



BUSINESS INTELLIGENCE, ANALYTICS AND HUMAN CAPITAL: CURRENT STATE OF WORKFORCE ANALYTICS IN SWEDEN

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Daniel Gustafsson

Supervisor: Mattias Strand
Examiner: Mikael Berndtsson



Business Intelligence, Analytics and Human Capital: Current State of Workforce Analytics in Sweden

Bachelor of Science - Information Systems Development
University of Skövde, Sweden

Daniel Gustafsson
daniel@danielsview.com
d09dangu@student.his.se

Supervisor:
Mattias Strand

Examiner:
Mikael Berndtsson

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Abstract

The way organizations make decisions today is very often purely based on intuition or gut-feeling. It does not matter whether decisions are of high risk for the company's future or not, managers golden-gut is the only thing that determines whether investments should be made or not. Analytics is the opposite of this intuition-based decision making. If taken seriously, almost all decisions in organizations are made on facts that are analytically derived from massive amount of data from internal and external sources such as customer relationship systems to social networks. Business leaders are becoming more aware of analytically based decisions, and some use it more than others. Analytics is usually practiced in finance, customer relationships or marketing. There is, however, one area where analytics is practiced by a small number of companies, and that is on the organization's workforce. The workforce is usually seen as one of the most complicated areas to practice analytics. An employee is, of course, more complicated than a product. Despite this fact, companies usually forget that conducting analytics on employees is very similar to conducting analytics on customers, which has been practiced for many decades. Some organizations are showing great success with applications of Workforce Analytics (WA). Most of these organizations are located in the US or outside of Sweden. This thesis has conducted research on to what extent Workforce Analytics is practiced in Sweden. Empirical findings show that some companies use WA in Sweden. The practice is not of highest sophistication of WA. Also, they show aspiration towards the idea of WA and some are locally conducting various of applications.

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1 Introduction

Some companies today show special abilities to differentiate themselves in competitive environments. They have put aside gut-feeling and are instead using facts from statistical measurements that can forecast and predict future events. It has come to be called Business Analytics (BA). This ability, when taken seriously, differentiates the business and enhances the competitive advantage (Wixom and Watson, 2010; Lavalle et al., 2011b).

Some people argue and believe it is overhyped for its performance enhanced capability. However, Watson (2011) believes that even though BA may be overhyped it is too important for being neglected. An example of a successful BA initiative is the famous case of Continental Airlines. They demonstrated the return on investing in BA when they strengthened their company from being the worst airline company to the most profitable and favorable in a period of 6 years after the initiative (Burstein et al., 2008).

BA is explained by Davenport and Harris (2007) in a variety of examples and applications in real organizations. They define BA as a subset of Business Intelligence (BI). That is, BA is the statistical and quantitative (predictive modeling, trend analysis, etc.) part of BI (Davenport and Harris, 2007).

BA is used in a variety of ways to boost an organization's performance. For instance, Customer Relationship Management at Continental Airlines uses an application called customer-value analysis that sorts the highest profitable customers so that employees are aware of that when interacting with them. Another example is their flight management dashboard application that alerts operational employees if a high-value customer are late due to gate-connection problems. This gives the employees an opportunity to help customers with their luggage by giving them a lift to the next flight (Burstein et al., 2008).

Workforce Analytics (WA) focuses on applying analytics on Human Capital (HC) and align it to the rest of the organization. WA concerns how to organize and motivate the workforce. It has been practiced much more in sports than in business. An example of this is New England Patriots. They show serious focus in measuring both tangible and intangible attributes of their players so that they will perform better and to be better suited for the team's goals (Davenport and Harris, 2007; Lavin, 2005). Although, there are some businesses that takes WA more seriously. In particular Google, that shows excellent prowess as one of their analytical applications has the ability to sort and hiring the best job applicants across the globe with a proprietary algorithm which compares the applicants to current well performed employees (Hansell, 2007).

Practice of BA is seen in departments like finance, supply chain and marketing. However, less practice is seen in organization's most valuable asset, humans.

1.1 Research Area

WA can be found in some companies, but in general it is very absent in the literature. Organizations have a hard time linking HC measurements to business performance. Other departments (e.g., finance, customer relations, etc.) have well estab-

lished methodologies for creating information that managers need for strategic decisions (Harris et al., 2011). Disparate legacy systems and siloed data keep managers from linking HC data and connect it with the business strategy. Even when business leaders and human resource departments are well aligned with the importance of measuring data on employees, there is lack of accessible and reliable data (Snell, 2011). As a result, organizations are not measuring HC data at all or are measuring the wrong data (e.g., time of hire instead of quality of hire) (Snell, 2011).

Organizations need to focus more on the HC, as they do on other assets (Ingham, 2011; Fitz-enz, 2009). The current business environment is highly competitive and the need for companies to analyze and predict future talent is dire. Companies are facing new challenges and cannot treat HC as they are used to (Worth, 2011). There is a need for better measurements that are important and meaningful and that have an impact on the bottom line (Ingham, 2011). It is evident that organizations need to start measure intangible attributes (i.e., skills, abilities, attitudes, etc.) (Worth, 2011). In other words, the new challenges that have arrived demands a much more frequent use of WA (Hilbert, 2009; Worth, 2011).

It is clear that organizations need WA. What about current practice: Companies like Google, Best Buy, P&G and Sysco are using it. These applications range from basic to very sophisticated analytics (Davenport et al., 2010). Harris et al. (2011) further extends this by explaining how companies reside within six levels of analytic sophistication as follows: Google on first level (Hansell, 2007); A.C. Milan an elite Italian soccer team on the second level (Kuper, 2008); Sysco Corporation on third (Cascio, 2006), Convergys on fourth (Mullich, 2005); Capital One on fifth and finally Valero Energy an oil refiner company on the sixth.

To sum up, organizations today have a need for and are struggling with the practice of WA. Thus, we can see that there is a lack of confidence and/or knowledge concerning the subject. Researchers and practitioners have approached this area and are presenting ideas to solve the problems and have shown proof of concept.

Thus, we can see that practice, solutions and research exists. It is still not sufficient to be taken as a well applied technology. Practice is undertaken but most literature originates from the USA and from Europe, no literature concerning Sweden was identified during the initial literature survey.

1.2 Research Aim

The intention of this work is to gain knowledge and insight regarding current practice of Workforce Analytics in Swedish companies. The aim will be to explore how current practice is being conducted and to what degree and level of sophistication they have of WA.

1.3 Research Objectives

To further elaborate how the aim will be accomplished, the following objectives emerged:

- 1: Determine to what degree analytics is used. How extensively are the organizations using analytics on their employees. For example, can they compare their

current well performed employees to potential job candidates or are they using more sophisticated techniques such as talent retention or workforce forecast modeling? The purpose is to identify what level of sophistication Swedish companies have of WA.

- 2: Determine whether organizations are collecting data on their employees or not and to what extent, for example demographics and performance or unstructured data such as social networks, e-mail and notes. The purpose is to identify if companies have the foundation and what kind of foundation to execute analytics on employees.

1.4 Research Delimitations

The study will focus on Workforce Analytics within organizations and other analytical applications are not considered. That is, other applications like financial analytics or customer relationship analytics.

Small or medium sized companies are not considered, only large Swedish companies will be selected.

1.5 Expected Results

The result will give an understanding of current practice of Workforce Analytics among Swedish companies. It will present data on how employees perceive their companies in terms of current practice, degree of WA practiced and what applications are being used.

The purpose is to contribute to an understanding that will make practitioners in Sweden knowledgeable of current practices, this might give insight to actions. They will gain an understanding of what, in their business, might need more or less attention. The study will also contribute to further research among researchers, as it will unfold new areas that need to be explained or further explored.

2 Theoretical Frame

2.1 Business Intelligence

Business Intelligence (BI) is a collection of information systems used to aid decisions. It collects and interprets current and historical data to report, forecast and predict events that can support the decision process. It consists of people from various of levels and departments and technologies, all performing activities on data and information that in the end support a fact-based management of the organization ([Burstein et al., 2008b](#)).

Even if the term BI has not been around for long, the technology behind it has existed for a long time but with different names. Business Intelligence is one of the latest terms that denotes decision systems. It was as early as in the 1960s and 1970s the first systems rose. These were often called Decision Support Systems. The term BI was first noted in, and used since, the early 1990s. However, the latest term is denoted Analytics or Business Analytics, further described in the next section ([Watson, 2011](#)).

The technology has been defined in several ways, especially in what technologies and activities it scopes. The scope of technologies usually consists of gathering, storing, accessing and analyzing data ([Wixom and Watson, 2010](#)), in other words, technologies for getting data in and getting data out ([Watson and Wixom, 2007](#)). Recent literature defines BI as an encompassing term for both Data Warehouse and Analytics. Data Warehouse extracts data from disparate sources and integrates it with cleaning and transforming processes and later stores it in a “single version of truth” database (i.e., getting data in). The other part, Analytics, is where questions are asked against the Data Warehouse and analysis and reporting are undertaken (i.e., getting data out) ([Ponniah, 2010](#)).

Throughout this thesis, the definition of BI is: an information system or a collection of information systems that includes people and technologies, both for getting data in and getting data out. In the end this supports decisions and a fact-based management. However, the meaning and differences of BI and Business Analytics are further described in the next section.

2.2 Business Analytics

Business Analytics (BA) is usually thought of as the part of BI where the analytics comes in. In other words, it is the statistical and quantitative part where predictions, forecasts and proactive insights are produced to support decision processes and data-driven management ([Davenport and Harris, 2007](#)).

Statistical and quantitative techniques goes beyond mere reporting and query/drill-down applications. It is the highest degree of intelligence and includes statistical analysis, forecasting/exploration, predictive modeling and optimization. These applications answer questions like, why something is happening or what will happen next. These applications are based upon BI applications on lower degrees of intelligence that answer questions like, what happened (i.e., reports and query/drill-down) ([Davenport and Harris, 2007](#)).

An underlying idea and philosophy of BA is given by (Davenport et al., 2010b, p. 176) that provides a description of what fact-based decision making is about:

“Fact-based decisions employ objective data and analysis as the primary guides to decision making. The goal of these guides is to get at the most objective answer through a rational and fair-minded process, one that is not colored by conventional wisdom or personal biases. Whenever feasible, fact-based decision makers rely on the scientific method—with hypothesis and testing—and rigorous quantitative analysis. They eschew deliberations that are primarily based on intuition, gut feeling, hearsay, or faith, although each of these may be helpful in framing or assessing a fact-based decision”

BA can be used in all the organization’s units to predict outcomes and to create a data-driven decision process. For example, cost management, merging and acquisition of businesses, manufacturing, operations and quality, research and development, human resources, customer relationship like attracting and retaining and pricing optimization, logistic management, etc., (Davenport and Harris, 2007).

However, even though some authors find BA as different from BI, other scholars do not. Watson (2011) explains that BA is the latest version of terms, and is just another term that describes the same technologies we have always used. Therefore, throughout this thesis, the meaning of the terms are the same and are going to be used interchangeable.

2.2.1 DELTA Analytical Organizations

The DELTA framework is one way to analyze an organization which uses BA, and to determine what it may need more or less focus on. Later on in this work, in Section 4, the DELTA framework presented in this section will be used as a comparison tool that will capture important WA aspects of the companies participating in this study.

The Delta framework, which stands for **D**ata, **E**nterprise, **L**eadership, **T**arget and **A**nalysts, is an idea that describes a successful analytical company. Analytical companies have a strong emphasis on all these five pillars and are constantly focusing on them to stay competitive. The framework comes from Davenport et al. (2010b) and is further explained as follows:

DATA

Covers the skills and activities required for having data that is available when needed, correct with regard to different types and formats, consistent across various systems and sources, meaningful in that it is useful and have the right context, etc.

ENTERPRISE

Covers the approach of targeting the whole organization. This concerns having every member and unit of the organization ready and prepared for a fact-based culture.

LEADERSHIP

Covers the skills and knowledge of leaders in the organization. This is considered important for advocating and motivation of analytics and fact-based decisions throughout the organization.

TARGET

Covers the focus on single differentiating areas of the business that will make the organization stand out and be competitive.

ANALYSTS

Covers the need for skillful analysts that have knowledge of analytics in various of degrees, ranging from little analytical skills to people with a PhD in math.

2.2.2 Five Stages Of Analytical Competition

The five stage maturity model described in this section is useful when companies need to know what level of BA they currently have. Later on, it will be used in Section 4 to place participating companies within a level of WA maturity.

According to [Davenport and Harris \(2007\)](#), companies can be categorized into a five stage model of progress of analytical sophistication, as follows:

ANALYTICALLY IMPAIRED

At this stage the company does not have the data required to conduct any analytics, or it may have the data but it does not have analytical skills to conduct any analytical applications, or the company does not have the support from senior management that is needed to conduct these kind of tasks.

LOCALIZED ANALYTICS

At this stage analytical tasks are being done on occasions in various parts of the organization. The one limit that this stage lacks is that the tasks are not coordinated towards a strategic goal that the organization have, thus, the analytical application does not affect the organization as whole.

ANALYTICAL ASPIRATIONS

At this stage the company does have the ambition to become more analytically skilled, where they have some analytical tasks being undertaken and have a few initiatives on the way.

ANALYTICAL COMPANIES

At this stage the company does have all the resources and technology that it needs to be capable of doing whatever analytically application. However, the company has yet to include analytical philosophy into to the strategic focus, and thus, lacks the competitive advantage that it gives.

ANALYTICAL COMPETITORS

At this stage the company is continuously doing analytical tasks all over the business and in all business units. The leaders of the company are all committed to analytics and they have received great benefits and results for doing so.

2.3 Workforce Analytics

Workforce Analytics (WA) is a concept used for denoting analytical techniques and activities used on an organization's workforce, its employees. WA concerns the importance of building a workforce that can achieve current business strategies. These techniques are used to get insight into how to organize and motivate the workforce (Hoffmann et al., 2012). It uses the same principles as any other Business Analytics application but is focused on employees. Measuring Human Capital data are known to be difficult and is almost thought of as an art rather than a science (Baron, 2011). In sports there has been a clear focus of WA for some time now. For instance, an American Professional Football team, called New England Patriots, won 3 out of 5 Super Bowls in a row and they are known for their widely used analytics. They collect and analyze loads of data on their players and potential players, data like personality traits and physical capabilities. They use this technology to be able to make important decisions on performance, wealth and how well suited they are to achieve the goals (Davenport and Harris, 2007).

Analytics targeting Human Capital has been given many names. For example Talent Intelligence (Snell, 2011), Talent Analytics (Davenport et al., 2010), HR Analytics (Mondore et al., 2011) or Workforce Analytics (Hoffmann et al., 2012). Throughout this thesis, the term Workforce Analytics is used to encompass every aspect and form of analytics being used on an organization's HC.

2.3.1 The Notion of Workforce Analytics

The notion of WA captures important aspects of an organization's focus on WA. The framework presented in this section will later be used in Section 4 where it will be used to analyze and find out what focus of WA participating companies in this study have.

Hoffmann et al. (2012) presents a short and simple description of the notion of WA:

“Know what work needs to be done and how to structure it; provide the right types of people do it; motivate them to engage in that work; and constantly explore innovations in how that work gets done”

KNOW WHAT WORK NEEDS TO BE DONE AND HOW TO STRUCTURE IT

It is important to explain the connection between an organization's strategy and its employees to be able to apply WA successfully. The workforce and its abilities must be structured and defined against the current strategy of the organization. If not, the projecting and planning of the future number of workers with certain abilities, that should be placed within certain locations of the organization, will be very difficult, perhaps even impossible. The strategy derived from various of goals the company wish to achieve such as target revenue, market focus, etc., are essential to what kind of work that needs to be performed by the workforce. This is perhaps quite obvious but it is important to remember that this connection is the core for linking the workforce effort to organizational performance. When performance of the workforce can be measured against organizational performance, answers to important questions like: if there is a need for investments in employee training, kinds of incentives, etc., becomes clearer (Hoffmann et al., 2012).

To answer these questions, analysis is conducted on data from various of systems throughout the organization, such as systems for customer relations, marketing, finance, HR, etc. The fact-based answers comes from rigorous analysis of data from all relevant systems with various of analytical techniques that determines cause and effect, correlations, etc., (Hoffmann et al., 2012).

PROVIDE THE RIGHT TYPES OF PEOPLE TO DO IT

To be able to place right people with the right skills to the right work in the right time can be difficult. Employees are not a simple static asset. They are very dynamically and complex as they may leave or move to other jobs. They change over time as they learn new things, their experiences and competencies will grow and they are inevitable different from one another. It is therefore important to recognize the difference between human capital and other assets (Hoffmann et al., 2012).

Balancing an organization's supply of workers with the demand of workers is done through projecting future demands where the skills and number of workers needed to do the job are assessed. The projected sales and costs, often done by analysis of historical data, are the basis for determining the needed supply and demand of workers. The result, of course, will not be a precise reality as randomness always occurs, but a reasonable forecast will be achieved. There is much more work to do to achieve an on-demand talent supply of workers, but in short, this is how it is done (Hoffmann et al., 2012).

MOTIVATE THEM TO ENGAGE IN THAT WORK

What motivates, engages, and drives a workforce to high performance to continuously meet the goals of the company? Here, analytics is used to determine causes for certain behavior like high and low performance and what characterizes employees with high performance versus low. Data from systems that employees uses as well as surveys can be used to analytically derive causes and relations of certain behaviors or problems

in engagement. Such analytics gives the organization facts on where and what type of training is needed for which employees, among other things ([Hoffmann et al., 2012](#)).

CONSTANTLY EXPLORE INNOVATIONS IN HOW THAT WORK GETS DONE

Knowledge capital: the knowledge that exists within employees. Innovations are known to be immeasurable and cannot be matched against return on investment. This is, however, not all true as several cases demonstrated in [Hoffmann et al. \(2012\)](#) shows quantifiable results of investments in new innovations and the sharing of knowledge.

The approach to quantify the business case of investments in innovation and knowledge capital includes an analytical team with people from HR, finance, etc., that has the responsibility for testing the new innovation in knowledge capital and clarify if it generates better results than current best practices and methodologies being used. The analytical team conducts an experiment with a sample of the organization's employees that are divided in one control group and one test group. The test group is provided with the innovational methodologies and technology and the control group is left with the usual work techniques. These groups are being studied and measured over a period of time with relevant data collected. The data is later compared between the groups and the quantified result will show if the investment is worthwhile. The important thing to remember is that intangible assets like knowledge can be measured and a fact-based business case can be produced that key stakeholders will accept ([Hoffmann et al., 2012](#)).

2.3.2 Degrees of Workforce Analytics

This framework gives further relevant aspects that a company can reside within. In Section 4 this framework will be used as a foundation to what degrees of WA sophistication that participating companies will reside in.

Companies using Workforce Analytics can be defined by a degree of analytical sophistication. Companies can reside in one of six different degrees where the sixth rung is the highest. Presented below are the different degrees starting with the lowest level ([Harris et al., 2011](#); [Davenport et al., 2010](#)):

FIRST RUNG, SINGLE VERSION OF TRUTH

First rung covers the single version of truth and can be seen as a prerequisite to the other rungs. All captured data on employees are accurate, consistent, integrated, accessible and relevant. This ensures that the company can keep track of the workforce as whole as well as single individuals. Commonly tracked data are skills, abilities, competencies and so forth. An example of this is the famous case of how Google used an algorithm to better decide whether applicants are valuable to them by comparing them to their current employees ([Hansell, 2007](#)).

SECOND RUNG, SEGMENTATION OF WORKFORCE

Covers segmentation of the workforce. It is the analytical practice and skill of categorizing and finding employees or departments that are at different levels of performance, in other words, better or worse. This activity determines attributes that are significant to certain employees or segments that performs good and what attributes that less performing groups or employees have. This uncovers insights that aids processes such as retention, training investments, change of work methods, etc.

THIRD RUNG, DIFFERENTIATE THE BUSINESS

Covers the sophistication to differentiate the business from competitors. It is the practice of finding key areas that can be used by analytics that if focused and invested in, can make the business more competitive and successful.

FOURTH RUNG, TALENT ANALYTICS

Covers the prediction of employees likelihood to stay with the company. Some companies use analytics to predict future behavior and employees' needs. By analyzing historical data through mathematical correlation equations or other statistical methods, useful insights can be found such as a big drop of well performing employees within their second year of employment. This results in tailored customizations of HR practices for single individuals or departments.

FIFTH RUNG, PREDICTION OF WORKFORCE

Covers the predictions of entire workforces and are planned years ahead. This is done through analytics used on historical data from marketing systems, financial systems, etc. Needed skills and levels of staffing are projected and scenario modeling is used to evaluate different possible futures against each other which will result in the optimal choice.

SIXTH RUNG, REAL-TIME JUSTIFICATION

Covers the justification of workforce need in real-time. The needed workforce is predicted instantly and a mix of skills and competences can be adjusted on the fly.

2.3.3 Two Ways of Workforce Analytics

Companies can take two different approaches to WA, or both, and is seen as an important insight. In Section 4 participating companies will be resided within one of these two approaches or both.

Workforce Analytics is often initialized in small intensive projects that solves critical problems within the workforce in a specific period of time. After a while though, organizations often feel that a series of on-off projects have their limitations and are

integrating the analytical capability as a part within the organization. That is, organizations can have WA as a part of the organization or they can buy it from outside contractors that are specialized in WA, or they have both.

3 Research Approach

3.1 Research Method

The research will take an exploratory approach to find out what the current state is in Sweden. The research can be seen as taking a qualitative approach rather than quantitative, because the data sources, primarily, are humans. If the research is to align to any particular philosophical worldview, it is a constructivist or pragmatic worldview (Creswell, 2008).

Following the objectives of the aim, two data-collection methods were most appropriate: a pre-study in shape of a literature review inspired by Webster and Watson (2002) was conducted, with a focus on identifying evidence for WA applications in Sweden, and an interview survey was conducted to explore if companies in Sweden are applying this technology and to get insights in their thoughts and/or application of it. In addition, frameworks from the literature that explains different aspects, levels of sophistication and ways of WA will be used in the analysis of the data from the interviews. That is, the data from the interviews will be analyzed and the companies will be placed within these frameworks.

The pre-study was appropriate to find out whether WA in Sweden has been documented in the academia. The pre-study was systematic and more thorough than a regular review of research that is usually undertaken. The relevant articles concerning WA were read and analyzed with the goal of finding applications and practice in Sweden. Articles that could not be accessed via the University of Skövde were left out.

The interview survey is appropriate due to the complexity of the problem. It is a relatively new technique and it has not been practiced enough to be well known. Papers indicate that Human Resource departments in general lack experience in this area. An interview, where the interviewer has the opportunity to explain, will make sure that the interviewees understand the research problem and that they can answer the questions correctly. For example, different candidates with different experiences will need different explanations to comprehend the research problem and organizations that uses these techniques may use it with different terms or name conventions. A questionnaire survey was considered, because it would have been more appropriate due to a greater ability to generalize the results. Although, the risk that the respondents may not comprehend the questions in the questionnaire were to great.

3.2 Research Process

3.2.1 Interviews

Around 100 Swedish companies, either with large turnover or high profit, were contacted by e-mail for the purpose of finding candidates for interviews.

Around 15 companies were contacted to start with, as can be seen in Figure 1. These companies were among the biggest in Sweden, with very high turnover and many employees. One candidate chose to participate. Those that responded to the e-mail were either out of resources for these kinds of assignments or they denied to

participate due to lack of knowledge in the area.

Due to very low rate of participation, some changes were made to the introduction e-mail that were sent out to the prospects, changes such as more simplicity, a more thorough description of the research, the estimated time for the interview was lowered, etc. The second round was targeted at companies similar to the first company that chose to participate, perhaps this kind of industry has knowledge within the subject. This time a few of them were contacted by phone due to the absence of e-mail addresses. This was not very successful as only one company chose to participate. Those that responded to the e-mail and phone had the same reasons for not participating as those in the first round.

When time and resources began to get limited, the third round was targeted at 50 new companies where the selection was much wider and diverse, still with high turnover and profit. And this time one company chose to participate. The reasons for not participating were the same as in the first and second round.

A fourth round was quickly started after the previous as time started to get very limited and at least one more company was needed. One company chose to participate. This time the reasons for not participating were the same as the previous ones.

Rounds	Contacted	Interviewees
1st	15	1
2nd	10	1
3rd	50	1
4th	25	1

Figure 1: Contacting Interview Candidates

A total of four companies with one candidate from each become the final candidates for the study. Two of the companies have around 10000 to 20000 employees, one company has 500 to 1000 employees and the fourth company has 5000 to 6000 employees.

The interviewees had experience and a position within or that was connected to Human Resources. They had 2 to 20 years of experience. The intention were that the interviewees were to have an understanding of Human Resources and the activities, decisions and investments made for employees in their organization.

One of the interviews was one hour long and the other three were each half an hour long. The interviews were conducted over phone (Skype) due to limited resources and flexibility, they were also recorded. The first interviewee wanted to be anonymous and therefore all of the content presented by all the interviewees were treated with respect to anonymity.

The length of the half an hour long transcripts were approximately 2500 to 3000 words each, the one hour long transcript was over 8000 words. The transcripts were sent out to the interviewees and some changes were made or added as there were misinterpretations and missed meanings that were important.

The interviews were conducted together with an interview guide that was created with accordance to the theoretical frame. Due to the complexity of the subject the

questions were created as open-ended as possible. The interview guide is shown in appendix B. A simple explanation and description of a typical case with WA is presented in the interview guide to further introduce the interviewee to the subject.

3.2.2 Literature Review

The literature review were divided into several consecutive steps which are presented in Figure 2. The databases used are those that were provided by the University of Skövde and can be seen in Figure 3. The databases, according to the University of Skövde, have articles within the computer science area, which were appropriate for this research.

1	Locate relevant databases
2	Locate relevant search terms for Workforce Analytics
3	Systematically use each term and select relevant articles
4	Scan the reference list from selected articles
5	As well as citations if such functionality exists
6	Analyze collected articles

Figure 2: Literature Review, Steps

Academic Search Elite
ACM portal
arXiv
CiteSeer
LibHub
Google Scholar
IEEEExplore
Lecture Notes in Computer Science
ScienceDirect
Scopus
Wiley online library

Figure 3: Academic Databases Used

To find relevant articles within the workforce analytics subject, the terms shown in appendix D were identified and used. Some of the terms were located and used in articles related to Workforce Analytics.

The relevant articles together with articles from their reference lists derived from the databases are shown in appendix D

4 Analysis and Result

This section presents the analysis and results that was derived from the interviews. Presented beneath with five sub-sections follows the five different aspects that can describe a company that uses WA.

4.1 DELTA Workforce Analytics

The respondents have different places within the five pillar theory model DELTA, as can be seen in Figure 4. All respondents resides in the Data pillar, the Enterprise pillar and the Analysts pillar. None of them made the qualifications for the Leadership pillar or the Target pillar.

Pillars	Respondents
1st Data	4
2nd Enterprise	4
3rd Leadership	0
4th Target	0
5th Analysts	4

Figure 4: Five Pillars Of Analytical Sophistication, DELTA

It was clear that all respondents were collecting data on their employees. They have common employee systems that almost all companies have these days, such as pay-roll systems, which is driven by data that is collected on employees. It would be very unusual to see a company today that does not collect data on their employees. However, the data collected needs to be consistent across systems, accurate, available when needed, etc. This was not easy to identify with all respondents. Three out of four respondents did not have any data warehouse knowledge and therefore could not accurately say if such quality of data were available. The one respondent having knowledge within the subject mentioned his passion about connecting various sources of data:

“You have the possibility to connect several sources no matter where they stand and then be able to make an analysis in a single place, and what we have managed to do is to connect several sources, because when you have done this, you really have made a profit, you have really added something”

The other respondents added something of value as well. One respondent said that they were mapping competences and other data on all of their employees once a year:

“Once a year, at least, we make analyses on the workforce where competences, etc., are mapped”

It does not explicitly say that data is collected and stored in an analytical spirit, but at least it gives an indication. They conduct analyses on employee data to forecast and predict the future of needed competencies and staffing levels:

“Employment’s based on seasons are grounded on numbers, through the analysis done on previous years, we can tell how many people we need”

If companies collect data and perform analytics, the indication that qualitative data act as a foundation qualifies the company within the first pillar. The last two companies showed similar indications.

One respondent clearly showed ongoing improvements in this area as they talked about current initiatives in connecting disparate data sources. They had ongoing initiatives that had the purpose to improve the accessibility and usefulness of the analytical applications that derives data from employees. The data collected were most structured data. Unstructured data, like e-mails, notes or social networks, were absent. One respondent clearly stated that obtaining data like e-mails or internet behavior is out of the questions as it insults one’s privacy:

“We work a lot with statistical collections, but on e-mail and such things we do not. It feels like you are insulting one’s integrity”

All respondents were collecting data on a regular basis to follow up on changes that occurs. These regular occurrences were conducted on a yearly basis.

An enterprise-wide approach covers the readiness of all employees to have a fact-based culture. Non of the respondents showed any signs of having a fact-based culture as they were not talking about WA in a fact-based spirit. They did, however, conduct analytics that covers the whole workforce. They have regular routines on conducting analytics on their workforce and they are conducting statistical techniques on employee data. Not all qualifications are made by the respondents on the Enterprise pillar, but the majority of the qualifications on the Enterprise pillar are made by all respondents. Therefore all participating companies will, weakly, reside within the Enterprise pillar.

Leadership for WA was absent and there were no signs that leaders have a strong particular interest in WA applications. The Leadership pillar requires that there exists leaders in the organization which have a strong enthusiasm and engagement in WA and are advocating this throughout the organization. Non of the respondents were analytical leaders in that spirit. One of the respondents showed enthusiasm and was motivated to get more WA applications up and running. The respondent was not a leader with regard to the Leadership Pillar.

Whether the respondents qualified for the Target pillar was easier to determine as this pillar needs strong attention from the whole organization. None of the respondents qualified for this pillar. The Target pillar requires strong attention from leaders, none of the respondents had that. The Target Pillar describes a WA application that is very special and has the purpose to differentiate the organization from competitors. The respondents did not mention any application that qualified for targeted analytics that makes it possible for differentiation within WA. However, one must remember that the respondents might have been very discrete about such things as it might be a company secret.

One of the respondents mentioned that they have analysts for conducting WA and that they were planning on taking this to a higher level with more analysts. All respondents have analysts, they did not explicitly mention that they have analysts, but all of them need analysts for conducting the kind of applications that they mentioned.

Therefore, all companies qualifies for the Analysts Pillar, but with different levels of skills.

To sum up, 4 of 4 participating companies fulfill the qualifications for Data to a degree where structured data is collected and unstructured data is not collected. 4 of 4 respondents follow an enterprise-wide approach as they statistically derive workforce forecasts according to the companies strategy. However, the enterprise-wide approach also consists of attitudes and awareness of WA, which all respondents lack in various of degrees. The Leadership pillar requires that the company have analytically enthusiastic senior leaders that advocates WA. All respondents are lacking in this area. None qualified for the Target pillar. As for the Analysts pillar, all respondents qualifies but one respondent showed a slightly higher focus on it.

4.2 The Five Stage Progress of Workforce Analytics

The respondents have different places within the Five Stage Process model. Two respondents resided somewhere between Localized Analytics and Analytical Aspirations as they fulfilled some criterion on both of them but did not fulfill all qualifications for Analytical Aspirations, see Figure 5.

Stages	Respondents
Analytically Impaired	0
Localized Analytics	2
Analytical Aspirations	2
Analytical Companies	0
Analytical Competitors	0

Figure 5: Five Stage Progress With Regard To WA

All respondents were sophisticated enough to not reside within Analytically Impaired, which is a stage where a company does not have data, does not conduct analytics on it, or do not have the skills to do it. All respondents showed skills within these areas, as was described in previous Section 4.1. The second stage, Localized Analytics, describes a company which conducts WA applications occasionally on various parts in the organization. Two respondents resided within Localized Analytics. They are conducting WA, as one respondent clarifies:

“It really depends, many things that considers HR are hard things to measure, for example, to measure the effects of a leadership program can be hard, but we do show what our investments would generate in forms of profit, effectiveness or time”

However, not as aspirational as in the stage of Analytical Aspirations. Analytical Aspirations describe a phase of a company where analytics has become an aspiration and they want more analytics and more advanced analytics. Two respondents did not show any aspirations towards such goals. They have the data and the abilities to conduct analytical applications to reside within Localized Analytics. However, they do not have the aspirations to qualify for Analytical Aspirations.

Two respondents resided in Analytical Aspiration. One respondent clearly stated a forward thinking aspiration about analytically skilled people:

“We do not really have the high analytical people on the employee data, but that is what we are trying to establish now”

The aspirations to be more analytical and the expression of ongoing initiatives for the future were also indications of the organizations to be placed within the Analytical Aspiration stage:

“Other opportunities like client satisfaction against an employees pay rate, is their a connection between those?”

None of the respondents were qualified for Analytical Companies, as it requires that an organization have all the technologies it needs to perform every existing WA application. None showed indications of having such sophistication in WA. In addition, no participating company resided within the last stage as Analytical Competitors.

4.3 Degrees of Workforce Analytics

The respondents are quite spread out across the Ladder of Sophistication model as they show skills for the first, second, fifth and sixth rung, with regard to WA, but lack skills in the third and fourth rung. None of the respondents showed skills to be placed within rung number three because they were not using WA to differentiate themselves. See Figure 6.

Degrees	Respondents
1st Rung, Single Version of Truth	4
2nd Rung, Segmentation of Workforce	2
3rd Rung, Differentiate the Business	0
4th Rung, Talent Analytics	1
5th Rung, Prediction of Workforce	4
6th Rung, Real-time Justification	2

Figure 6: Ladder of Sophistication

All respondents show that they have the sophistication to reside within the first rung. They collect data and stores it in places for retrieval for various of purposes, as is previously described in Section 4.1.

Two respondents have such WA practice that resides them within the second rung. With their data on employees they can segment and categorize their workforce to identify high performers or other differences between departments and employees. One respondent clearly and shortly stated it as follows:

“Yes, we have segmentation, where we measure high performers”

One respondent showed WA applications for retaining employees. The fourth rung covers the sophistication of using WA to retain the employees so that they will not leave the company for simple reasons that can be prevented. The respondent stated it as follows:

“We make a competence maps, where we map our high performers and our key employees. So that we do not stand with our beard in the mailbox when someone decides to quit or that somethings happen”

The last sentence of the quote is a proverb saying that we need to be aware of what needs our employees might have. This was however not the highest degree of WA but enough to reside within the fourth rung.

All respondents reside in the fifth rung. They predict their need of workforce competence and staffing to a certain degree, where the companies strategies are a foundation for mapping demand and supply, as has been described in previous Section 4.1.

The sixth rung is the most sophisticated and two respondents showed a focus in this area. The sixth rung covers the analytical skills to change the staffing levels according to what the next day will unfold. One respondent stated as follows when the focus of WA in a call-center was described:

“24 hours a day, for them it is a life-vein, to know whether they are not staffing up to small and not to much. To measure how much clients are calling and to see the client behaviour and to derive a staffing-pool”

With a watchful eye, one can see that some of the participating companies seems to skip some of the degrees in the Ladder of Sophistication Model. The model is a little bit defect according to my analysis, as a company can reside within the sixth rung but have nothing in common with some of the other rungs.

4.4 The Notion of Workforce Analytics

All respondents have the knowledge and skills to structure their workforce and they know what kind of people they need. One respondent motivate and engage its workforce and another respondent showed the ambition to explore new innovations of WA.

Notion	Respondents
1st Know what work	4
2nd Right people	4
3rd Motivate and Engage	1
4th Explorative	1

Figure 7: The Notion of WA

All respondents have structured maps on their workforce and its competences. They know what work according to their strategy is coming and how to structure it. One respondent says as follows on the subject:

“Every year there is a strategy developed where, where needed competences is mapped against it”

They align it with the strategy and they know what competences and staffing levels are needed. All respondents showed skills of knowing where their employees should be and for what reason. Therefore, it is clear that all respondents shows sophistication for the first and second notion. However, they did not show a strong focus of WA in the

area, only to a certain degree. One respondent showed skills in analytical applications that enhances motivation and engagement. The third notion describes this skill, where employees need to be motivated to perform well against the current strategy. One respondent stated the following about Talent Analytics:

“You find connections between why people enjoys being here and what makes people not enjoy the place, these are well known and applied methods, what we are trying to do now is to be as correct as possible”

As for an explorative attitude towards new applications as well as current ones, one respondent showed interest as was described in Section 4.2.

4.5 Two Ways of Workforce Analytics

All respondents showed a continuous use of WA in their organization. One respondent was on occasions also using single cased projects of WA.

Ways	Respondents
Permanent	4
Single cases	1

Figure 8: Two Ways of WA

All four respondents were using some WA application on a continuous basis. These routines are most on the time applications such as planning and scheduling future demands of workforce where balances between supply and demand are calculated. One respondent, however, mentioned that they were occasionally using contractors for single case projects, where investigations on engagement, performance, etc. on their workforce were measured and assessed. The respondent stated it as follows:

“Such investigations are bought, where companies specialized on this conducts the survey. They are companies that conducts surveys where they measure engagements or performance”

5 Conclusion

The aim of this work was to gain knowledge and insights of WA in Sweden. The interviews made it possible to answer the aim to some extent. The resulting analysis shows that 4 of 4 respondents have WA practice in their organizations. However, the sophistication of WA was quite low. 1 of 4 respondents stands out from the others. It showed a higher focus on WA because of newly started initiatives and modern techniques being used, and therefore qualifies as more sophisticated in the area of WA.

On the whole, the four respondents varied from each other with regard to WA, but it can be seen that WA is not a very high priority. WA applications were used in areas where it was most needed, so that the organization could function correctly. Those applications were workforce planning where historical data was used to predict future demands. This is one of the oldest applications. 2 of 4 respondents showed much higher degree of WA in the area of real-time justification of workforce demand. However, this unit would not function without WA as it is a necessity to be able to do its every day scheduling.

All respondents were collecting data on their employees. They were collecting structured data but did not collect any unstructured data.

The attitude towards WA varied among the respondents. 1 of 4 respondents showed more interest in the subject, but on the whole organization it can be seen as a neutral attitude. Besides the respondents individual subjective attitudes toward WA, there were no high enterprise-wide enthusiasm towards WA in any of the companies.

Due to the low respond rate by over 100 companies, where the majority of answers to the e-mail were absence, lack of resources or lack of knowledge, one could come to the conclusion that the technology of WA is not well known or not a priority to the companies.

This research shows how four companies currently practice WA. They do not represent all companies in Sweden and the statistical significance is not enough. However, it is a first step towards it. It gives an idea on how WA might be practiced in Sweden.

6 Discussion

6.1 Reflections On The Research Method Chosen

The method chosen was very appropriate due to the complexity of the subject. The interview technique made it possible for the interviewer to adapt to the interviewee. The possibility that the interviewees had various backgrounds and experiences were very high. As for the resulting candidates, they had different personalities and experiences which made the interviews very different from each other. The end result, however, was similar to one another because the adaption to the various interviewees only changed the questions' appearance, not the underlying idea.

A positive part with this method is the conversational part, where a communication and a stronger interaction is made between the respondent and the researcher. The method almost always ends with a result. A negative part with the method is its representative power. The resources needed to make this method representative are enormous and is not possible, especially not for a bachelor degree.

If any changes were to be made on the approach of this method, it would be on the selection process because of the companies' lack of interest in participating. The reason for this may be the complexity of the subject due to limited resources of the prospects. If the approach would have been different, the selection of candidates would have had a stronger focus on people with experience in Business Intelligence or similar areas. Changes would also probably be made to the introduction e-mail and the interview questions. This could have resulted in more candidates.

Concerning the pre-study for literature, it was very appropriate and crucial to this research. It was needed to assess the documented practice of WA undertaken in Sweden. No documented practice were found. A positive part of this method is its ability to help a researcher not reinventing the wheel and to make sure that the current research is worthwhile.

6.2 Results In Relation To The Aim

The results from this project answer the aim to a certain extent. It presents insights, knowledge and practice of WA in four companies. It shows to what degrees and sophistication these four companies have and are practicing. It shows their enthusiasm towards it. This is good insights and can be used. However, it is not that representative as one could hope, due to the few respondents and the none significance. These respondents cannot alone represent a whole country of companies. To receive data from that many companies concerning a relatively new subject like this was not possible.

But yes, it answers the aim with regard to four companies in Sweden but lacks the ability to generalize the results to all other companies. The companies show us that WA is undertaken in Sweden and this is a first step towards greater insights.

6.3 Results In A Wider Context

6.3.1 Scientific Perspective

This project contributes to science. It has the systematical approach together with empirical data that supports current scientific research within the subject. With the help of the pre-study in the subject, it is certain that this research was needed to determine what the current state is in Sweden. This is the first step in all scientific contributions, to first explore what is happening and later be certain of what areas within that description that needs attention (De Vaus, 2001). The knowledge within this subject is further strengthened by knowing how applications of WA is being conducted in Sweden. It shows where we are today and what might happen in the future, and what might need focus. This creates a more concrete understanding to what is really happening than only theoretical descriptions. This research has the qualitative technique that help make things clear and easier for other researchers in the sense that real life events are discussed.

Current research have a focus on companies outside of Sweden, with case studies and interviews that shows WA practice in actual contexts. This work have the same idea with interviews but with a focus on Sweden.

6.3.2 Practitioners Perspective

This work is primarily written for practitioners in Sweden in the sense that they will gain knowledge and insights in current practices of WA. But the research is also written for other practitioners outside of Sweden. The research has been undertaken in Sweden, but it is as useful to Swedish companies as it is to other companies outside of Sweden.

As to the contribution to practitioners, this research provides insights and knowledge of what is happening in Sweden and now they have a possibility to take action. In general, this research does not give detailed information of what applications are being undertaken but it gives a picture and a sense on what is happening and to what degrees companies are applying this technology. They may consider this as an advantage or as a wake-up call. The research gives a clearer picture to what potentials exists in this technology and approach.

The research can be useful for almost any roles in a company but those who should consider it the most are those of leadership, business intelligence, human resources and key employees in a business that have an influential ability to persuade and explain to others what it is and why it is important.

This project's main focus is to inform and to inspire people and business on what is happening and what is possible. It shows various of general methods that can measure a company's place within the technology and inspire them to undertake new initiatives and ways of conducting WA.

6.3.3 Ethical Considerations

Information ethics are very central in this research as the subject and the techniques presented mostly concerns humans and data that are collected on them. There are

some categories of ethical issues that needs to be covered in information technology. Following the categories some ethical issues are of very importance for applying WA.

The ethical issues that have the strongest relation to this technology are professional responsibility, quality of life, system quality, intellectual property, privacy, risk and reliability, use of power and integrity.

Concerning the Professional Responsibility is that those users that have the responsibility for WA applications should treat it with respect and not use it against their colleagues that do not have the same knowledge.

As for quality of life, WA enhances the quality and the justice that will give employees fair decisions made about them. For example, WA can give employees an objective and truth giving picture of their work performance and needs, compared to the subjective and narrow view of a traditional decision maker. It does, however, impact their lives in a new and more clear view that may alter their lives in ways that they may not want or do not expect.

System Quality is very important in this area as it holds the responsibility to accurately process important and fragile information on employees that must not be wrong. This concerns issues like data accessibility, who should have access to all this information on the employees?

Intellectual Property and Privacy can become an issue if the employees requires privacy and do not want the company, no matter what, to collect certain types of data on them. How do you make these decisions, who is right about what data can and should be collected so that the persons integrity remains stable and secure?

Risk and Reliability concerns the risks and vulnerabilities that WA systems can produce when users are conducting analytics on it. This can make the data it holds damaged, incorrect, or lost.

Use of power is an issue in this technology because it gives the analysts a great power of knowledge that can be used for their or others advantage.

One company did address this ethical issue more than the others as they clearly stated that collecting data from e-mails and internet behaviors are out of all respect. The ethical dilemma that appears with this kind of technologies will always be there. What companies need to do, is to try to balance the risk of not losing the employees and enhance the effectiveness of the organization. Another aspect is legal issues, laws may forbid the collection of data on certain areas and levels.

6.4 Future Work

Together with this research, a possibility to conduct a wider study in Sweden is possible. With the issues addressed and described in this project's research approach, about the complexity of the subject and the interaction with the interviewees, can give enough knowledge to approach it in a different way. One could try to conduct a more representative approach on Sweden that would uncover a more general and significant description of current practice of WA. With the knowledge that this project provides about how things went and ended could give a foundation and alter a new plan to a next approach that could be better. This approach can be a combined interview method with questionnaire method that uncovers wider empirical data. The ability to

do this would provide a broader and more general picture of Sweden and strengthen the current knowledge of WA practice in Sweden.

Another future work would be to apply one of the frameworks presented in this research in a case study on a company in Sweden. Preferably a company that has the potential to have a strong WA practice. Together with the knowledge from this research as well as related work, one could conduct a case study to assess these frameworks. The frameworks are rather theoretical and have not been assessed systematically by other researchers, there is a lack of transferability. That is, the frameworks are presented together with real companies, but it is not clear how the studies were conducted. This could contribute to knowledge and proof of concept that the frameworks actually work.

A third future work proposal would be to apply WA to an organization as an action research where techniques, frameworks, current practices and approaches are applied. This gives the opportunity to actually test all the issues and opportunities that WA gives and creates. It gives the possibility to derive a theory on why WA is hard to implement, why leaders do not care for it, why it works, or why it does not work, etc. This proposal contributes to science as well as practitioners as it gives new insights of the struggling and/or successes that WA gives.

A fourth proposal is to conduct a project that only concerns the ethical dilemmas of WA in Sweden. This is a rather big area to approach and has the possibility to uncover the real reasons why people do not want these kind of technologies or why they might want it. It could uncover to what extent people are willing to share data if the gain of sharing is more than the loss of integrity. Such research would contribute to ethics with a focus on WA and because WA is relatively new, the ethical dilemma will always alter as time goes by and technologies get better and new technologies appear.

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7 Appendix

A Quotations

Q1: “We use a method when it comes to absence due to illness, where the factors that leads to illness and to what it costs, or when conducting surveys on employees where correlations exists between different factors.”

Q2: “When changes or improvements are made or you change a system or work routines, you create a business case where expected effects are very much considered but not against any particular methodology like you explained”

Q3: “Often you get an idea of doing something, a reorganization or to make a buy-in or whatever it may be. Then there are different types of workshops with people from various of units, then all the units have their aspects on the matter, their cost calculations and so on, and then when all details have been identified, the potential benefits are discussed, if it is worthwhile”

Q4: “I use to tell others what absence of illness costs, what an increased turnover costs, how long and how much it takes to train a new one, i am using collaboration indexes where you can see if an employee knows his goals, feels motivated, if they are productive, and so on.”

Q5: “We have control cards where you have key performance indicators that are related to employee costs and targeted sales, from this it can be measured how the effect of change is compared to indexes, but the actual assumptions are made on common sense”

Q6: “It is based on experience and the key performance indicators that we have”

Q7: “We got a HR system that is really good where you have questions and answers and where you can get statistical data”

Q8: “Once a year, at least, we make analyses on the workforce where competences, etc., are mapped”

Q9: “We work a lot with statistical collections, but on e-mail and such things we do not. It feels like you are insulting one’s integrity”

Q10: “Yes we always try to catch up something that will make employment’s easier”

Q11: “We work with a process called performance development where we work heavily on the development part, it is a years cycle where every employee is evaluated and assessed”

Q12: “We make a competence map where we map our high performers and our key employees so that do not stand with our beard in the mailbox when someone decides to quit or that somethings happen”

Q13: “We have worked with this for a long time now, very structured because our competitors are just around the corner, where we fight for the same people, and it is then it is important to have good work routines and to create a competitive advantage”

Q14: “Every year there is a strategy developed where the needed competence is mapped against it”

Q15: “It is a fundamental condition to have that before you forward your business case”

Q16: “No, we measure, where we know what it will cost”

- Q17: “We have a competence profile where skills, personal traits, etc. are captured”
- Q18: “If there is a change you try to identify what that new position requires and that is of course reflected when new employments are conducted”
- Q19: “Every time, tests are based on statistical and mathematical significance”
- Q20: “When it comes to business intelligence, we have used it for decades”
- Q21: “You find connections between why people enjoys being here and what makes people not enjoy the place, these are well known and applied methods, what we are trying to do now is to be as correct as possible”
- Q22: “Such investigations are bought, where companies specialized on this conducts the survey”
- Q23: “They are companies that conducts surveys where you can measure engagements or performance”
- Q24: “Many times, this, i think is bought and is not very often done by the company itself”
- Q25: “What do we want to do, do we want to compare our employees scores against how happy our clients are”
- Q26: “That you always build your decisions on facts, no one dares to bet money on something does not have an expected effect”
- Q27: “Where you have the possibility to connect several sources no matter where they stand and then be able to make an analysis in a single place, and what we have managed to do is to connect several sources, because when you have done this, you really have made a profit, you have really added something”
- Q28: “We do not really have the high analytical people on the employee data but that is what we are trying to establish now”
- Q29: “In general we look at the organizations health with different sets of ratings such as do the employee perform well, look at if employees quit their jobs early, etc.”
- Q30: “Other opportunities like client satisfaction against an employees pay rate, is their a connection between those?”
- Q31: “It really depends, many things that considers HR are hard things to measure, for example, to measure the effects of a leadership program can be hard, but we do show what our investments would generate in forms of profit, effectiveness or time”
- Q32: “I think that a proposal do need a good foundation for why you want to go for it, if you put something up you have to have the correct numbers for that given investment, why will it make money or why will it improve”
- Q33: “It is always a long work before that acts as a base for explaining the present and the benefits that in compared to the present will make profit”
- Q34: “It is based on facts such as numbers on how long time it currently took and also on experience where you known that it takes to long”
- Q35: “Employment’s based on seasons are grounded on numbers, through the analysis done on previous years, we know how many people we needed back then”

B Interview Questions

INTRODUCTION

- Purpose of research explained
- Estimated time of interview
- Ethical foundations
- Anonymity
- Recording

RESPONDENT

- What is your position and function?
- How long experience do you have?

AN EXAMPLE OF WORKFORCE ANALYTICS

Short Description

A typical case is when the organization wants a convincing evidence that a particular investment for the workforce is worthwhile, and that it will strengthen the organization through enhance its bottom line. Business Intelligence for the workforce is sad to solve this through the use of analytical methods that derives meanings and causes that provides a fact-based reason to go through with an investment. An example of this, is when a sample of all the employees are divided into two groups where one gets the new technology or method, and the difference is measured between them.

A long description

A typical case is when the board of the company wants proof of concept, fact, on what a potential investment might have on the organizations bottom line such as higher profit, a more effective workforce or time consuming. Such a fact can be that the profit will rise by 20 percent if a particular investment in the workforce will be made, like employee training, new technology, new work routines, new career opportunities, etc.

Workforce investments has historically been hard to synthesize in a business case, but there are companies that use Business Intelligence to calculate the benefits of investments made for the workforce.

This methodology collects information on employees as well as other assets in the organization to later analyze it with statistical and mathematical equations that determines relationships and causes between employee behaviors/performance and benefits/technology/work routines.

When a profit for an investment is calculated it is often done by taking a sample of the workforce and divide it into two groups where one of the groups get the new

technology or method and between the groups there are measurements that tells if the investment will benefit the organizations bottom line.

MAIN QUESTIONS

- How do you work with this kind of method or technique?
- How do you make new investments (new technology, work methods, etc.) for the workforce that is that big that it needs a clear sign from the board of the organization?
- On what foundations or reasons do you decide whether investments should be considered and obtained?

OTHER QUESTIONS

Data on Employees

- Do you collect data and information from your employees? For example, demographics, training, engagement, performance, social networks, e-mail, news, notes, etc.

Analytical Segmentation

- Can you derive characteristics that good employees have and compare them to potential candidates for your organization?
- Can you compare how employees are performing against each other, and derive characteristics that is unique for each one of them?
- Can you categorize good employees and derive characteristics that is unique for them?

Investment Analysis

- Can you derive numbers on how much an investments will effect the bottom line?

Workforce Forecasting

- With the help of statistical methods and scenario building, can you predict what workforce needs you will need in the future, such as competence and staffing levels, to meet what the market might demand?

Talent Retention

- Can you, with the help of historical data and information from your workforce predict what your employees might expect from you? For the purpose of lessening the chance that they will leave your company for a competitor.

Real-time justification of workforce

- Can you with the help of analytical skills predict the next days demand of workforce, so that you can change it according to it

FINISH

C Transcripts

The transcripts are subtracted (24 pages) from the report due to anonymity.

D Literature Review

Workforce Analytics
HR Analytics
Human Resource Analytics
Workforce Intelligence
HR Intelligence
Human Resource Intelligence
People Analytics
Talent Analytics
Talent Intelligence
Analytics AND Workforce
Analytics AND HR
Analytics AND Human Resource
Analytics AND personnel
Analytics AND employees
Business Analytics AND Workforce
Business Analytics AND HR
Business Analytics AND Human Resource
Business Analytics AND personnel
Business Analytics AND employees
Business Intelligence AND Workforce
Business Intelligence AND HR
Business Intelligence AND Human Resource
Business Intelligence AND personnel
Business Intelligence AND employees

Figure 9: Search Terms

Database: Academic Search Elite
Frauenheim (2011)
Frauenheim (2007b)
Greengard (2003)
How Five Major Companies Do It. (2006)
Frauenheim (2007a)
D'Amico (2009)
Hammers (2002)
Frauenheim (2007c)
Hansen (2008)
D'Amico (2009)
Frauenheim (2006)

Figure 10: Relevant and full-text available articles from database: Academic Search Elite

Database: ACM Portal
none

Figure 11: Relevant and full-text available articles from database: ACM Portal

Database: arXiv
none

Figure 12: Relevant and full-text available articles from database: arXiv

Database: CiteSeer
none

Figure 13: Relevant and full-text available articles from database: CiteSeer

Database: LibHub
Cooper (2009)
Alvin Evans (2012)
Suresh and Mahale (2011)
Marsden (1998)

Figure 14: Relevant and full-text available articles from database: LibHub

Database: Google Scholar
Bonadio (2009b)
LaValle et al. (2011a)
Anderson (2004)
Scott-Jackson et al. (2006)
Schramm (2006)
Young (2009)
Bonadio (2009a)
Bonadio (2011)
Worth (2011)
Bonadio (2010)
Lavelle (2007)
Peters et al. (2011)
Davenport et al. (2010)
Levenson (2005)
Hamerman and Thomas (2008)
Bassi (2011)
Mondore et al. (2011)
Aral et al. (2010)
Lee (2011)
Levenson (2011)
Harris et al. (2011)
Harris et al. (2010)
Ingham (2011)
Baron (2011)
Mondore et al. (2011)
Hansell (2007)
Snell (2011)
Nolan (2011)
Kuper (2008)

Figure 15: Relevant and full-text available articles from database: Google Scholar

Database: IEEEXplore
Varshney and Mojsilović and (2011)
Liu and Wang (2011)
Shah et al. (2007)

Figure 16: Relevant and full-text available articles from database: IEEEXplore

Database: Lecture Notes in Computer Science
Kieliszewski et al. (2007)
Yin et al. (2011)

Figure 17: Relevant and full-text available articles from database: Lecture Notes in Computer Science

Database: ScienceDirect
Lim et al. (2012)

Figure 18: Relevant and full-text available articles from database: ScienceDirect

Database: Scopus
none

Figure 19: Relevant and full-text available articles from database: Scopus

Database: Wiley online library
Pemmaraju (2007)
Fitz-enz (2009)
Khanna and New (2008)
Hilbert (2009)
Smith and Marinakis (1997)
Walker and MacDonald (2001)

Figure 20: Relevant and full-text available articles from database: Wiley online library