just Bluefragments. And I hope it will continue like that for some time.

Caroline: Do you expect that your customers will have strong opinions about the AI?

Danny: Some of them. But I think that most of the small businesses, they don't really ((have an opinion)), they have an opinion that - they agree that their staff should not fumble with their phones with customers in the shop. And they should meet at on time. And they should follow the right procedures, when locking down the store, and you know, stuff like that. How they do it, they don't really care.

Caroline: Is that your experience, or is it something that you believe?

Danny: I think, that's my experience. I've been interviewing a lot of small businesses, when I started this project. And nobody cared about AI, or whatever.

Also we run, even though the software it not ready yet, for customers, we already run Facebook ads, and have landing pages. Because while we're finishing the last things, in this project, we want to be ready with our marketing, have found out what is working and what is not working, and stuff like that. And some of the adverts we have on Facebook, say that we help people achieving those things, selling more and stuff like that, by using AI. And it scores terribly ((bad)).

So it's like, if you have one ((add)) saying "We help people recruit, train and motivate their staff" perfect blah blah. Okay we have an ((add saying)) we help people doing this by using AI. It doesn't make a difference at all. Who cares?

It might, actually even scores worse. So I don't think it's because people have anything against AI, but I just think, that people of sceptic. I don't think they know how to react to it. Or if they trust it. A lot of people are afraid of letting computers make decisions for them.

Some of the competitors, they have just scheduling. They do work-plans for their clients. When they need to make a new work-plan for the next two months, or so. Then the system, actually just suggests it. Instead of somebody saying "Okay, so he's going to work then, then and then etc.", he says ((press button)) 'suggest', BOOM .Then we have two months of work, based on historical data. And they ((client)) don't know what generates this, and they don't really care, but they like that they actually saved three hours, sitting there and creating the next two month-schedule.

So I think you know it's ((AI technology)) like air. You shouldn't talk about it, it should just be there.

Caroline: So it ((AI)) is not a buzzword for them ((the clients))?

Danny: No, I think it's a buzzword for big companies, right now. And it's very normal that it starts in the big corps and then it's you know ((spread from there)).

And then it just gets interesting for smaller and smaller businesses. So in a few years, I think it might be interesting for them ((smaller businesses)).

Caroline: So just to understand. So the people you believed had strong opinions was because they didn't know what it was?

Danny: No, I don't think that anyone has strong opinions about it ((AI technology)). I think it is a buzzword for ((companies)).

I think most people don't care about it. People in Big organisations ((however)), they get a lot of, you know, they have Microsoft Saab, Google etc. Keep telling them "Hello, you need to look into this now! You need to look into this, now! You will lose if you don't look into this now, you will lose".

So they ((Big corps)) are now starting to look into it, and it takes much longer time than anticipated. It's always like that.

But when it rolls, it takes a much shorter time. So it's like it's like way back when, I don't even remember who said that "Nobody, will need a personal computer in their home".

My first visit with Google, one of the speakers was Vint Cerf who invented the Internet, you know the IP protocol. So it's like "Okay, I'm Danny I have a small company in Copenhagen who are you?" "I invented the internet".

It was quite exciting, but you know, the story is amazing because at that point it ((the internet)) was only thought of as an internal communication ((system)) for military, so when they were giving the first IP addresses, and it was like "ok, so how many how many users could ever ever use this in the world" and they were like "25, 50?". Maybe 125, if all countries, which will have this, is like 125 or something like that' "OK let's make it 250, then" or you know something like that. (.)

And then a few years later, in that year I think it was 2012 or 13. They went from IP4 to IP8, which meant that they went from some billions of IP addresses to a lot of billions of IP addresses. Because now everything is, you know, having an IP address. You know, your refrigerator, Philip's you ((device)), you know a lamp has an IP address.

They didn't really expect that, and I think it's quite the same with the with AI. We're talking a lot about it then IBM head of the deep blue, somebody else had it something else. And know we should use it for this, and this, and this. Within the number of years it will be everywhere, and we won't notice it will just help us do a lot of things. We already have it ((Danny demonstrably picks up his phone)). It is right here, and this ((AI in the phone)) will explode. In a short while Google's assistant will be launched in Denmark and the Nordic region, as well - I know that for a fact. And it ((Google's assistant)) is already in all English speaking countries. We have it everywhere, and we don't even notice. And it will be even more everywhere.

Caroline: So with that said, do you believe that AI can be used in everyday work?

Danny: Absolutely, it will enhance us. We will get so many human enhancers over the next decade, that we can't even imagine.

It you want to know what the future looks like, you should start watching science fiction. Maybe, you know, watch those from the 90s, because that's where we'll be within the next 10 years, so it's crazy.

You will have - people like us who have arms and legs, we don't need ((artificial)) arms and legs, because we already have them ((arms and legs)). But we will have some kind of extra things on the arm to improve our lifting capability and running speed, or whatever on our legs, or whatever.

And of course we will have things helping us calculate things faster, so before we even need it, we will get, you know, "was this what you're searching for?". Maybe not in that way - but in a totally natural way you don't even consider, it will be all natural.

It will be like ""I was just trying to lift this huge rock, and I couldn't, and then I discovered I forgot to take on my armour today, how silly of me!"".

Caroline: I see your point.

Danny: They print organs, did you know that? They print organs as well! It's just happening on so many levels right now, so it is insane.

Caroline: Do you think we're going to be able to keep up? Humans to keep up with the technology?

Danny: No, I don't think so.

Caroline: Do you see it escalating?

Danny: That is quite a ((big question)), is that really a part of this?

Danny: No. I don't think so, I don't think we will be able to keep up.

You know, a lot of people, they say that it is a human to do something with all these robot and AI, and so forth. So we're safe. But they are so wrong - it doesn't ((a human)) - at some point it doesn't take people. Because no matter what we want to deliver, they ((machines/AI/robots)) can do it better,

And so we will be (.) Well, we will be useless at some point, and won't be able to keep up. So we really need to figure out, how to control this ((NewTech and the fact that humans will be useless)) in some way. And make sure that no matter what we make robots and AI do, that we will be able to coexist with them. And do whatever we want.

If it's working ((being employed)), ((then it will be like)) “oh your working, oh your such a good worker. A robot could do that a million times faster” You know, it is so important for people to wake up and have something to do ((said sarcastically).

And it's just like, “what am I doing today surfing, tennis, I don’t know” Robots doing everything, it is going to be like ‘let's go for the mount Everest climb today’ or whatever, who knows.

Caroline: Just to get back on track again, How does AI act intelligently when you use it, in your opinion?

Danny: In my opinion, it's just when it solves problems for me. You know, maybe in a more clever way then a calculator, but it's more or less - maybe it just about the complexity.

But I think, in my opinion, I think it got really interesting with Machine Learning. With machines learning by themselves I think that's really what it's all about, I know that it's not only that, in AI. But I think that's what I think is interesting, right now. Don't tell them how to play chess, let them learn.

Caroline: So the interaction with AI. I know you’re not like specifically working with AI, like Bluefragments are, but you are in some way engaged in it, so do you see AI react to the way, or respond to the way, you use it?

Danny: I haven't seen that. I've seen it on Google assistant, and I have seen in on - back in time. On jellyfish - a Backgammon computer that improved it’s game.I’ve read a lot about it. Also, the case with the five poker players, I think. Who played a game with luck involved, you know randomness, and actually got beaten by AI over time. That ((AI)) adjusted accordingly.

I seen a lot of examples. You can find a lot of examples online with the computer playing some kind of video game, and you see 10 minutes in, 2 hours in, two days in, and it ((the AI)) just starts playing the perfect game. And you know, spent like 14 month of your childhood trying to get this ((game)) and it's three days in and it’s playing the perfect game all of the time.

So, I just think I’ve seen a lot of examples of it ((AI)), and I think it's inspiring amount and now I want to see it in my own platform.

I think it is the last few days - it's like it when I received data from the some of the client it's like “YES!” - I have data “oh, can we put this in the system now? can we put in? Can you import it, can we see what happens?” And I look forward to that ((seeing what happens)).

Caroline: Do you also see the interaction improve over time?

Danny: I believe that will happen - all the time. And that is what I want to achieve. It is very important to me. That is one of the things I talked to Bluefragments about. We’re not just, you know, using some kind of algorithm which will be static. I don't want any static. And Bluefragments - before I talk to them, I talked to someone, who made the predicted performance part, ((which)) is something that require from another company, and they had someone who made some them some calculations, and then the algorithm that took the data that they had, and found out who was the perfect employee, or rate them ((the employee)), and then could predict, you know, based on personal profiling.

But you know, every time something changes - that needed to be changed - ((as an example)) from having like 100 or 200 test persons, to having 1000. That algorithm would get better. It would still be the same algorithm, so I wanted to go all the way and have something - code something now but it keeps getting better. And I know that ((attitude)) has also done something to the alignment with Bluefragments. They say “okay, but we need to take a look at it once and awhile, we can’t just know have we have programmed it - that is it”.

Things change and even though things get better and better - so if we start with like 200 ((test persons)), which is not enough, it's a small amount of data. But 200 different persons then you know. Then it ((the AI)) will learn something. Then as you put in more people, then it will change it ((the AI)), and get better at predicting who is a great employee and who is doing the best work and stuff like that.

But you need to, you know, test it, you know, check it once and awhile. And we’re actually also building in a quite fun thing into the predictive performance. So we have the computer which predicts the performance, and then we actually have a person. So we build in a (.) So the computer can predict the performance based on two things - based on sales, the breakdown of the sales results or a manager who scored the person. So we have the managers who have 4 different areas where they give a score from 1 to 10, in those 4 areas. And that gives a person a score. Then we have the sales-results-breakdown, and the other thing we talked about, where you try to see who performed best by just typing in the turnover of the location for one day. And then we can actually see both of them ((the variables)), so we can see who was more right.

Is it more right when you look at the sales, or when you look at what a manager actually told about the persons. So the sales thing might say that a person is top 10%, where the manager said ‘ Well, he is just 40 or

vice versa' and then we will keep track of the person after they hired him, we keep track so we can actually see who was getter closer. And that's also quite fun as well. And that is also, a bit on purpose, to show people who is right.

Because all of the ((Optisquare's/Frontliners')) customers, they might have problems trusting the machine. But if they see over time that it's ((the AI)) more close to ((the truth)), let you know, that the historic performance of the employees is more close to what the machine predicted, than what the manager predicted. They ((customers)) hopefully try to, they will trust it 10 more. If that is what is happening! It might be the other way around - then we need to adjust something.

Caroline: And what do you believe makes an AI valuable?

Danny: Anything that saves time, or give us an insight that we wouldn't be able to gain otherwise.

Caroline: And do you believe that AI has agency? Meaning, do you believe it can exist and is capable of acting independently from human input?

Danny: I think so, I don't think it's, I don't know if it's ((AI)) there yet. I think it will be capable of doing that. But I'm not sure it is there yet. I don't think it's there yet. It's not a living organism yet.

Caroline: But you see it coming, or?

Danny: Yeah I see it, I think so. But I don't know on how long or how short term. But it is all about the rules. So when you talk about machine learning it's all about the rules.

Caroline: So, you talked a bit about the data and so on, for Optisquare's platform. So we just have a few sub questions for that. So how much of the data is based on - how much of the data is personal data. Is it all of it?

Danny: It depends on what you believe is personal data. But almost all of the data is based on personal - on a person's behaviour - so a small amount of the data is identifying a person, and a lot of the data is this what the person did, or didn't do, and that stuff like that.

So if we get - regarding deletion of data etc. If somebody don't want to be a part of this system anymore, then we can delete the person but we still have everything else than what can identify the person.

So we still know that a person in that age, that postal code and that gender, with this personality score and this training and this motivation, will perform like that that. So we still have that data. So that's kind of personal. Some of it is about persons and some of it is about stores, or just you know like store names, store addresses, work schedule in that store which then contains personal information and stuff like that. But a lot of it (.) it is only a few things that are in identifiable. The rest of it is just, you know, mainstream statistics or I don't know what to call that it is just, you know, one big soup of data. That no one knows, who it regards, but it's just a number but when a number performs like this - this happens and so forth.

Caroline: And do you believe there are ethical considerations, in regards to the use of personal data in AI?

Danny: Yes, I think so. I don't think (.) As long as it's identifiable then there are ((considerations to take into account)) but as long as it's not identifiable, I don't think there is ((any considerations)). But it also depends on what you use it for

If you use it for bad things like, I don't know, war stuff. Yeah likewise, if you want a - if you use it for manipulating the voting ((process)) in the United States or you use it, for you know, it depends on what you use it for.

But if I think it's a problem that Google can make a hairdresser reservation for me, I think it is fantastic! Please go ahead, please do it for me, I don't wanna do it for myself. So boring just takes time.

I could eat an ice cream at that time. It would be so much better or watch a football game or whatever. So I think it really depends ((on what you use the data for)). So I have never been afraid of just spreading my data around. Facebook gets all my data, if they want, you know, and all the other stuff.

I think it is a bit scary, that when I talk about something while we're sitting here, and then when I go to Facebook or Google next time, it shows a result, you know, based on what we actually talked about, because it is listening. It's a bit scary, but hey! Who don't want to save those 0.2 milliseconds - I want to!

Caroline: So do you as your company imagine that you're going to use AI differently than what you initially intended? Or do you still think that what you initially intended AI should be used for, is what it will be used for?

Danny: I think my mind 2 weeks ago were not capable of knowing what I will ((would have)) used AI for in 2 weeks.

So it's always evolving, so we will see. So right now I know - I have some things I want to use AI for now. And in two weeks I definitely want to use it for something more. And weeks later something more and so forth. And it will never stop not before, that thing from Terminator ((movie)) comes back!

Caroline: And this is from your talk with Bluefragments, you perceive the possibilities or?

Danny: No, it's just the way I am (.) It is just, I know we can't know everything right now. And things move forward so fast, so that - it has nothing to do with what Bluefragments said. They would definitely 'oh, you need to think about it'.

Okay, I might. I will think about it. But I will definitely find something to use it for, also in the future. And it will just continue that way,

Caroline: So, this is our final question. And don't know, we might have some follow-up questions or. So what is your perspective on Bluefragments?

Danny: Well, I think they're very kind, I actually like that they're cautious, not overselling it, I like that approach. So I trust them, I think they are (.) I think they have some cool employees. I like that they're international, when they visited us with four people last week, it was two was from Norway, I think. Two was from Denmark. I like that as well. Yeah I have two Indian people, which is a problem because of GDPR ((legislation)). But our two backend developers are sitting in India. We have a Danish guy sitting in Portugal, working from there. And our Student helper he is from the UK living in Copenhagen, and you know, I think it's (.)

I like them ((Bluefragments)) because they're thinking forward and are, you know, straight about what is happening, and they have an international profile ,and really also the same passion as I have about getting some really clever people on board ((the Optisquare/Frontliners project)). Do some really amazing things, and that can only lead to something cool.

Caroline: So that was actually it.

Philip: I just have one question. You say that AI can turn into Terminator, but at the same time you seem to link AI with a larger treat of human improvement. You mentioned we're printing organs - so why use AI? If you see this something that might turn into something that might destroy the entire human race?

Danny: Because my mind, you know, the human mind is not able to foresee that ((the development)). It is not able to connect the dots, so I can see that what I'm using AI for, is going to lead to that. But I can see that if the wrong people gets a hold of it and use it, by mistake who knows. ' oh, I wrote that code and not that code, damn!'

But I don't know, but I'm curious about it. If this means that we're all lemmings jumping into the water 10, 20, 50 or 100 years from now, who knows. So be it. But I think it's - but I'm very curious. And I don't think that I'm building will properly now get us to that point

Philip: Hopefully not.

Danny: Otherwise it will be me that they are sending someone back in time to kill. And I don't believe in time travel, yet.

Caroline: I think I have one, maybe two ((questions)). Just a basic question, so you haven't incorporated AI yet. But do you know how long it will take to develop it, to be able to incorporate it?

Danny: I think, it sounds like it is not taking that long time. So the initial (.)

Caroline: So is that a couple of weeks, months or ]

Danny: A couple of weeks. I don't know, if they've ((Bluefragments)) change that because from our first meeting they said that the development time would be a few weeks and they send me a price on that.

And then, at our second meeting I was actually a bit surprised about the scoop. I think the scope changed a bit, it got a bit larger. But it seems like they had had that into consideration all the time. So you know, I was thinking 'ok we're getting this the predicted performance perfect'. That is what takes that time. But they

had been thinking all the time, ‘we have to able to see who's performing well, so that's actually a part of it’. Whereas I saw that as a completely different thing, so now I’m you know, thrilled that both of those things will be developed in near the future.

So I hope it is a few weeks, who knows. And now I got a lot of data for them to work with. And as soon as we’re done with the meeting I will start sending the data and then we will see what happens.

Caroline: I was just wondering, if you believe that humans are needing AI more than AI are needing humans. At this point or maybe in the future?

Danny: It depends on what perspective, a philosophical perspective, it is kind of big questions. So I think at this point in time, AI needs humans more than humans need AI. And that will turn at some point.

# Appendix 6

## Interview with Lars Hjørnholm, Team Leader, Bestseller

Note: After the conducted interview, we had follow-up questions which were emailed to Lars Hjørnholm. The follow-up questions are at the end of the document.

'Caroline' is the interviewer and 'Lars' is the interviewee.

Caroline: Who is Bestseller and what was the project you were involved with?

Lars: First of all, Bestseller is of course a Danish clothing company. We've been around since 1975 and has from there started growing both into a national retailer and also now a global one. We're spread across different brands and it's both for the male and female section. And some of them could be Jack & Jones, Selected, Only, Vero Moda so on and so forth.

The project I was involved in, was last year and it actually came out of a business plan proposal within IT. We had a strategy of working smarter and we decided to take a leap of faith into approaching a and trying to figure out in which area, which AI technology, could we actually apply to an existing problem and try to solve it. It was actually intended to end out with three proposals of technologies within the AI platform that we could utilise, but we ended up with one - made together with Bluefragments - it was this intelligent dispatching engine.

That actually could take tickets ((internal cases)) from a ticket system, translate them into English - because we're a global company and we get all kinds of different languages into the tickets - translated into English, try to feature and put weight in two different wordings, categorising, and then putting forth or dispatch them to a certain area within IT that was supposed to - or able to - deal with that issue in the ticket. So we called it Automatic Intelligent Dispatching because we wanted to relieve humans of doing the dispatching: 'well this should be to SAP - second line. This should be to client management'. We wanted the computer and the AI intelligence to do that for us. So that was kind of what the project ended up being.

Two other ones were Cognitive Fashion, I think we called it. Trying to use the cognitive services within the AI umbrella to define what was in a picture. So is this a denim jacket? Yes it is. Is it slim fit? Is it, you know in a different kind of specific wash? Is it on a male or female model? What is the setting the model is in? Is he or she looking confident, sad, happy? Trying to put some metadata into the pictures and using that to kinda make a e-com platform - the bestseller.com website - a bit more descriptive on the styles. Because today humans putting in what's on the pictures, but why not to build a model that can actually scan through pictures 24/7 right? And put that weight into the picture and describe it and create the metadata for the online platform into use. That was the second one.

And the third one was, see if I can remember (.) a virtual agent. We, of course, have heard about Amelia IPsoft made her, you know, the bot that you will be talking to - the robot - but with these humanistic characteristics, so to speak, that you feel as a employee or customer that you are actually talking to someone that you can, in some degree, relate to even though it's and machine. And we wanted kind of, to to dive into that area and see what could be done, in terms of taking calls, because we got approximately 140,000-150,000 calls - or tickets - to the service desk each year. So can we actually take a bunch of those and answer them - the top ten asked questions - could we answer them by using a virtual agent, Amelia style, it didn't necessarily needed to be an audio version, you know it could be a text/chat thing while you're writing 'well, I can't find whatever what printer to use'. And because we have the date about the person and were he or she is writing from, and we have the knowledge base, we kinda wanted to bled those two together and see what we could make.

But both the Cognitive Fashion side and this virtual agent side - when we started scratching the surface, we discovered, well, the amount of data, the amount of quality data, and the amount of data structure - and actually data hygiene - became a roadblock. But it also became a learning for us. So we decided, instead of eating all the cakes at the table, we just eat this one and really try to figure out what is it like? And that was the project with the Automatic Dispatching we meet with Bluefragments.

Caroline: So just to be sure, you haven't really worked with the last two projects yet? It's primarily the first]

Lars: ]No actually, no. The virtual agent we kinda put on the side line quite quickly. We try to use some of the out-of-the-box AI technologies that we see, especially AWS the Amazon cloud and Azure cloud for Microsoft, are starting to provide these out-of-the-box AI technologies because they, of course, want us companies to embark on that journey. And provide us with some kind of basic framework to do that and we, as many others,

took a dive at it, looked at one of the models that Microsoft came up with. Which was this Q&A bot thing. But it didn't make it, so, you know, we put that aside.

And actually that the second one, the Cognitive Fashion, re-emerged just a couple of months ago. Actually just before that the summer vacation because we really wanted to involve e-com on this one. E-com is a huge platform, it's is a huge selling, it's a huge market for us as well. So we wanted to, we really wanted to engage them and, of course, they have been busy with other stuff, so it was kind of hard to get them to see that benefit of spending time you know it's kind of those 'slow down to speed up' manoeuvres. You really need to slow down in a period, make the effort, make the investment, and then to speed up again. They just came back to us a couple of months ago, and said 'well, now we can actually give you the whole photo library of the whole bestseller.com online platform'.

So that was the data, right? And we had this model that we could use, it was not an out-of-the-box-model, it was not fashion-oriented, but it was something to get started. And you know, we're just back from vacation now, so in my point of view I think we will go at it - to come Autumn. Have another stab at it - see if we can find something that will be beneficial, proof-of-concept wise, to make it visible for the business side 'well, we can actually use modern technologies, AI, whatever it might be - the cognitive services - to provide better data', right?. We want to be data-driven, we don't want humans to go through all the data let's use the machines to do it.

So, I suspect we will go forward with that one in the Autumn, but right now it's the Automatic Intelligence Dispatching that is being worked on. Also because, of course, there's financial and resource wise impact on this. Because you really need to spin it well. Because it's still within - when you approach the business - AI still, quotation marks, magic to a lot of people, it's scary there is a lot of emotions about it, because it (.) with the media spin around robotics and AI, you see the headlines in 4 years, 5 years, 10 years - 40% of the workforce that we have - the labour - that we have in Denmark, for example, will be replaced by robots. And, you know, it makes people uncomfortable because this is the classic, you know, mechanisms to start worrying about the future and the job. So, they ((the Danish labour)) tend to you know back off and go: 'Well, what we are we doing right now is ok. We are making money'. It's still that barrier they need to cross. And I think that is one of the things that we need to do in this aspect, of doing the Cognitive Fashion - is to really be good at explaining, in a human way, what we can gain from this and why it won't take away their job but it might transform it into a different thing.

So that's kind of where we are at right now.

Caroline: Just to get back to one of the first things you said, you were talking about tickets? Can you explain what that is or what you mean by that?

Lars: Well a ticket is really a case that you file in as an end-user. It could be like the example I gave you before: 'well I can't use this printer'. So you call the hotline and you say: 'well my name is Lars, I can't figure out why I can't print to printer one'.

Caroline: Is it internal?

Lars: It's internal, yeah. But this is where we gather those 140,000-150,000 tickets each year on different IT issues. So, a ticket is just a case. Something worked yesterday, it's not working today - please help me. So it's IT support - tickets.

Caroline: Were you working in a specific department or were you put in for a team? Can you explain a bit more about that?

Lars: When we ((IT department)) made the business plan, you know, there is a business plan within Bestseller, which is of course, to make a lot of money and make good fashion in a timely manner. Provided the world with the fashion they need. And to support that we, in IT, make a business plan that will support that goal or that strategy, if you want. And one of the things were exactly to work smarter because for us in IT we want to work smarter. Because we know we can utilise technology to lift, but we also wanted to show the business, well, we can actually use technology and make you guys use it, as well, and make this common goal achievable.

So we pointed out different stakeholders in this business plan to carry out all these activities. And one of the activities was prove that we can use AI. Prove that we can use machine learning, cognitive services, deep learning, whatever it might be - to trust the business forward. And I was appointed to lead that task force and figure out what are we going to do? How are gonna prove that AI - or how are we gonna visualise and kind of make AI understandable? Make others in IT, and the business side, aware of how do we see AI? And why is it not magic? How can we use it?

That was kind of the idea. We wanted to make it - we want to clarify it. So, I was leading the task force. I was team lead for the on-site department, which was in IT. But I had played around with with AI and stuff beforehand, so you know, I was kind of the obvious one to do it. And made a team of developers and service desk people, also stakeholders from the business with my network and knowledge of 'what are we doing' in different parts of the business. We kinda gathered that and sat down in a room and said 'ok, how are we gonna do this? How are we gonna explain AI in a, you know, something you can understand.

So, we did that. It was a team of six-seven individuals and we sat down and we had approximately 6 months, from roughly end-August to mid-February, which was the delivery time - the deadline. And we sat down through different meetings, brainstormed, you know, googled. Trying to figure out, what can we do? And we figured out these three things: Cognitive Fashion, Virtual Agent and the Automatic Dispatching. We started with the Automated Dispatch in because it had the best business case, right? It was achievable it was something that we were knowledgeable about, we know the ticket environment, we were in IT - you know a lot of different things played in. So, we picked that one because we kinda have a good gut feeling it would be feasible to do it. We could make it. And also put forward actually a useable product that could come into production and started creating value.

So, we engaged different companies, consultants, Trying to figure out, how do you get started when we are from scratch, which nobody had really dug into AI in IT at Bestseller before. So, we couldn't really go to anyone for advice. So, it was it was Blue Ocean, you know, keep your eyes open and search the web. Talk to people and Thomas from Bluefragments popped up. And I gave him a call during the summer of 2017. And we kinda made the agreement that we should meet up and see what we could build. And that was actually the idea. Leading the task force to provide proof that we could use AI.

Caroline: What does intelligence mean to you?

Lars: That's almost a philosophical question. Well, intelligence to me it contains actually some different things. Of course it contains some kind of knowledge. Knowledge of specific topics, but also how those topics and things within that area interact with others. So, intelligence is taking a lot of different pieces of a puzzle and putting them together and seeing the bigger picture. It might explain the whole thing, but also the surroundings. And I think intelligence is also very much about perception and being able to take information, take data and put it into information. Really, taking different chunks of, whatever it might be, and figuring out how it's connected. How you can you interact with it, whatever it might be.

Caroline: So what does artificial intelligence mean to you?

Lars: Well, kinda in the same line of thought. The artificial part is, instead of its humans, you know, we will try to put that into some kind of code or logic. An entity able to make information out of a chunk of data, really. Look at something and explain what it is (.) pull-out strings of information that will explain. That will (.) yeah, kinda put together the puzzle for you. That is the way that I see artificial intelligence. Something that is (.) computerised, in some degree but still with all the notions of knowledge (.) how things are interlinked (.) yeah, that's kinda of it.

Caroline: So do you see a distinction between intelligence and artificial intelligence?

Lars: To some degree, yeah. But I think (.) artificial intelligence is something that (.) it's very hard to explain because when you look at intelligence (.) it's such a broad field. It's so deep, it's so hard to explain the (.) how it's really working. And I think artificial intelligence, yes to some degree, it got a lot of common ground with intelligence, but then again (.) when you really put it into the long-term perspective - will we ever achieve, you know, genuine artificial intelligence? Well, we probably might. But many years down the road from now. I don't - I still think that are these (.) because it's just so vast and it's just so complex. We won't be able to put it into code. We won't be able to put everything of the intelligent world, as we as humans perceive it. We won't be able to put everything into code. But we might be able to put elements of it - like describing an image. But the whole interpretation part, the whole ethic part, the morals. It's going to be hard to put into code. So, some common ground and some for humans only, is kind of how I see it. I don't know how to explain it better. At least that's the picture I have in my mind.

Caroline: And how would you distinguish AI from other technologies?

Lars: Well, to be frank, AI to me is not, like I said, it's not magic. It's a technology just as a lot of other things. It's explainable. It's math. Its data (.) the models that you build within deep learning, neural networks, it's math. It's statistics. It's patterns. Yeah, so I don't really see it as being much different. I see it as powerful just as any

other technology. When applied correctly to a certain field, but no, I don't really distinguish it differently. I see it as a opportunity, I see it as platform to build solutions. And to help the business thrust forward, but no. I try actually, a bit actively, to look at it as anything else because I really think we should stop talking about AI as something incredible magical almost. To me it's not it's a new, well, old technology, but we haven't got the computational power as before as we have today, right.

So, now we got the kind of the resources to really scale up that stuff. And make it really kick butt. Then again, no it's a technology for me and nothing more nothing less.

Caroline: Where do you think AI has its limits and capabilities?

Lars: Well, I think AI in itself doesn't have that much, as a technology, I don't see a lot of limits. I see the limit being with us using the technology. You know, in every kind of IT thing you always have the input and the output - to put it out that way. And if you put stuff in, the quality of that and the structure and whatever it might be of that data. Well, it will have a direct impact and affect the output. And I think, as I said, I see it says as a technology like everything else. It's not magic, so it can't cure illness, right. If you put in ill data, the probability of having some kind of ill output would be quite high. So, I think it's got its limitations within us. I don't think the technologies got limitations per say, you know. If we utilise it correctly, if we keep an insanely structured amount of data and we build the right models, because it's us building them, and we train the models and train the AI entity, in the correct manner, well I think the limitations are to a large extent within us. And not within the technology.

Caroline: And how did Bluefragments present the concept of artificial intelligence to you?

Lars: Well, first of all being very low practical, which was also one of the things that I emphasised to Thomas, that were needed - as we are not rocket scientists or anything in that regard. We really needed to take that approach, you know, keep it simple. Try not to jump into the pool at the deep end, let's try to, at least, figure out how we could actually use something - just really to show 'well, we can actually utilise some kind of AI technology'. So, it was very low practical. They presented themselves as a company playing a guitar with a lot of strings - one of them being a AI, the other one being app development, for example for Roskilde.

So they were versatile, you know, which really kind of sparked my interest because AI is a balloon right now, it's a bubble, right. So, a lot of, of course, consultancy companies they come with that AI bubble and promises within that bubble because they want to show that they can do AI. So, I really embraced the fact that Bluefragments were kind of, you know, 'we're kind of new to this, as well, we've done hackathons and apps and we have done some AI. We're poking around with it in our office. You know, with a webcam looking down at a parking lot, trying to figure out how much traffic', and what not. And I like that approach. It was hands on, it was honest. They didn't promise anything, they said let's have a look at the data and that kind of tricked me because, as it probably, you know, if you figure out by now - it's all about data. And I like the approach of looking at 'let's see what we could put into the machine'.

How well we can put it in, how well the data is, how well we can structure it, filter it and see what we can make of it.

Caroline: So, was there a distinguishing between your and Bluefragments definition of AI?

Lars: (.) I don't really think so. It never stood out to me, at least. As, no I think the perceptions were (.) kind of similar to a large extent.

Caroline: Did you know all of the capabilities of AI before you spoke to Bluefragments?

Lars: Some, yes. All? No. Not in a lifetime, but we had kind of withdrawn the big picture, you know, we had, like I said, googled and trying to dig up the information about the technologies under the AI umbrella and trying to take a stab at it, you know. Just experimental wise. Back at home in the evening spin something up in Azure, put something in and see what comes out. It was really low practical.

So, I think what they provided us with, was an insight into, especially the model part. Because we knew machine learning, we knew deep learning, we knew the cognitive services and all that stuff. But they kind of put some more words into it and made it visible for us: How do you actually use models? And when we take that step further down or up the AI ladder: What do we actually expose? Well, feature hashing ((turning arbitrary features into indices in a matrix)) and these different split models and whatnot. Everything that Hazel, you know, she was really, this data scientist girl that really loved and was so passionate about her work and you

got a inspired by out. So, she actually kind of showed us some of her world and we got some ideas, at least some very basic understanding, of ‘ok it is math. It’s really math’.

And that was good because it is kind of made, it underlined my notion, you know, my gut feeling that this was a technology that was tangible. It’s not something you can’t explain. Something that is complex? Yes, but it's doable.

Caroline: Did Bluefragments present the concept of Ready-Made-AI to you?

Lars: Ready-Made-AI? (.) No, I don't think so.

Caroline: Okay. I’m just gonna briefly explain what it is, because he might have used it, but not used the term. So, it covers different things. Basically it covers that, Bluefragments and the client they’re working with have the same understanding and perception of AI before they start working with it. So you have the same definitions so you don’t misunderstand each other. And then they also have some workshops or some pre-made AI which the client can look into and can be like, you can say a showcase of how it could be done and the client can take a look at it and see how can it be further developed or maybe use whatever they have pre]

Lars: ]So, what you're saying is that Ready-Made-AI is off the shelf things that you can show and ‘well we could build it like this’.

**30:50** Caroline: Yeah, and also create a common understanding of AI]

Lars: ]Yeah well, we did that on the workshops, really. (.) Really just tuning into each other and getting that same language, to a large extend, for us to, like you say, avoid misunderstandings and I think we got a long way with that. But then again, we had a good idea on the basics of AI, so it was a short intro. But I don't recall them coming with this ‘well what we could do is look at this, we did this with another client’, but they presented the idea of ‘well we could do it this way so if you send us 10,000 tickets we can actually start doing some work home preparation so that when we come to the hackathon we already got something to build on’. I think that may be the closest thing that I would get to calling something from them being Ready-Made-AI.

Yes, they had an idea and we kind of tuned in on the first workshop to the concepts and the notions of what is what and how can we use it. But I didn't feel - no I don't think any of us felt them pulling something down from the shelf and going like ‘here it is’. They might have had some kind of basic understanding of the fundamentals in place, but I think that were much more an expression of the people and the skill set they with from Bluefragments that was the fundament.

Caroline: So, do you think that this workshop, that you discussed a bit, created the foundation of you having the same common understanding of AI with Bluefragments?

Lars: Yeah, to some extend it did. (.) Yeah, absolutely.

Caroline: Okay, to something else, what organisational infrastructure has been needed for you to adopt AI into the company - if any?

Lars: Cloud. Really, because that (.) this is where you got the resource pool, you know, if you really want to crunch data - if you really want to deal with huge chunks of data and you don't want to break the budget and buying, you know, old school data centres. Well, then the cloud is where it happens. You got the scalability and you got that kind of on-demand resource pool you can dig into. And as I said, with AWS Amazon, you got the Google Cloud, you got the Azure Cloud with their focus - and themselves, of course, also using a lot of AI technologies to empower their services - it was a natural step to go into the Cloud and say ‘well, this is where we put our investment’. So, the Investment was made in the transactional data, whatever it might be, you know. Input/output, really. And those Cloud services was kind of the investment we needed to make. We don't run anything AI wise, everything is done in the Cloud

Caroline: And has adopting AI been a strategic decision for the company or the department?

Lars: Well, now yeah, it’s been. I think the POC ((Proof of Concept)) we did - the activities, the business plan activity was the frontrunner. We’ve kinda paved the way. As I said, explained to, not only IT management, but also into the business that this is a potential that is needed for us to harvest ((the fruits)). We need to invest in this. When we look at our peers, we can see they’re already a bit down the road, in terms of using cognitive

services in apps, whatever it might be on the e-com platform. So yes it's. It is a strategic decision for us to head down that road.

But then again, let's not get, you know, blindsided. Let's keep our eyes open because, then again, it's a technology as everything else. It got its limitations, it got its maturity curve and we need to take those steps, you know. Yeah one at the time. So, let's not go rushing into fully, I think this is stepwise adaptation, as the technology matures, as their service providers mature the platform, as a data improves. Because that is the main concern I have. The main focus we should have right now, is really the data culture. Because that needs to be in place. AI won't fix your mistakes. It will help emphasise. It will help thrust whatever you have in a good orderly fashion. It will help to multiply that, in terms of outcome. But it won't magically cure bad data.

So yes, it's a strategic decision. But I think we are aware that we need to do this in a smart way.

Caroline: You said now it is ((a strategic decision)), so was it not a strategic decision when you started in 2017?

Lars: No it wasn't. The idea was to create the fundamental understanding of AI. How is it fitting into the portfolio of technologies that will help a business thrive. Will it, at this point in time, at all, thrusts the business forward? Or will it just be one of those things that will hit you and then you go totally crazy about it and spend a lot of money on it - and then it really didn't turn out that well, in terms of no return of investment? So, we wanted to showcase. So, when we needed to make a strategic decision, well it was enlightened. It was factual. It was not guessing. It was not a Gartner report. It wasn't, whatever. It was factual.

And that made the decision more easy. It was a decision made with open eyes.

Caroline: But if you wanted to work with AI in order to thrust your company, wouldn't it then be a strategic decision?

Lars: Yeah, it would be. And of course that's the plan. Even though you don't see in the strategy that we're gonna use AI to thrust the business forward - that's not the strategic goal for us - it's an activity that might support it. But it stand shoulder to shoulder with a lot of other activities. And it might become a part of the foundation in some part of the business. So, right now the strategic decision was really (.) it's not (.) you don't see AI in it. It's not like big billboards we're gonna use AI in everything, no. We made the POC, we made it tangible and now we're gonna (.) maybe, implement it into the solutions if it makes a difference.

But then again, if our data is not good enough, AI is not gonna to help us. So, do we want to make that investment in the AI? Or do we really want to make the investment of providing, or building the data model and the data culture instead? Because, from my point of view, that is where you wanna spend your money, right. Because it won't only help you AI it's gonna help you in a lot of different areas. I think you're gonna start with building that. It's kind of like starting building the roof on a house when you haven't even put into walls in place.

So, step-by-step. Yeah, but it's definitely a part of what we're going to do - in what extent, in what area, with what AI specific technology, time will tell.

Caroline: Have you implemented yet or are you still being developed?

Lars: Well, it's in test right now. The intelligent dispatching is in test. And the way that we build it, and designed it together with Bluefragments, that it's supervised training. So, the model needs to be improved. From their original model that we came out with at the end of the hackathon, it proved an accuracy of 83% - so out of, let's say 10,000 tickets, 8,300 would be correctly assigned out from the definition of how a correctly assign ticket was made. So, right now we're taking life data. We're pulling it in to a dispatcher, it's a human called Dedrick, sitting in the Netherlands and he's actually looking at tickets. Seeing what the AI model predicted. Which assignment group, which department should this ticket go to, to be solved? What with, his experience, what would be the right one? And then the end result.

In this way we're gonna (.) go through a lot of data. And see, is the model correct? Did we actually use the correct data structure and amount and hygiene, to provide a good model? Or did we built the model on dirty data? We might have. But right now it's the testing to see, did we actually do the right thing? We could have just a pushed it into production - some people wanted that. When you're driven, when your result-oriented, 'well let's just go. 83% it's good. We gonna see these two, three, four human resources and we gonna make them something valuable instead. Instead of just being postal workers assigning tickets for different departments. Let's use the AI it's working, we're using AI now'. People get so focused on the target. (.) They're zone in on it and they tend to forget to see a broader picture.

So right now, luckily, we in the face of, hopefully ending. It's the plan. Let's put it into production, but let's make sure we put good stuff into production and not something that's not that good.

Caroline: So has there been challenges of developing the AI so far?

Lars: To some degree, yes. From a technology point of view, no. I think it's been pretty straightforward. Azure ML workbench they provide us were useful. We did the integration set, we should from our ticket system. We made the web service that is used by this person, Dedrick, to train the AI model or to review the data at least. So, from a technology point of view, no. No real hindrances, really. It kind of went smooth. But then again, looking at the organisation and getting people to sign up for this, because it was not within my department only, we needed collaborations with others ((departments)). And kinda getting that prioritised was kind of one of the hard ones. And it took some political work to make it happen. Because it kind of, I won't say step on somebody's toes, but, then again, this ticket system as a service now. In their pipeline development, if you go to the website you can see 'well, we got in the new release a lot of machine learning capabilities'. So the system owner wanted of course, why should we implement this that you've built in a hackathon over the course of two and a half day, why should we implement that into a perfectly standard system? Take this non-standard structure and put it into a standard system when we know the standard system will be providing this technology within the next 6 to 8 months'. So, that was kind of the road blocks that we needed to remove. But then again, let's just kick the door in and see what happens. And in the final run, right now, we are in test, so we're happy. Looking at the results, but we're going to take our time.

We, of course, also gonna listen to the drum from service now and see what they can provide us with. Because whatever's best wins. It doesn't need to be what we build, like I said, it was a proof-of-concept. It didn't really intend to be something that could be been to put into production. If we made it, great! Money well spent, but it wasn't the end goal. The end goal was to explain AI in a Bestseller context.

So, right now it's on its way, hopefully it will end up in production, but we'll see.

Caroline: Do Bestseller's employees have strong opinions about AI?

Lars: If you ask people in the brands making the stuff that we sell in this in the stores, no. They're focused on retail. This is what we do, we sell clothes. We design them the best way we can and provide good fashion. They have their eyes on the trends and whatnot. But of course, they're not seeing it from a technology point of view and they're not seeing what we are seeing. And by we, I mean IT. When we go to conferences, when we look at our peers. We look at the technology forefront, we can see how AI can help a designer. We can see how AI can help within the supply chain. We can see how it can help in the e-com platform. How it can help us internally in IT. In finance. In the legal unit.

So there's is a lot of things that we need to put out to them, because they don't see it. I think within IT because we had this business plan focus. I think people are now paying much more attention. We have this town hall thing where we meet up everyone, in ITU, online from all around the world - it's a global meeting. I stood up and explained AI from my perspective and how we could utilise it in the business. And I think, from those events we had a guy from one of the universities - I can't remember if it was from DTU or what - it was a guy talking about it ((AI)) on one of the conference we had the summer. So it's starting to move in on us - it's starting to close in on the perception of doing IT work because it's gonna contain some kind of AI. And if you look into all the new products that are coming in - because AI is a bubble - you will see it. Explained somewhere 'well we use machine learning to blah blah blah'. And it makes it feel fresh, right. So I think for us in IT we are aware, but as a Bestseller employee we haven't really shown it to the business.

Caroline: And how about the people who are distributing the tickets, do they have an opinion]

Lars: ]Yeah, definitely! I think it was a jaw-dropping experience for them.

Caroline: A positive or negative one?

Lars: No a positive one. when they saw what we could actually do. Because we had one of the on board during the hackathon, you know, it was a very good and open and honestly discussion on - he wasn't really afraid of losing his work, he wasn't. He was one of those 'let's try to kick ass with this. Let's see how we can utilise it. Because I really want to do something else, you know, can I do RPA? Can I spend my time and on being a unit developer instead? Instead of doing this postal work?'. Of course it's beneficial for him as a person, in his professional path. So he was, very much, in a positive way really amazed on how much progress, first of all, we could make within 2 1/2 days - and a lot of credit goes to to Bluefragments and to the participants in the hackathon, as well. It was really an eye opener.

So, I think they're gonna be clapping their hands because, will it help us provide the business with smarter solutions and more efficient work? Yes, definitely. Because ticket result time will decrease. Instead of a ticket laying around two days because it's bouncing ((back and forth)) 'no it's not SAP, It's HR. Well, it's

actually not HR it's contract management. No, by using this vast knowledge in qualified data, by the model, we can actually put the ticket to where it should be. And then shorten that time to market, if you will, for the ticket and the resolution of the tickets. So yes, it will help thrust the business because they won't be down in a long period. They will get their ticket resolved in a fast manner. So they ((the postal workers)) were positive.

Caroline: Does management and employees have different perceptions or are they similar?

Lars: By management we do you mean IT management?

Caroline: Yeah, or like the top management.

Lars: I think (.) If we talk top management I am sure Anders - our CEO, I haven't heard him say it - but I'm sure that he's aware. You know, he's good keeping his eyes open, right. He is seeing what other people a lot of the times are not seeing. So he's definitely, I think aware of AI. But also with the background that we actually provided was approved by Pernille our CIO. She probably brought it forward to him and said 'Anders you know maybe this is the way forward'. I think, I haven't I haven't talked to one or either of them about this, you know. Well I talked to Pernille about AI but I think there are Aware.

I think Pernille is very much aware, that this is, she said it on the conference, 'well AI is one of the things that we are going to look into'. We gonna utilise it, if it makes sense. If our data is mature enough, if we are mature enough, if the technology that we are going to use or apply is mature enough. So top management is seeing it, I think for the company most likely within IT for sure. The employees, yes, to a large extent because of what we did. And, that was the whole idea. Let's show them, you know the giraffe. That was really what it was all about. Pull it out of the hidden and make invisible for everybody, showcase it

Caroline: Is there a common understanding of the organisational purpose of AI, throughout the organisation?

Lars: And then again - then we need to define the organisation. Because if we look at, Bestseller is not an IT company, we are a retail company, right. This is what we do, clothes and fashion. So everything that is AI is within IT (department) pretty much. But then again the systems that the business use, utilise, they could contain AI. I think the whole organisation not so much, maybe to some extent. If we talk E-com. yeah they are aware, if we talk Jack and Jones design no I do not think so. If we talk IT, yeah. If we talk logistics yeah, finance yes. So it's this kind of leading this new technology into the organisation and it will take time.

But I think to a large extent, also with the media and all that stuff, because it's almost becomes - it has become an everyday and a normal person's thing to talk about artificial intelligence, you know. It's no longer something that happens in the basements of the universities. Now it's something that is in the media and we talk about it, in general and the public. So I think it's much more something people are aware of - but I don't think that if you ask for example the J&J (Jack and Jones) designer, no he's not gonna be able to see what I can do for him. But some certain parts of the organisation can definitely see the benefit and kind of are aligned, to some extent. If it answers the questions.

Caroline: Yeah of course ((it does)).

So do you think that the Ready-made-AI, as you can see it, has been a contributed to this ((common understanding))?

Lars: To some extent, yes. Because from what I understand Ready-Made-AI, AI is kind of the off of the shelf. for AI as a service, as I've kind of called it, if you use AWS, Azure or the Google Cloud, you will find services that can provide you with a platform to use machine learning, deep learning, the cognitive services, whatever. That is Ready-Made-AI right? Take this one, you know, they made this with 'alright let's put data into, let's try hack and slash and see if we can find anything that will be useful for us'. So I think Ready-Made-AI is (.) The services providers are giving us the opportunity and it definitely will help everyone go forward with AI. Because now it's off the shelf, pulled out in the Azure ML workbench, you can go forward, hire in a data scientist provide a pool of data and a good idea, and then you're pretty much set.

Caroline: Something completely else. How do you believe that AI can be used in everyday work?

Lars: (.) Well it can be used for, in our field especially, because we look at a lot of data and we really want to be data driven, and if that is a fact then I think that AI is one of the tools and the technologies that we can utilise to make decisions, everyday decisions, more precise. Because you'll have a better understanding of the data.

With the shops that we have around the world and all the data that we collect, the data amount and the complexity of the data, is to such an extent, that even though that we try to make decisions based upon that data, and we use the BI, you know the business intelligence solutions, to provide us with some kind of fundament to make that decision. Well AI is one of those tools that we really make decisions easier to make for a larger group of people.

If we for example take a retail store, it could be a store Copenhagen. The sale data and the stock data from that store, we pull in, we look at it. And somebody in headquarter here in Brande or Aarhus, will take a decision because now we got that store data, we got that store data, so for the Metro area of Copenhagen we can see whatever style is trending that will be our HQ decision - 'Ok if that style is trending but well this is not' should we make some kind of discount deal on this non-trending style, to make, you know, to kind of push it forward to the customers. Well that is a HQ decision today or it might be, right. But why not push it out to the store manager? But right now the data is too complex. He can't see his way through it. He is not a business controller, he's not using the BI ((business intelligence)) system as the people at headquarters, so. One of the things that I really think that can be used here is that, we could push the decisions or the decision making process and capability into a lot of people, using AI. And I think it's much more feasible, right. He's ((the store manager)) the person knowing about his local area, knowing about his customers because he sees them everyday, HQ doesn't. So by using AI and for example crunching a lot of data and using some machine learning to, it could be well - based on what data we see, we suggest by using a certain model, that you ((the store manager)) discount this, and this, and this or whatever it might be. It can be tons of things but I think that is one of the things that would be useful to really push out the decision-making capabilities into a lot of people, instead of just a few people. And it's got its drawbacks, of course. But I think it's one of the things that could be utilised, if and I can't even remember the question now.

Caroline: It was how AI do you believe AI should be used in everyday work?

Lars: Yeah! That is one of the examples. The BI area for sure, with all of the big data going on there, we could use models to draw out patterns for us, make predictions to whatever SIM that would be precise enough, I think that is definitely one of the areas where we are aware that we might need to do something. The E-com. platform as I mentioned, I think that there is lot of the cognitive stuff in the pictures. You know, 3D modelling. That could be a lot of new ground in that area to try to build something exciting with cognitive fashion as I call it. Where we start to build models that are fashion specific, because that is what we do, we do fashion! So we need to use fashion oriented AI. So it could be in the design process. A part of that, it could be in the logistics part, tracking of packages, tracking of containers. It could be auto replenishment to stores. Yeah, really helping us make faster and better decisions I think. It's a lot about that part, right now. But then again, there is a data layer and there is something that needs to be in place before that. Which I think is equally if not even more important to get your head around or at least approach and digest in a certain way. Before you, you know, go running down the street yelling AI - because it's the technology in itself it won't help our business in itself. We need to be aware of what we put into it and how we decide.

Caroline: How does AI act intelligently when you use it? In your opinion.

Lars: How does it act intelligently ? (.)

Caroline: If you think it does.

Lars: Yeah, well to a certain extent I think it acts intelligently but then again it's really (.) Right now we haven't, you know, the world haven't seen true artificial intelligence, right. We haven't seen where it can take emotions, ethics, morale [morals], whatever. It doesn't take that into account, it doesn't beat human intuition, whatever that is. (.)

Yeah, it makes artificially intelligent decisions, but intelligent no! I don't think it does - I think it provides us with maybe a clearer picture. Not the clearest - but it's a step of the way.

So the questionnaire?

Caroline: How does AI act intelligently when you use it?

Lars: Yeah well, it acts how we invented it, right. It's made by humans with all the flaws and error that might come in that way. So, how does it act intelligently. Well it might seem intelligent, that it goes through 100,000 tickets and it distributes them, but then again is that intelligence? well it is pattern recognition, it's you could call it intelligence - but then again we are back to the philosophical question and the definition of what intelligence

is. So you know without it can become very fluffy. But well it's yeah it is partly intelligent but (.) But we trained it, we build it. So partly intelligent, yes. But I'd can't really come closer.

Caroline: So in the beginning you said 'to some extent'. Can you elaborate on what you mean by that?

Lars: How it is intelligent 'to some extent'?

Caroline: Yeah.

Lars: Yeah well, it doesn't really, it doesn't take everything into account. And is it intelligent not to take everything into account? Well then again we're back to defining what intelligent is - but I think it's still lacks a lot of things, that the technology is still lacks to be truly intelligent. With an understanding of getting the big picture, and kind of, pulling out a context. Digesting the context and kind of re-evaluating the whole scenario - no we're not there still a machine, that we put something into, and then it does something, that is extremely complex, yes. But it's still just crunching data from a model that we designed, right. There is nothing happening here by magic!

You could say - when we hear that, you know, the models where they do the unsupervised training, the Deep learning where it's training itself, is that intelligent? That it's able to train itself and make itself better. You could argue that it is. But you could also argue well we asked to, so we said is it more intelligent than us? No, I don't think so it's just got more resources than we do. It can go through a lot more complex things - but then again we designed it, and we designed the self training model (.) So well it's kind of the closest thing I can get to it.

Well I think it's incredibly, I think AI is incredible - but it's then again it's not magic! It's math, is AI intelligent? Well yeah, to some extent it is. But then again it doesn't take into - it doesn't take my or a person's intuition or I have this gut feeling thing ((into account)). No it doesn't take them into account. Is that intelligence, yes it is! That is seeing a broader picture, right. That is the peripheral vision, if you will and the AI unit, it doesn't have it. It looks at the data that you can put in a period. There are still some actions (.) it is not there yet.

And of course, that's also where all the ethical questions comes in and the whole layer of security, we need to provide at the whole AI community really. And when we have to talk about AI. (.) It should also be a discussion of how intelligent should we make it, or allow it to become. And I think that's one of the things that we need to discuss as well. And actually also at this point in time, for us in Bestseller even, we need to take into account what are we actually trying to do, and what would be the effect of this. But without going into this kind of crazy talk! Well yeah to some extent it's intelligent but then again no it's just doing what we have to do.

Caroline: Do you think it will become intelligent?

Lars: When we talk human intelligence, no I don't think so. I think we will get close, but I think there is something - not that I'm a spiritual or religious person in any way - but I think the complexity of our mind and how it works just, is just crazy. (.)

Right now I think we're talking about single digits percentage wise the competence of a human brain. So the AI is not even close yet. But you could say it's self-powering factor. Because when we make the AI, and do the unsupervised training, where it will self train and all that. We're going to see enormous steps forward, but then again, there is feelings, there is intuition, then again there is a lot of tacit knowledge that we can't feed into the AI, it can't read about. So will it ever become well, and I'll Never Say Never, because you know who thought we would see people flying to the moon just 100 years ago, you know it was just unfathomable kind of. So I won't really put it out the famous Nokia quote, you know nobody will use the iPhone thing. But yeah it is will get extremely, extremely better and of course it will. It will undergo the same invention and speed. Once it really catches momentum we are not going to see the same craziness that we see in Cloud computing and a lot of other areas. So yes, it will be become extremely (.) It will become much more than it is today. And more quotation marks intelligent. But then again, I think there will always be a barrier, and that barrier might be narrow down, and to a point where it's maybe only a thin line. But now it's ((there is)) a vast space between artificial intelligence and genuine intelligence or whatever you call it.

Caroline: What do you think the barrier is?

Lars: Right now, I think the barrier is really the utilisation of AI. Like I said, well if you look into our organisation, a small group of people are aware of what AI can do. And that small group of people are only aware of a fraction of what AI can do. If you gathered, kind of all the knowledge of AI in the world and you put

people into a room. Yeah, we would get far but then again I think really it is a a journey. It's a journey from a technology point of view, the computational power is still to a certain degree limited, even though we build park safe GPU units that can, you know, figure all these crazy things out in the very short period of time. That is the technology side of it. But then there is there the people side of it, and I might actually see that just a big factor, you know, we still need to embrace it. As the human race is something that we do everyday, you know, 20 years ago everyone didn't have an Iphone or mobile phone or a smartphone. Would it ever (.) you know 50 years ago was that even on the horizon, no it wasn't! So, I think it's a journey, I think it's it's the journey off of maturing the stuff, with all the Alexa dots, and all the series, you know, when I need to look for a picture containing the sea, I use my Google photos and search for 'sea', and then all my photos where the kids are in there are having a swim in the sea pop-up. That is crawling into our everyday life, and I think, the more that we going to see that, we are going to see self-driving cars and what not, I think it will just gain momentum.

The journey involves us all, kind of. The more we embrace the technology, the more emphasis it will be for companies to provide more of that technology. And that will just be a self-empowering thing and you're gonna go to see those crazy curves, you're not go through the roof. We're going to see that space narrow down to a line, at some point in time. But that's my idea, at least. There is a human factor to it.

Caroline: Do you see the AI acting independently at this moment?

Lars: No.

Caroline: Do you see it acting independently in the future?

Lars: Yeah, Well is the future is that in within 2 minutes or is it within 50 years? Yes, I think as everything else within the technology field, we're gonna see that explosion. Right now it's a bubble, we gonna, you know, it's going to burst at some point in time - we are gonna - Right now, we are actually seeing 'ok it's not magic' well we thought it could be, you know, flick the AI switch and everything dandy and we would be do all these creative things. No! That realisation has kind of hit us, and I think it has hit kind of the world, that technology will also. It doesn't mean that we have put AI off. But it's just, the balloon is slowly deflating, and I think we're gonna come down to a point where we see what is AI, right now. And then it will start to pick up - but it's a lot of hot air right now.

So in the future of course it will! For sure, it's gonna be in our everyday life, just as the smartphone and today you could argue that is with Siri. I go up every morning and I say 'good morning' echo ((Amazon Echo)) and she tells me what I programmed her to, she tells me what I'm supposed to do today. What's my agenda, how's the weather and you know what's the kids, you know, after school what are they going to play hockey or are they going to swim or whatever. So I utilise it but my wife doesn't, my parents, so do you?

Caroline: No, not yet.

Lars: No exactly, and that's really kind of emphasising my point. Some of us do, but on a smaller scale. And when that scale becomes bigger, when you start speaking to your car, and tell it 'Well, drive to Kastrup' then we're gonna see it come better, because the data amount and the quality of data will increase. That's the fundament ((fundamental part)), right. Then when we put it that into the model, the model well get better and get more areas where we can apply it, to a wider audience and more will adapt it [for their use], then you get it going really. So it's small steps, but yes it will increase and it will just start picking up momentum. In the future yes, it definitely will be a huge part of everyday life for almost everybody.

Caroline: When we talk about AI acting independently, do you also believe it will act independently from humans?

Lars: No, only to the that extent that we have asked it to. But because it's still humans building it. It will (.) it might seem like it's acting on its own because it will come to a certain conclusion that we haven't thought of. But it's build upon a model that we made, some kind of logic that we made, so yes I think it comes down to how you perceive it really. Did it act independently, because we didn't foresee that kind of move, like the alpha go right? Well it suddenly place this pawn, or whatever it was, in the middle of nowhere, would a human do? Did that seem intelligent, yes! Was it truly artificial intelligence, no. I don't think so. It was math. Just to complex for us to figure out in short period of time. So acting independently, some might see it as. And then again, we're back to a kind of a definition of what is independently and what is genuine artificial intelligence.

I think for a lot of people it will seem like 'Whoa, how did it do it?'. I can tell for a fact, that back home we're playing an animal game, which is something that the dot from Amazon, you know this small thing with echo, I can ask her, you know, 'let's play the animal game' and I will think of an animal I won't say it out

loud but I will think of a squirrel. And she ((Echo)) will start asking, does it have clothes 'not sure', is it brown, 'yes', does it have a tail , 'yes', does it live in the jungle, 'no', you know and she will start asking questions and I've done it with my kids, and then she said 'is it a squirrel'. And people are like 'How did she know!?' and that seems truly intelligent because she, you didn't tell right, it was in your mind nowhere else and she figured out. But then again, you know, she's just parting the phone book in the middle and start looking, 'if it is not there, it might be in the other half'. And you know it might seem intelligent, and that kind of every time I do that with people, and we play the animal game, they are amazed. And they say 'Whoa, this artificial intelligence, you know, it's kicking ass'. So I think it's perception, it how you see it. My mum, and my kids, and my wife, they see it as amazing, I see it as funny - amazing no. It's fun, but then again it's math, really it is not magic.

Caroline: I think I almost have the answer for this question, I'm going to ask it away. Would you describe an AI as an evolving entity? Meaning a changing thing.

Lars: Yeah, very much so.

Caroline: In which way?

Lars: In the way that it will help us look at complex scenarios from a different angle. We're going to take that knowledge and we gonna improve the AI technology with it, we're going to build better models, they will be, they will enabled us to see even more complex problems or scenarios more clearly, and we're going to improve the models. So we're going to improve AI, AI is not going to improve itself - but we're gonna move AI forward because we believe in it. And we believe that we need it, right.

So yes it's going to continue to evolve. To a point in time where even if we strike the almost impossible one ((scenario)), where it's ((AI)) truly intelligent on its own - I don't think we're gonna, not within a long period of time, but for sure I most certainly wrong about that - but you that is my gut feeling, at least. History tells us something different, but yeah it's gone to evolve, we going to push it hard because we need it.

Caroline: Again, I think I might already have the answer to this question. Do you believe AI has agency? Meaning that an AI can exist by itself, and is capable of acting independently from human input.

Lars: (.) Yes, I believe it can. But not truly independent, because humans designed it.

Caroline: So you don't actually believe it has agency.

Lars: Not 100% autonomous decisions.

Because you can to a large extent, very large extent, say it's acting on its own, yes. But I can't help going back to the fact that we told to so. I think very much that's the definition-wise problem, yeah how do we define acting on its own. It didn't pop out of nothingness, right. We build it, we've designed artificial intelligence. So it will act on its own to that extent that we asked it.

It's just to 85 or 95% of the human population it will seem truly autonomous. Because they don't see what's behind it. Of course, they don't know - people like electricians or whatever, teachers. They don't have the knowledge it not because they're stupid but they don't know how it works, until we somehow tell them, if we do. But then again for me, no it's not total autonomy because we told it to in the first place. It's just a complexity, we can't see through it in the end. It will be able to digest so much more data, we can't comprehend how much it can crunch, so it might seem autonomous but then again we told it how to be autonomous.

I don't know. It's kind of a fluffy thing but I can't really explain it more, because I don't think it will - it will always have the umbilical cord to the human race if you will. It will never be severed. It might become very, very, very long and we might forget. But it will always have that kind of connection.

Caroline: Just to understand you, when you say it can act independently do you mean that it can process information and come up with an output?

Lars: Definitely! It can say 'Well, I was supposed to go that way but I will go this way instead, because I got this data foundation, and I figured out - this is the smarter way or root, yes'. If that's acting independently and it will.

We see it right now, right. Google Maps it won't turn the car for you, but it will tell you there is a quicker way 'go there'. So 5 years down the road, when I'm putting myself into the self-driving car, it will be linked to Google Maps it sees the shortcuts in traffic, it will act independently.

Caroline: And what do you believe makes an AI valuable?

Lars: Well I really believe that we as humans, you know, we tend to become I won't say lazy, but we like the idea that the computers are working for us, and I like that. question again?

Caroline: What makes an AI valuable?

Lars: And the value is really that we can make it do stuff for us. Stuff that we don't want to do, right. That is the value - we can we can actually free up time to do whatever we want or different things, right. Or better things that's a certain part of the value. There is also a value in the financial part. It can help us, maybe make a bit of market decisions. It's not about being lazy, but it's making faster and more precise decisions, that is a value in itself.

It might be able to if you look into the health sector, and right now Rigshospitalet in Copenhagen are using Watson from IBM, right. To go through all the journals and all that, it can help us in that way. So the value can also be to us as humans, it can help us digest a lot of data and then I can make decisions easier to take or make the right decisions.

So it depends on how you to determine value, because it can be both from an economic point of view, it can be from a human race point of view, it might figure out you know the cure of cancer. Just take one thing, it is one of my personal wishes really, is that I really hope it will help that branch ((cancer research)). Of course then will we have cured cancer and we will, I think eventually. Then there will be a new sickness and then we work on that one.

Nonetheless I think that will be a value, it will be a value to us money-wise. It will be of value to us in our spare time. When I go on vacation I will be driving more safely with my family, we can enjoy each other's company instead of driving. So, yes I think it will be valuable, in a lot of different areas.

Caroline: So you think it is valuable because its deals with time consumption and because it is process optimizing?

Lars: Yes, that is definitely one of the things. Shorting down the time, right. Making complex things seem simple, so we won't spend so much time on doing non-value-adding activities but actually only doing the value-adding ones. Because we got this worker over here, doing all the hard work, crunching all data. So definitely time-consuming or helping us spend time more wisely is a value, making good economic decision, making the health sector function better, making the traffic going better or whatever it might be. Yes, I think a lot of value in AI ((can be found)). I actually only see value, I see some risks also.

Caroline: I just have a few follow-up question.

- BREAK -

Caroline: Do you believe that human will always be more superior to AI?

Lars: (.) Yes I think so.

Caroline: You don't see a Terminator, RoboCop scenario?

Lars: I can definitely see it, but then again, because we designed it, then again you know in the in the very first instance, this is didn't pop out of nothingness this is human made. I think we will have some kind of leverage towards it, at anytime. I think it's as we go along and in the technology kind of know becomes better I think we will start discussing the security aspect and all that stuff, you know. So you won't have the Terminator scenario or at least it won't go that bad, but I think we will be superior. I honestly think that the human race will be extinct before they let, you know before the artificial intelligence (.)

Caroline: Come that far?

Lars: Yeah.

Caroline: You were talking about the self-driving cars, do you see that as intelligent or do you still see that as math?

Lars: That is math to me. Because it's patterns and it is sensor input, it is code written by humans digesting the input. It is a lot of input a human won't be able to do it, right. Well we drive but you know, we still make a lot of crashes each and every day. But no, it's not magic it's just maths. It's decisions made upon the data and there you go, you can drive from A to B.

Caroline: So, just one last question. Can you just tell me a little bit about your background? We have been looking at your Linkedin as well. But just a quick background.

Lars: Well background.

Caroline: Well what did you study?

Lars: I studied, what is it called in English? Data technician in Danish, directly translated.

Caroline: Data Scientist?

Lars: No, it wasn't data scientist. It was actually just a very technical background. Networking, operating systems, programming - you know the fundamentals really. And that kind of led to do 5 years in a development company in Aarhus, Open-source platform company. And then I moved to Bestseller 7 years ago and I started in client management. I have been doing OS deployment, and patch management. Then I got a bit more into the whole process thing and I had a background in the Danish Navy. So I had a lot of knowledge about crisis handling and all that, and working under pressure. So I made some of the incident processes that we have, the major incident process and worked as a major incident manager for some years. It was kind of more process-oriented, but through that I got a lot of business knowledge, how is Bestseller actually working. Also from a technology point of view but also from a business point of view.

So that's kind of my background, I think there was one of the reasons why I was kinda of pointed out to do all the AI stuff, as a POC. I know a lot of different technologies and the Business areas in fact. I know in deep dive what are the different business units doing and that is a huge part of it. Because those are the ones we serve. Hygiene itself is not a goal. But good business is, right. So yeah that's just the background pretty much.

## Follow-up Question

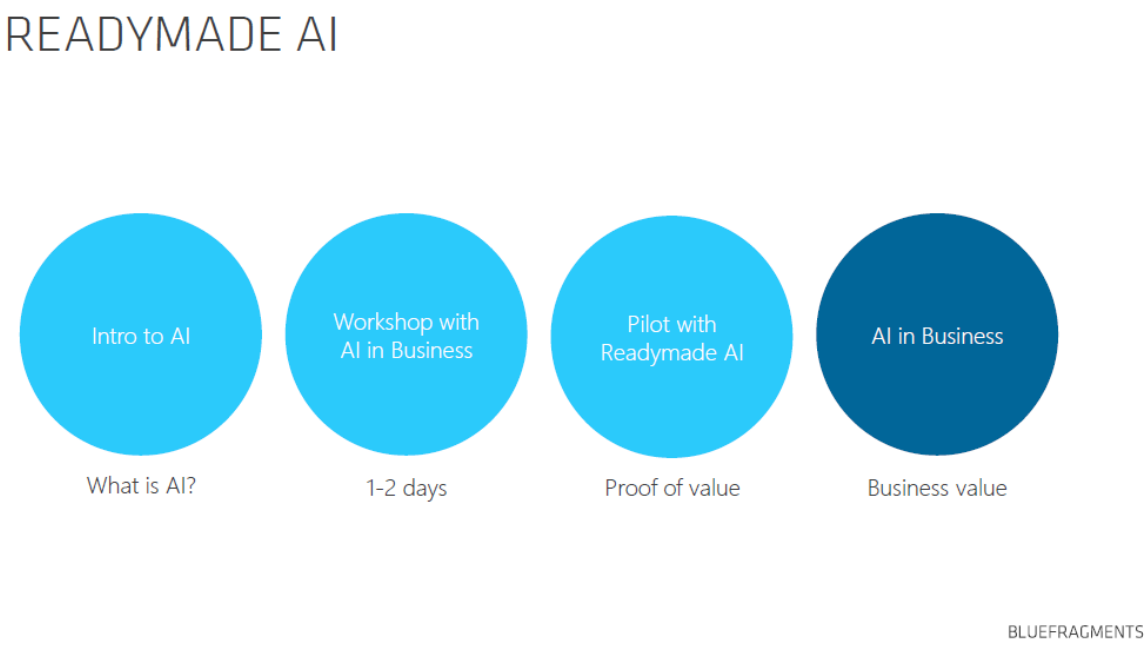
Caroline: Will your company use AI differently than what you initially intended, after meeting BlueFragments? Why/why not?

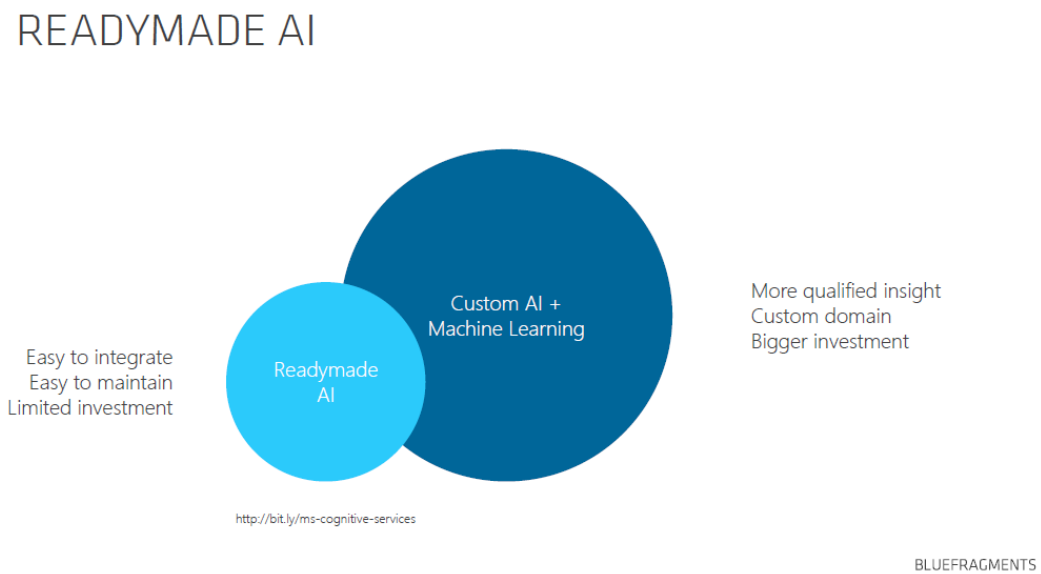
Lars: Partially. BF taught us about the importance of clean, structured data. Next AI endeavour will most likely reflect that in our approach to data capture and hygiene.

Caroline: What is your perspective on BlueFragments?

Lars: Professional yet down-to-earth approach to doing business. They are pragmatic and portray a sense of sticking to proven methods which impose a feeling of quality and calmness. There is a certain "feel-good" vibe to their dealings. It made us feel comfortable and sparked a creative productiveness that we didn´t foresee.

## Appendix 7


READYMADE AI
Intro to AI
Workshop with AI in Business
Pilot with Readymade AI
AI in Business
What is AI?
1-2 days
Proof of value
Business value
BLUEFRAGMENTS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Easy to integrate
Easy to maintain
Limited investment
Readymade AI
Custom AI + Machine Learning
More qualified insight
Custom domain
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