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VANOPSTAL, Dirk

Datum: 5.11.2008

The effect of trusf and employee loyalty on the performance of research institutes

Dirk Vanopstal

promotor :
Prof. dr. Philip VERGAUWEN

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Foreword

This paper is the masterpiece of my university study, Business Engineering. Completing my studies with a scientific research was a very interesting task! I have learned that setting up a good research and questionnaire is very hard, which resulted in a high respect for academic researchers, who dedicate their jobs in doing this.

This paper also helped me to my organize work and to take memo's. Given the short time period (one year is not that much to complete a full investigation of a subject), I really learned to select items that were important and others which weren't.

I would like to thank my parents, who gave me the opportunity to take these academic studies. They have helped me through these five years by supporting me at the right moments. Also my girlfriend was a great support during my academic career.

A special word of gratitude goes to my promoter, Prof. dr. Philip Vergauwen. Although he has a very busy schedule, he made as much time as possible to guide me through my thesis. The same applies for the affiliation of Prof. Paloma Sánchez, a rewarded professor at the University of Madrid.

For the purpose of my questionnaire, I used the program SNAP. It was the first time I worked with this program, so that wasn't easy given the time pressure at the moment. Danny Lambrechts and Ann Peters helped me to set up my questionnaire with some data and feedback. I therefore would like to take this opportunity to thank them as well.

Dirk Vanopstal
Hasselt, May, 2008

Summary

The shift within the economy from a traditional one to an economy based on intangible assets has been clear for the last couple of years. The importance of intellectual capital (IC) has, as a consequence, been increasing. This caused researchers to investigate different impacts of the elements of intangibles on the performance and the management of organizations.

The purpose of this graduation paper was bipartite. First of all it liked to give an overview of the literature presented about management and impact of intellectual capital. Secondly, this paper wanted to analyze whether if trust and employee loyalty had an impact on the performance of organizations or not. Trust and employee loyalty are two components of intellectual capital, since they are intangible by nature and provide an organization with the opportunity to create stakeholder value. This is explained by the fact that trust and employee loyalty could increase the productivity within an organization and, as a consequence, have an influence on the performance of that particular company.

The investigation was performed at the nine research institutes of the Hasselt University where a questionnaire was used to measure the level of trust and employee loyalty. Next these data were cross analyzed with some performance measures for the research institutes. The intention of the paper was not to provide a complete explanation of the effect of trust and employee loyalty on the performance of research institutes, but instead this research can serve as a basis for further investigations.

In the paper, three findings are worth mentioning. First of all, there exists a strong correlation between trust and employee loyalty. Apparently there is a positive relationship between the two variables. Secondly, there is a relation between trust and performance, but this has only a significance level of 23,8%, which definitely is not that high. The fact that there is no strong relationship between trust and performance is in line with previous research from Moeller (2006). Finally, there is no significant effect of employee loyalty on the performance of the research institutes. It should be mentioned that the response rate was rather low (just above 10%). As a consequence the results should be taken with a pinch of salt.

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0 Introduction

The last couple of years many organizations witness an increasing importance of human and intellectual capital (IC). Whereas the most important resources used to be physical assets such as land, machinery or financial assets, recently intangible assets have gained importance. They were described as key resources and sources of competitive advantage (Marr, 2005). Hand in hand with the change of the key resources, the economy itself is developing into one that is more and more based on knowledge, which of course requires the necessary management attention.

It remains a fact that managerial awareness of the importance of human and intellectual capital is still low, although there is a shift from traditional work environments towards the situation that knowledge and skills of employees are the main productive element in today's economy. The development of the Tayloristic system into a knowledge-based economy requires new approaches in management especially with employee-orientated actions, because workability, well-being, and the creativity of employees determine the success and sustainability of an organization (Litschka et al., 2006). Malinen and Toivonen (2005) also argue that the economy, as it is changing, needs new skills, new ways of combining the service/production by outsourcing, sub-contracting and through other ways of using methods for providing services and products to the customer base.

The Financial Accounting Standards Board could not escape the changes in the economy. In 2001 the board developed a proposal on disclosing information about intangible assets not recognized in financial statements. This proposal has lead to FAS 142, Goodwill and Other Intangible Assets. The board stated: "Analysts and other users of financial statements, as well as company managements, noted that intangible assets are an increasingly important economic resource for many entities and are an increasing proportion of the assets acquired in many transactions." (FASB, 2001b)

The above paragraphs show that the importance of intangibles in today's economy is increasing and that that we should know what their impact is.

Paragraph 1 consists of the general definition of the problem, which many companies face. Like mentioned before, the aim of this paper bipartite. First it likes to provide some insights into the different literature published about IC which is done in paragraph 2. secondly, in paragraph 3 describes the impact or effect of trust and employee loyalty on the performance

of research institutes. Paragraph 4 draws some conclusions, whereas paragraph 5 mentions some limitations of the research. Finally, paragraph 6 makes some suggestions for further research.

1 Definition of the problem

Due to the move from a traditional, financial economy to a knowledge-based economy, the relevance of accounting based information declined in favor of information about the intangibles of a company (Orens and Lybaert, 2005). Therefore managers should change to a more intangible focused strategy. Especially when a company has a large business network, the importance of intangible factors increases. This is because the performance of these networks depends much more on organizational issues, such as interdependence, trust or collaboration, than the performance of single organization (Moeller, 2006). The question however is what the impact is of intangible assets on tangible measures such as profit, growth, revenues, etcetera.

This thesis is build on previous research of Moeller (2006) and Sánchez et al. (2005, 2006). The first paper argued that intangible variables such as participation and strategic relevance have an effect on both intangible and tangible performance. The papers of Sánchez et al. (2005,2006) describe intangibles in universities. The objective of this research is to find out if trust or employee loyalty has an effect on the performance of research institutes. This leads to the following definition of my problem:

What is the impact of perceived trust and employee loyalty within research institutes on the institute's performance?

Given the short time period, not all effects of trust and employee loyalty can be analyzed. Instead the emphasis is more to provide an opening for further research on the field of the effects of trust and employee loyalty.

2 Literature review

2.1 *Intangible assets*

Kaplan and Norton (1996) used the concept of intangible assets for the first time The same authors defined intangibles as the skills, competencies and motivation of employees; databases and information technologies; efficient and responsive operating processes; innovation in products and services; customer loyalty and relationships; political, regulatory, and societal approval.

A couple of years later, Marr and Moustaghfir (2005) assessed several definitions of intellectual capital (IC) and noted that the definitions of IC vary with the different management perspectives. First of all, the **Accounting community** defined intangible assets as non-monetary assets without physical substance. An asset is a resource that is controlled by the enterprise as a result of past events and from which future economic benefits are expected (IASB, 2004). Second, the **Human Resource community** refers to skills, knowledge and attitudes of employees when talking about IC. The **Marketing perspective** looks at intangibles such as brand recognition and customer satisfaction as the heart of business success. Finally, the **IT-sector** sees intangibles as software applications and network capabilities. Vergauwen et al. (2007) divide intellectual capital into four somehow equal parts: Structural capital, Human capital, Relational capital and Intellectual property.

Although the different definitions of intangible assets, and the results of these differences would be an interesting theme for a graduation paper, it is not the intention of this thesis to elaborate this matter. Therefore, in the following paragraphs, some definitions are just briefly described. For more extensive literature I would like to refer to other literature like Andriessen (2004), Cañibano et al. (2002), Marr (2005), et cetera. For the purpose of this paper intangible assets are defined in accordance with Ramírez et al. (2006) as follows:

> *Intellectual capital is the combination of intangible resources and activities that allow an organization to transform a bundle of material, financial and human resources in a system capable of creating stakeholder value.*

Notice that in this paper the terms intangible resources, intellectual capital, knowledge-based resources and intangibles will be used interchangeable, which is in line with Sánchez and Elena (2005).

When a definition is set, intangible assets can be divided into several categories. Again this has been done by many researchers, resulting in different classifications. Fortunately these categories are in most of the cases quite similar. For the purpose of this thesis, I will define the classifications in accordance with Ramírez et al. (2006) specifically for universities:

1. **Human Capital**: this involves the knowledge of personnel of the research institution (professors, researchers and assistants), which is acquired through education and other processes to keep the personnel up-to-date.
2. **Structural capital**: this covers the internal process of distribution, communication and management of scientific and technical knowledge in the organization; it can be both *Organizational* (the operating environment derived from the interaction between research, management and organization processes, technology and culture) and *Technological* (patents, licenses, proprietary software, databases and so on).
3. **Relational Capital**: It gathers the wide set of economical, political and institutional relationships developed and maintained by the research institutions.
4. **Cultural capital**: This component considers organizational culture as a specific component of IC because of the importance and strength of the Cultural Capital in many Universities and Research Organizations, mainly traditional ones. However, contradictions between an organization's structure and its culture, or between its Mission Statement and Strategic Objectives and the dominating academic culture, in some or all of its Faculties, can be just the opposite. Experienced managers of IC and Change Management Programs are well aware of the need to address these issues before trying to implement new procedures and technologies (Ramírez et al., 2006).

The reader can notice that the fact that there is neither a uniform definition nor categorization about intangible assets prevents analysts from comparing companies' intangible resources. This would be an interesting study, but is beyond the reach of my thesis. It would require much more time to investigate all these different effects.

2.2 How are intangibles different?

Skinner (2007) summed up a couple differences between tangible and intangible assets. First of all, many intangibles are not separable, salable, or discrete items. As a result, their value is often linked to the value of the underlying entity. Secondly, well defined property rights associated with most tangible and financial resources often do not extend to intangibles. And finally, most of the time there is an absence of a secondary market for intangible resources, making valuation and measurement difficult and costly, because one should derive its value through the underlying asset.

2.3 The intangible economy

As mentioned above, the economy has shifted towards a situation where the main resources for the competitiveness of companies doesn't consist of tangible resources alone, but instead are influenced by tangible and intangible resources. Companies have successfully been looking for new ways to differentiate themselves with the competition. Resources that deliver competitive advantage should be hard to transfer and collect, difficult to imitate, not substitutable, tacit in nature and synergistic (Schiuma et al., 2005). Knowledge assets create such a competitive advantage, which explains the increased importance of these assets.

In a knowledge-based economy, intellectual capital (IC) is likely to be a major asset of many organizations (Schiuma et al., 2005). The European Commission (2003) states that a knowledge based economy and society is based on a combination of four interdependent elements:

1. **The production of knowledge**: mainly through scientific research
2. **The transmission of knowledge**: through education and training
3. **The distribution of knowledge**: through the information and communication technology (ICT)
4. **The use of knowledge**: in technological innovation

At the same time, new configurations of production, transmission and application of knowledge are emerging, and their effect is to involve a greater number of players, typically in an increasingly internationalized network-driven context (European Commission, 2003).

According to Andriessen (2004), there are seven characteristics of the intangible economy.

1. Knowledge replaces labor and capital as a fundamental resource in production, and intangibles like brands create a substantial part of the added value of companies.
2. The knowledge content of products and services is growing rapidly.
3. The intangible economy is an economy in which services are as important as products.
4. It is an economy in which the economic laws are different.
5. In the intangible economy the concept of ownership of resources has changed. Because knowledge mainly resides in the heads of employees, companies no longer own their most important resource.
6. The intangible economy is an economy in which the characteristics of labor have changed. Knowledge workers create most of the value added in companies
7. As a result organizations have changed. The management of intangible resources is fundamentally different from the management of tangible or financial resources.

Whenever an economy is satisfies most of the above characteristics, we are dealing with an intangible or knowledge economy. According to Johnson et al. (2006), knowledge can be defined as the awareness, consciousness or familiarity gained by expertise or learning. What matters is that knowledge of groups of people within the organization or the organization as a whole is becoming more and more important. Johnson et al. (2006) explains this increased importance in three ways. First of all, because organizations are evolving into more and more complex organizations, the know-how gathered by its employees is becoming of a greater value. Secondly, information systems have started to provide more ways to share and pool the knowledge of people. Finally, it is likely that organizations will achieve competitive advantage through the experience and knowledge they have accumulated, which Schiuma et al. (2005) also argues.

2.4 Measuring intangible resources

"What you can measure, you can manage and what you want to manage, you need to measure" (Roos et al., 1997). This is one of the problems Andriessen described in his book 'Making Sense of Intellectual capital'. It is difficult to measure intellectual capital, because it is about putting figures on people, structures and relations. Andriessen (2004) also stipulated the phrase Stewart used in his book 'The wealth of knowledge: intellectual capital and the twenty-first century organization'. Therein Stewart wrote: "You cannot manage what you

cannot measure." This cliché is either false or meaningless. It is false because companies have always been managing people, which are essentially unmeasured. It is meaningless because eventually everything within an organization turns up in someone's ledger of costs or revenues.

The Austrian Competence Centre for Human Capital Research has conducted studies showing that management is acknowledging the fact that there is a relationship between management success and their employees, but not to the extent for real human capital management (Litschka et al., 2006). Because intellectual capital is so hard to measure, there are not much figures known about it. This makes it difficult for managers, as they cannot ground their decisions with substantial evidence. Almost all researches therefore agree that it would be better to have a more objective measurement method for intangible resources, but so far only a few good ones have been suggested (Litschka et al., 2006).

2.5 Communicating intangible resources

The Commission on Intellectual Capital proposed ten principles for effective communication of intellectual capital (Trasi and Welzl, 2007).

1. There need to be a clear link to future valuation creation. This means that only those indications that are used for internal management are relevant for investors.
2. The methodology used should be transparent. If investors understand management's method for valuing intellectual capital, communicating on these elements will be more effective.
3. There is a necessity of standardized intangible indicators. Standardized intangible indicators are needed because investors can only compare the indicators when they are based on the same grounds. Standardization also facilitates benchmarking.
4. Information has to be consistent over time. Again this is needed for investors want to compare the figures of IC between companies.
5. There has to be a balanced trade-off between disclosure and privacy. Too much information disclosed can lead to competitive disadvantages, to little disclosure leads to an information asymmetry.
6. The interests of companies and investors should be aligned.
7. The prevention of information overflows. Information should be focused on the most crucial indicators. This information can be gathered by examining the mission

statement and the vision of the company. This point is linked to point five, where the balance between disclosure and privacy needs to be preserved.

8. The information provided by the company should present the true corporate situation. Misleading investors and other stakeholders is not something that falls under corporate governance, another 'hot topic' in recent literature.

9. The ninth principle for effective communication would be risk assessment. Assessments of risks inherent to each indicator on intellectual capital.

10. The last principle on disclosing intellectual capital information should be that the information will be provided at the right time and place. This can be for example at the end of the annual report.

When companies do not follow comparable principles, confusion will likely be the result. But is it important to communicate on intangibles? Corrado (2007) showed some figures on the importance of intangibles. In the United States, intangibles business investment exceeded $ 1 trillion in the late 1990s; In the period 2000-2006, the intangible business investment was 40 percent larger than tangible investments, and so on.

Corrado (2007) concluded that equally treating intangible and tangible assets would result in higher rates of growth in labor productivity and a larger role of capital as a source of economic growth. This means equal valuation methods and disclosure principles.

2.5.1 Why would companies disclose intellectual capital?

Many institutions argue that the financial reporting system used today is incapable of explaining "new" resources such as relationships, internally generated assets and knowledge (Mouritson et al., 2004). When organization would more frequently disclose information on these intangible resources, it would take away some uncertainties about the future revenues and earnings of the enterprise. As a result, companies will more easily generate new capital. Another advantage of knowledge-based resources is that they are often difficult to imitate and therefore present a good opportunity for competitive advantage (Mouritsen et al., 2004).

In addition to the increased value of a company, intellectual capital can be seen as a catalyst for the change in a company's cultures and management structures. A high level of trust, loyalty, confidence, et cetera, will have a major influence of the culture of an organization.

Of course disclosing information about intellectual capital is very favorable to stakeholders, since they now have a more detailed view on the organization, making it easier to make forecasts if needed. The volatility and the danger of incorrect valuation of a particular firm is also decreased when the company in question discloses a so called level 3 report (see paragraph 2.5.4). When companies make more information public about their intangibles, the possibility of insider trading decreases, because managers have less information which is not known by the public (Mouritsen et al., 2004). The latter is the so called decrease of information asymmetry.

2.5.2 Disclosure of intangibles

Companies are providing a lot of information towards many different groups of stakeholders. The following groups are nearly always represented: owners, employees, suppliers, creditors, customers, debtors, Public Administrations, and the general public (Polo and Vàsquez, 2005). Most of this information, like financial reports or stock exchange information, is mandatory by nature. On the other hand, stakeholders still require firms to disclose additional information on a voluntary basis. One type of this information voluntary disclosed is intellectual capital information (Orens and Lybaert, 2005).

If intangible information is so important, why aren't companies using it? The reason why, may be because they do not see a clear relationship between this disclosure and the corporate profitability (Cowen et al., 1987). Also there are structural factors that affect social disclosure practices like size, sector or industry, and the country in which the study is carried out (Polo and Vàsquez, 2005). Finally, social disclosure is also related to such factors as capital intensity, the age of the company, and strategic considerations (Polo and Vàsquez, 2005). Especially disclosing on strategic considerations includes risks of providing to much information, so that competitors can us this information.

Despite the preceding, companies should at least consider the benefits disclosure of intangibles can generate. Financial statements that include an intellectual capital statement represent more faithfully the assets and therefore, the financial position of an enterprise. This reduces the risk to potential investors and thereby increases the possibility of new capital. The International Accounting Standards Board stipulates that intangible resources are important for to the needs of all kind of users, but in general managers don't want to see it in the financial statements (Eastman, n.d.).

Lev and Zarowin (1999) argued that the relevance of accounting based information declined in favor of information about the intangibles of a company. Orens and Lybaert (2005), on the other hand, stated that hardly any conclusions could be drawn whether or not capital market participants really used intellectual capital information. Therefore they presented a paper to provide an insight into the relevance of intellectual capital information, which presented a couple of interesting finding. First of all they measured an increase of the voluntary disclosure of IC information in annual reports between 2001 and 2003. Secondly, they noted that the use of this IC information by financial analysts didn't increased over time. "So despite the fact that corporate managers have significantly improved their IC information disclosure, financial analysts have not changed their behavior concerning this kind of information." (Orens and Lybaert; 2005; p. 12). Thirdly, there is a positive relationship between the market-to-book ratio and the level of IC information as well as to human capital and to internal structure. Finally there is neither a positive relation between experience and the use of IC information, nor a negative relationship between complexity and the use of IC information.

2.5.3 Counterarguments to reform accounting for intangibles

Skinner (2007) critically reviewed policy recommendations.

First of all, Skinner (2007) argued that although many economists say that financial statements are losing relevance, there is no clear evidence of this. During the late 1990s a lot of papers discussed the value relevance of financial statements. The results of these researches were mixed. For instance: the last couple of years, more traditional industries such as oil, mining, commodities and steel have been booming due to the increase of demand for industrial output.

Secondly, even though accounting models fail to recognize many intangibles, this could be a good thing. Skinner supports this statement by the following. Some claim that technological companies systematically undervalue their companies by not including intangible assets, and as a result have it difficult to raise capital. According to Skinner (2007) this does not make sense, since the balance sheet is not designed to form the basis for valuation. Valuation should be done based on the income statement. Many technology companies such as Google are valued relatively high by investors and seem to have little trouble in raising capital.

Thirdly, because accounting models fail to recognize many intangibles, firms fail to obtain financing. Again Skinner (2007) disagrees because there is little evidence to support this

claim. Furthermore he states that financial markets quickly adept to find new ways of financing different types of assets, including intangibles and even when traditional ways of financing are not available. It is hard to believe that companies have difficulties in raising financing for intangible assets, when these assets eventually generate cash flows.

Skinner (2007) concludes with some remarks that during the last fifteen years a lot of research has been done to develop standards to disclose information on intangible assets. However, little actual progress has been made. As a matter of fact, is it actually necessary to develop new standards? Because of large differences in types of intellectual capital between organizations, it will be very difficult to create one comprehensive framework. The nature and the measurement of intangibles vary considerably across industries. In addition, the absence of guidelines to disclose intangible assets did not prevented companies to raise enough capital. In fact, Skinner (2007) argues that financial markets worked well to finance intangible investments.

2.5.4 The Intellectual Capital Statement

Today, the importance of intangible factors for business success has triggered attention on many fronts: institutional, academic, professional, managerial, etc. It has not only been academics who have studied and demanded the completion of the traditional financial information with knowledge of these resources, but many companies too have opted for the voluntary disclosure of this information in the Intellectual Capital Statement (Polo and Vàsquez, 2005).

The Intellectual Capital Report, like the name suggests, is a report containing information about the status of intellectual capital of an organization. It is often a supplement to the annual report (Mouritsen et al., 2004). Polo and Vàsquez (2005) sees the report as a container for whatever information that might have been included in the Social Balance, but which is broader in scope with primacy over the latter. Devoting a specific document, the Social Balance, can be seen as an unnecessary effort, since this type of information may be provided more suitably within the so-called Intellectual Capital Report. Unfortunately, there are still no regulations concerning Intellectual Capital Reports. Because of the interest that the topic has aroused in recent years and managers' awareness of the issue, there exist some statements which are very widely known by the managerial community (Polo and Vàsquez, 2005).

The Intellectual Capital Report usually contains the subsequent items, which follow the same subdivisions as do the most used definitions of intellectual capital (Polo and Vàsquez, 2005):

1. **Human Capital**: intangible elements associated with the company's personnel, such as their skills, motivation, experience, commitment, et cetera.
2. **Structural Capital**: this embraces intangible items to the internal environment of the organization. Edvinsson and Malone (1999) divide them into three parts:
    a. Organizational capital: intangible resources from the possession of an internal structure that is appropriate to and coherent with the goals of the entity.
    b. Innovation capital: the capacity to be creative, giving rise to obtaining protected commercial rights.
    c. Process capital: techniques, tasks, tools and procedures leading to the company's effective production of goods and services.
3. **Relational Capital**: commercial relationships and the intangible elements that derive from this activity.

There are three levels on how much companies are willing to disclose their intellectual capital. Level one just gives a minimum of information, Level two, where intellectual capital information is generally disclosed in an ad hoc table, and Level three which contains a full intellectual capital report. (Zambon, 2007)

2.6 The impact of Intellectual capital on the organization

2.6.1 General Impact

Moeller (2006) describes the importance of business networks, which in my point of view can be seen as relational capital, to build up competitive advantage. The paper argues that networks can help to distribute acquired knowledge throughout the entire organization, which can be competitive. Moeller (2006) also states that intangible resources like knowledge, customer relations, innovations, relations with your suppliers etc. are important to the success of a company's network.

Anskaitis and Bereisis (2005) believes that the attention given to intellectual capital will be beneficial to an organization. The reason lies in the idea that the performance of a company will increase, because simply more attention is given to intellectual capital. Off course we have to ask ourselves if the attention given to intangibles is enough or not. Too much

attention would be a waste of time and resources, too little consideration will mean a loss of potential benefits. Management thus has to weigh of the costs of time spent on investigating intellectual capital against the benefits of knowledge about intangible assets.

Malinen and Toivonen (2005) investigated the impact of intellectual capital in the growth and profitability of Finnish ICT firms. They did this by measuring the ratios of the intangible assets to turnover in a base year and statistically analyzing the impact of that share to the future growth and profitability of those companies. The results showed a strong correlation between future growth and the ratio of intangible to fixed assets. This does not necessarily mean that the growth can be explained by the level of intangible assets, but it definitely provides a basis for further research. The impact of intangible assets on the profitability of the Finnish ICT firms could not be proven.

Intangibles are of strategic importance for the organization. Organizations have to understand their corporate competence and resource composition in order to evaluate these opportunities (Marr, 2005). This means that the intangible assets of a firm should be one of the central considerations in formulating strategy and one of the primary constants upon which a firm can establish its identity and frame its strategy (Marr, 2005).

Revellino (2007) shows that the nature of human resources and technologies are of crucial importance when talking about the competitiveness of an organization. The importance of knowledge is for example large when a company wishes to look at the fidelity of its employees. This latter will also be investigated in section 3.

2.6.2 Kaplan and Norton's Strategy Map

Kaplan and Norton (2004) provided a way to analyze the corporate strategy through strategy maps. Figure 1 gives an example of such a map. As the reader can see, the strategy map contains a lot of intangible indicators such as human capital, information capital an organizational capital. These are the foundations of the strategy map and will eventually influence a company's performance.

As stated before, intellectual capital can be divided into four groups: Human Capital, Relational Capital, Structural Capital and Intellectual Property. The impact on the performance of intellectual capital can therefore be seen from four different angles. Kaplan and Norton (2004) divided their Learning and Growth Perspective into 3 different categories:

Human Capital, Information Capital and Organizational Capital, the latter includes Structural and Relational Capital. The Balanced Scorecard (a precursor of the strategy map) assumes a cause-and-effect relationship between intangible assets and the performance of an organization among its four perspectives: financial, customers, internal processes, learning and growth (Moeller, 2006).
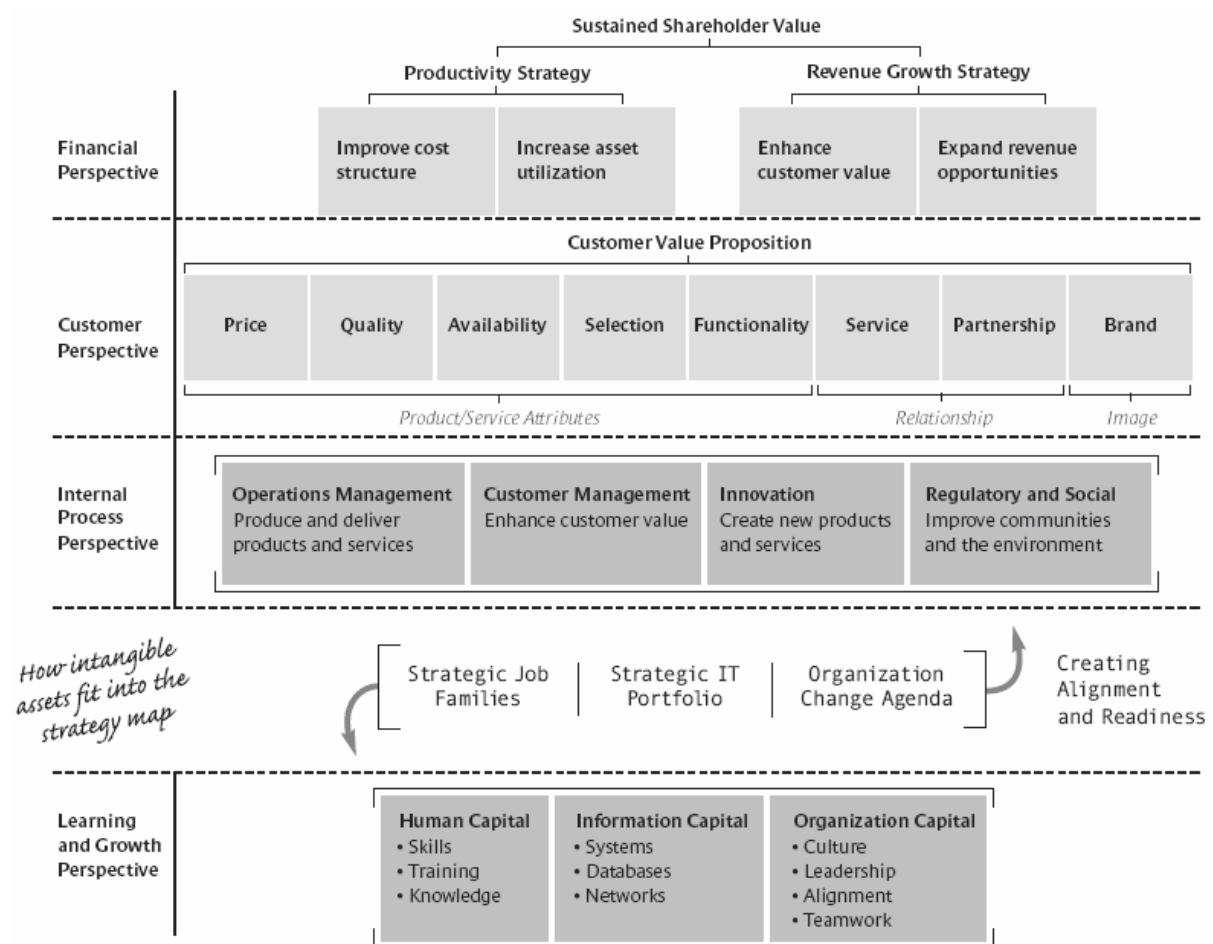
Figure 1: Strategy Map from Kaplan and Norton. Source: Kaplan and Norton (2004), page 3:

Moeller (2006) investigated the importance of trust, participation and strategic relevance to determine their impact on intangible performance. Subsequently he examined the influence of this intangible performance on tangible performance. Figure 2 stipulates the hypotheses tested by Moeller and the results of the tests.
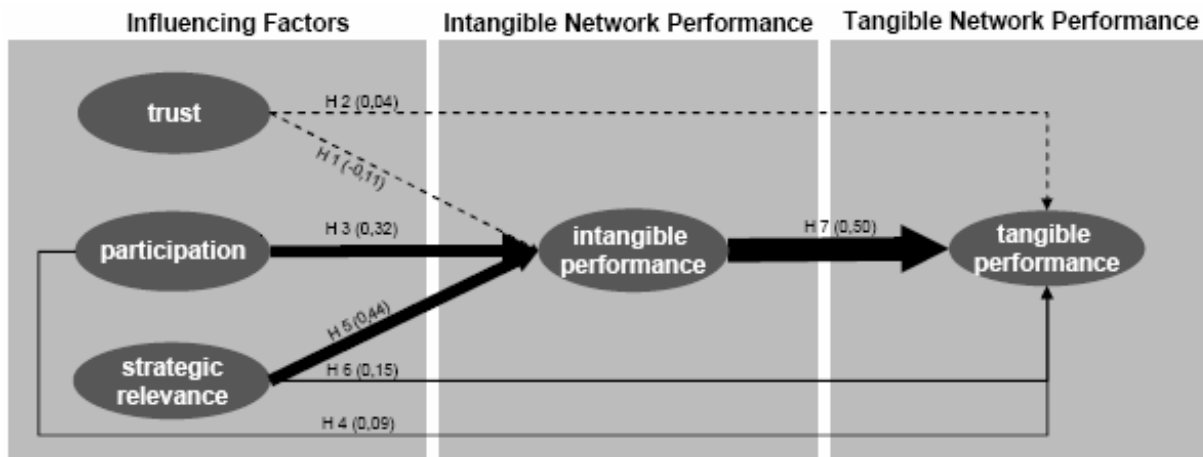
Figure 2: Influence of intangible factors to tangible performance. Source: Moeller (2006), page 3

Moeller (2006) set up a large scaled empirical study on German business networks. The findings of this research showed that there was an interrelation between intangible and tangible performance. Intangible performance in his turn is mainly influenced by strategic relevance and participation. Although most studies showed that trust has a positive effect on a company's performance, Moeller's research did not present such a relationship. The latter was explained by the fact that trust-based organizations have different levels of risk exposure. There did exist an interrelation between trust and participation.

Hypothesis		Path	direct effect	indirect effect	total effect
H 1 (+)		trust ⇨ intangible performance	-0,11	0	-0,11
H 2 (+)		trust ⇨ financial performance	0,04	-0,05	-0,01
H 3 (+)	✓	participation ⇨ intangible performance	0,32	0	0,32
H 4 (+)	✓	participation ⇨ financial performance	0,09	0,16	0,25
H 5 (+)	✓	strategic relevance ⇨ intangible performance	0,44	0	0,44
H 6 (+)	✓	strategic relevance ⇨ financial performance	0,15	0,22	0,37
H 7 (+)	✓	intangible performance ⇨ financial performance	0,50	0	0,50
* The specified effects are based on standardised mapping coefficients.					
✓ Hypothesis preliminary confirmed					

Figure 3: Results of the hypotheses testing and effects in the model . Source: Moeller (2006), page 9

As you can see, the first two hypothesizes are not accepted. Moeller (2006) comments on this that a free-riding-behavior could be an issue preventing partners within the network to trust each other. More research is in this matter definitely needed! Unlike trust, participation does have a strong effect on the intangible performance, but a rather low influence on the tangible performance. Moeller (2006) argues that this result can be explained because a high degree in partner participation creates an environment, where intangible value potentials can

grow and unfold their value generation potential that later on can be exploited and turned into financial performance. Strategic relevance has a rather large total effect on the financial performance of an organization. Finally, the largest effect on financial performance comes from intangible performance. This is very important, because this emphasizes again the importance of intangible assets!

Important to notice is the leading-lagging effect between intangible and tangible performance. The development of intangible structures usually takes time, meaning that benefits of those structures will only be visible a couple periods after the development. A good example of this is building a strong relationship with your customers, this will not be achieved by one sale, but rather by a sequence of good quality sales.

The research conducted by Moeller (2006) has been an inspiration to the research presented in paragraph 3. The fact that more research was needed in the area of trust and its impact on the performance of an organization, appealed to me. The results will be discussed in paragraph 3.

2.7 Managing Intangible Resources

Knowledge, which is used to improve a firm's innovational capabilities, processes and performance is of intangible nature. Because of that, these resources need to be translated into identifiable and measurable resources. Management of intangible resources is about figuring out which knowledge resources a company possesses, and how they interact with each other. Unfortunately, like mentioned above, managerial awareness for the importance of intellectual capital is still low, but improving. Executives begin to recognize the relationship between entrepreneurial success and their intellectual capital. The reason why this shift towards a more knowledge based enterprise is so slow is the fact that intellectual capital still is hard to value. As a consequence, the need of management to substantiate their decisions with figures remains difficult.

Before management can make better decisions, they must know which factors to influence. Litschka et al. (2006) described four categories of factors: **Performance and motivation; Workability, health and well being; Job satisfaction; and Commitment**

Some authors proposed that intellectual capital statements are a part of companies' knowledge management strategies as well as a device for communicating knowledge management's objectives, initiatives and results. Thus, knowledge management is the linking pin between the intellectual capital statement and the theory of the firm (Roberts and Chaminade, 2005).

Roberts and Chaminade (2005) developed their research based on a case study of the Spanish energy company, Union Fenosa. They set up an intellectual capital model to support their hypothesis that intangibles contribute to meeting the operating objectives and, therefore, the financial objectives. Roberts and Chaminade (2005) summarized that the intellectual capital model is a tool to identify, monitor and control the key knowledge of the firm.

The challenge that firms nowadays are facing, is how they will realize that intellectual resources can be made manageable, and how these resources affect the development of an organization (Mouritsen et al., 2004).

2.8 Knowledge management in higher education

Knowledge management and intellectual capital approaches are critical for most universities. The explanation lies in the fact that the main goals of universities are the production and the distribution of knowledge. Moreover higher education institutions have important investments in research and human resources (Ramírez et al., 2006). So, more than any other sector, higher education needs to adapt their management to a more knowledge-based orientated management. The European Commission (2003) states that universities are unique, due to the key role they play in the following three fields:

1. Research and exploitation of its results, thanks to industrial cooperation and spin-offs
2. Education and training, in particular training of researchers
3. Regional and local development, to which they can contribute significantly.

To manage intellectual capital in higher education institutions, one has to identify the specific characteristics of this sector. Sánchez and Elena (2005) mentions the characteristics that define the public sector in relation to the private sector:

1. Less incentive to adopt new management approaches, due to a non-competitive environment
2. Intangible objectives, less linked with the value market and with financial profit.
3. More importance is given to social and environmental responsibility.
4. Most of the public organizations provide services (education, health, etc.), which are intangibles.
5. The most important resources used by the public sector are intangibles: knowledge and human resources.
6. Inflexible management procedures and rigid structures. The bureaucratic model does not facilitate new approaches.
7. Less necessity to quantify.
8. Increase of external demand for accountability and transparency in the use of public funds.

Given the different characteristics, an educational institution is based upon many intangible resources and provides different intangible services. Since these intangibles are changing rapidly, European universities have to adapt and adjust to a whole series of changes. These include:

1. Increased demand for higher education. Management has to think of ways to deal with how this increase will be met, considering the limited human and financial resources (European Commission, 2003)
2. Internationalization of education and research, which is speeded up by new technologies. As internationalization increases, competition will be fiercer, since now institutions have to compete with universities from abroad. Competition will be on three fields. First on the field of students, second on the field of trained and qualified researchers and lastly competition to attract new funds. (European Commission, 2003; and Ramírez et al., 2006)
3. Pressure to harmonize the different national university systems. An example of this is the Bologna Process where European universities are standardized so that degrees will be more comparable and compatible throughout Europe (Ramírez et al., 2006)
4. Increased demand for transparency and accountability about the results and benefits derived from public funds (Ramírez et al., 2006).
5. The explosion of places where knowledge is produced. This is linked to the previous element, since also this causes an increasingly competitive environment. Contract research for companies will probably be assigned to the best-performing universities. (European Commission, 2003)

In order to stand up to these changes, it will be necessary to develop knowledge based management models and intellectual capital models to reach the strategic objectives of universities and research institutions (Ramírez et al., 2006).

2.9 Trust and loyalty

2.9.1 Trust

Alan Greenspan, former president of the Board of Governors from the Federal Reserve System, once said: "Trust and reputation can vanish overnight, a factory cannot". Trust can be seen as taking risk, meaning that actions of one party materially affect the other. (Fu, 2004). Perry et al. (2007) define trust as follows:

> "*Trust embodies one's expectations, assumptions or beliefs about the likelihood that another's future actions will be beneficial, favorable, or at least not detrimental to one's interests*"

According to Fu (2004), there are three different levels of trust which are interconnected.

1. The first level consists of the properties of individuals, where trust is seen as a personality variable, highlighting individual characteristics like feelings, emotions and values.
2. At a second level, trust is regarded as a collective attribute to achieve organizational goals.
3. The third and last level treats trust as a valued public good facilitated and sustained by a social system.

It is important that people within an organization have a mutual confidence that tasks can be carried out without close and frequent supervision. To much control will cause an employee to believe that their supervisors do not trust them. Although not all research studies bring the same results, I think that trust has a positive effect on a company's performance, maybe not direct, but indirect through intermediate variables like structure and productivity. Trust can make sure that the exchange of information between colleagues will be more open. This lowers the information asymmetry, which leads to a better ability to coordinate processes and tasks (Moeller, 2006). Since tasks will be fulfilled more effectively and efficiently, the

performance of the organization increases. The effect of trust on the performance of organizations is investigated in paragraph 3 of this paper.

It is important to remark that trust cannot be developed overnight. The development of trust is a longsome and costly procedure. Also, managers and personnel should be aware of the risks of blind trust. Despite risks of trust literature mainly remains positive about the effects of trust (Moeller, 2006).

2.9.2 Employee Loyalty

In a continuously developing economy, organizations sometimes forget basic resources within their own organization, namely their employees. Attention spent on your workforce has a positive effect on their performance and loyalty. A loyal employee most of the time is proud to work for his employer/organization, this conviction will be visible to one of the most important aspects of the enterprise, being the customer.

The loyalty of your workforce can be seen as their devotion to the company. Indicators of employee loyalty are for example the responsibility your staff is willing to take for their work or the willingness to look for another job (Anskaitis and Bareisis, 2005). Again, employee loyalty is a part of this research. In section 3 I will elaborate on different indicators of loyalty and their impact on the performance of a research institute.

The difference between loyalty and commitment is not sufficiently emphasized. "Though loyalty and commitment have much in common, much is lost when the two concepts are treated synonymously. Whereas commitment is more likely to have a strong connection to employee turnover, loyalty might be more strongly related to the likelihood of whistle-blowing or organizational citizenship behaviors" (Coughlan,2005).

Coughlan (2005) also explains that (just as with intellectual capital) different definitions of employee loyalty were used over time, resulting in different measures. This makes it of course more difficult to compare the level of employee loyalty of you own firm with the level of other institutions. Coughlan (2005) investigated these different definitions and then set up a new conceptualization of loyalty as follows:

> "*Loyalty is reflected in behavior that can be tied to an implicit promise, voluntarily made by an individual operating in a community of interdependent others, to ad here to universalizable moral principles in pursuit of individual and collective goals.*"

There are three major aspects that are included in this definition. First of all loyalty involves a pact between interdependent individuals, so there has to be a relationship between two parties with the intention to satisfy individual and collective needs. Secondly, the definition indicates that loyalty involves the behavior based upon a community's shared values. So loyalty occurs when the actions of the parties reflect the shared moral values of the organization. The third and last aspect of the definition involves that loyal individuals act according to the moral principles of the community. With respect to the latter, moral values include respect, social responsibility, personal and moral obligation, honest communication, concern for employee welfare and justice (Coughlan, 2005).

3 Trust and Employee loyalty in Research institutes

European universities need to adept their management of intangibles in order to stand up to the environmental challenges discussed in section 2.8. Very closely linked to these universities are the research institutes who face the same challenges. Research institutes mainly consist of intangible assets, the importance of intellectual capital is very high. As a consequence, they need to find out which intangible assets have an important impact on the performance and which of the intangibles have a negligible impact. Many projects, like MERITUM[1] or RICARDIS[2], were already set up to investigate the importance of intellectual capital.

This research investigates the effect of trust and employee loyalty on the performance of the research institutes at the Hasselt University. This research can be extended to the effect of trust and loyalty on the performance of the entire university, but because of the lack of time I will not investigate this. So for the meaning of this graduation paper three main hypotheses were formulated:

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[1] MERITUM is a project set up by the European Commission in order to develop some guidelines for managing and reporting on intangibles. Research is performed for organizations at a European level (Sánchez et al., n.d.).

[2] RICARDIS stands for Reporting Intellectual Capital to Augment Research, Development and Innovation in SME's. Also this project was set up by the European Commission to stimulate the reporting of intellectual capital in research intensive organizations (Sánchez et al., n.d.)

H1:   The higher the level of trust between colleagues, the higher will be the level of employee loyalty

H2:   The higher the trust between colleagues of a research institute, the higher will be the institute's performance

H3:   The higher the loyalty of the personnel of a research institute, the higher will be its performance

3.1 Research design

3.1.1 Research subject

The three hypotheses mentioned above were tested at the nine research institutes of the Hasselt University. These are:

1. **The institute for material research (IMO)**
2. **The expertise centre for digital media (EDM)**
3. **The biomedical research institute (BIOMED)**
4. **The centre for environmentology (CMK)**
5. **The institute for mobility (IMOB)**
6. **The centre for statistics (CenStat)**
7. **The institute for behavioral sciences (SEIN)**
8. **The knowledge centre for entrepreneurship and innovation (KIZOK)**
9. **The centre for applied linguistics (CTL)**

Supplement 1 presents a more detailed discussion of the different research institutes.

The survey was retrieved from the independent and assisting academic staff and the student researchers who are working to achieve their doctorate. Since this 'population' is not that big, a questionnaire was sent to the entire academic staff of each research institute. This resulted in a total population of approximately 407 academic researchers with the following distribution (Hasselt University, 2007):

1. IMO-IMOMEC: 86 researchers
2. EDM: 71 researchers

3. BIOMED: 61 researchers
4. CMK: 46 researchers
5. IMOB: 38 researchers
6. CenStat: 45 researchers
7. SEIN: 30 researchers
8. KIZOK: 16 researchers
9. CTL: 14 researchers

3.1.2 Research background

This paper extends the research of Moeller (2006), Sánchez et al. (2005, 2006) and Zolin et al. (2004). Moeller (2006) investigated the importance of trust, participation and strategic relevance with respect to intangible and financial performance (see paragraph 2.6). Although the article argued that in contradiction to other research trust has no significant effect on tangible or intangible performance, additional research definitely was needed. Sánchez et al. (2005, 2006) contributed a lot with research on the importance of intellectual capital in universities and research institutes. Also Sánchez has done a lot on the field of setting up an intellectual capital report for universities. Zolin et al. (2004) has investigated indicators of trust, which were partially used to set up the questionnaire. Finally, Anskaitis and Bareisis (2005) already pointed out the importance of investigating the impact of trust and loyalty. Although Anskaitis and Bareisis (2005) investigated the importance of customer loyalty, the employee loyalty indicators used in this thesis are deducted from Anskaitis and Bareisis (2005).

To gather data for the research, two methods were used. First of all, a questionnaire was developed in Snap, which was electronically sent to the different researchers (Supplement 3). The purpose of this survey was to find out if the degree of trust and employee loyalty within the different research institutes. Secondly, some performance indicators were needed for the different research institutes in order to compare the degrees of trust and employee loyalty with these performance measures. Since research institutes are not seen as profit-orientated organizations, normal indicators such as profit, turnover, clientele, etcetera were not that relevant. For research institutes it is more important what their scientific output is, being the number of publications in national and international journals. For this latter type of information, secondary data were used, mainly annual reports of the different institutes.

3.2 Data analysis

To process the data, the statistical program SPSS (Statistical Package for the Social Sciences) was used. To analyze de data, a number of methods were used. A first level analysis was performed to give the reader an idea about the possible outcome of the research, which was done in section 3.5. In this section the sum was made for each respondent by adding his answers to the different questions. The respondent received a total score on the indicators 'Trust', 'Employee loyalty' and 'Performance'. Afterwards these results were cross analyzed.

Before analyzing a second level, the reliability of the measurement scale had to be checked. Chronbach's Alpha was used in order to check whether if the items (questions) of each variable (Trust, Employee loyalty or Performance) measured the same thing. De Pelsmacker and Van Kenhove (2006) state that the Chronbach Alpha lies between 0 and 1 and that if the value drops below 0,6 we could say that the internal consistency is not good, which leads to a low reliability of the measurement scale (De Pelsmacker and Van Kenhove 2006). This minimum of 0,6 will be used as well in this paper .

The second level analysis consisted of a principal component analysis in order to reduce the number of variables. The principal component analysis determines factors in such a way that as much of the total variation in the data is explained by as few factors as possible (Swinnen, 2006). Before we could perform the principal component analysis, we had to check whether if the data could be used for this method. This was done on the basis of the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. The KMO-value checks if the variables are sufficiently correlated to form factors. In accordance with Swinnen (2006), a minimum of 0,5 was used for this measure. The number of factors was determined by the eigenvalue, only those factors with an eigenvalue above 1 were accepted (Swinnen, 2006). A limitation of the principal component analysis is that much of the outcome depends on the choices the analyst makes. Which data entries, type of rotation, stopping criteria and so on.

3.3 Survey

The survey, which was held at the academic staff of the research institutes, consisted of four parts. The first part examined the level of trust that the academic staff within the research institute perceived. The second component in its turn looked at the perceived level of employee loyalty. The third subdivision checked some intangible performance indicators from

the research institutes. Finally, the last part just gathered some general data such as age, years of service and the research institutes for which the respondent worked. For the first three parts, the respondents were asked to give an answer on a five-point Likert scale, ranging from totally agree to completely disagree. To verify the fairness of the answers, some check statements were included and some of the questions were reversed. To facilitate the questionnaire and to increase the response rate , the language in which the survey was set up was Dutch, which was at the end not such a good idea. A translation of the questionnaire was added in supplement 3.

In the following three paragraphs a brief elaboration on the different used indicators for trust, employee loyalty and performance is given. Definitions and descriptions can be found in section 2.9.

3.3.1 Trust indicators

To identify the indicators used for trust, previous research from Moeller (2006) and Zolin et al. (2004) was used. Therein, a list of indicators for interpersonal trust were proposed, which were found very usable for this research:

1. **Quality of the information**: this indicator is checked by questions V2, V4 and V13.
2. **Degree of task interdependence and control**: when there is a lot of control needed for an organization, there will be little trust present. Therefore questions V3, V5, V10, V16 and V23 cover this indicator.
3. **Sharing information**: when the amount of information shared is high and thereby there is little risk in sharing information, the trust will be higher. This topic is investigated by questions V8, V15 and V19.
4. **Openness, Honesty and Credibility**: people who aren't honest cannot be trusted. For this, questions V11, V12, V14, V24 and V26 investigate the degree in which co-workers are honest and thereby credible.
5. **Appreciation of work**: when employees are appreciated for the work they do, they will more easily trust their employer. Of course this is not a fact, but nearly an assumption. Questions V22 and V27 cover this matter.
6. **Perception of trust**: this is measured by looking at how employees think of the way they can trust colleagues or the research institute. Questions V1, V6, V7, V9 and V20.

7. **Perceived importance of trust**: questions V17, V18, V21 and V25 try to capture how important the respondents believe trust is.

Questions V4, V10, V12, V15, V19 and V20 are reversed in the questionnaire. For further analysis they are reversed again in SPSS to become the right scale. This is done just by subtracting the answer from 6. So the answer 5 becomes 1, 4 becomes 2, and so on. The reversed variables are indicated in by adding 'b' to the number. This means the creation of the following 6 new variables: V4b, V10b, V12b, V15b, V19b and V20b.

Important to notice is that the questionnaire was set up in a way that totally agreed received the value 1 and totally disagreed received a value 5. This will be important for the further analysis, since the higher the score a person has, the less the effect will be on the variable.

3.3.2 Employee loyalty indicators

Employee loyalty factors were subtracted from previous research performed by Coughlan (2005). The chosen indicators were the following:

1. **Satisfaction**: as employees are more satisfied, they have little intention to leave the organization and thereby will be more loyal to the company. This important indicator will be investigated in questions L2, L3, L4, L8, L10, L13, L18, L19 and L23.
2. **Loyalty consciousness**: how do the employees feel about loyalty is checked in questions L5, L17 and L26.
3. **Sense of belonging**: an employee who feels himself/herself connected to the organization will probably be more loyal. In questions L7, L11, L12, L20, L21 and L24 this indicator is measured.
4. **Perceived importance of employee loyalty**: questions L1, L6 and L22 measure this topic
5. **Moral values**: when your moral values are in line with those of the company, you will feel more attached and thus more loyal. This is checked in questions L9, L14 and L15.
6. **Colleagues**: the better you work together with your partners, the more loyal you will probably be. That is why questions L16 and L25 investigate this matter.

For these indicators the following questions had to be reversed: L9, L15, L17, L18, L19, L20, L21, L22, L23 and L25, creating the new variables L9b, L15b, L17b, L18b, L19b, L20b, L21b, L22b, L23b and L25b.

3.3.3 Performance indicators

Performance indicators were used to check whether if the respondents feel that the research institute is performing well or not. First of all, a short definition of a performance indicators is given, afterwards the classification within the university is discussed.

A performance indicator can be defined as:

> *"a policy relevant statistic, number or qualitative description that provides an indication that the university, some aspect of it, or the university system is performing as it should"* (The Association of Universities and Colleges of Canada, 1995).

Following the definition, a performance indicator should have 7 key features (Association of Universities and Colleges of Canada, 1995):

1. **Goal or result oriented:** related to missions or outcomes
2. **Reference point:** a target, performance over time or comparison across institutions
3. **Provide strategic information about the condition, health or functioning of the institution/system**
4. **Evaluative:** the purpose is to assess, judge
5. **Strategic, specific, policy-oriented and issue-driven**
6. **Connect outcomes to structure and process, taking inputs into account**
7. **To be used for improvement, enhancement, positive reform**

Like mentioned above, two sets of performance indicators were used in this paper. The first group was retrieved from the questionnaire and investigated what the respondents though of their performance. The second group was gathered from secondary data like annual results and research statements. In the following both these groups are briefly described, starting with the set of indicators analyzed from the questionnaire.

1. **Value creation**: this indicator covers both added value as the increase in scientific research and is investigated through questions P1, P2 and P11.

2. **Financial means**: P3, P4 and P8 check out if the means provided by the state, by the university and by firms is high in relation to other research institutes

3. **Collaboration, structure and bureaucracy**: this indicator, which is measured by questions P6, P9, P10 and P12, investigates how well the procedures work in order to ease the work of everyone. Structure and bureaucracy can influence the performance through efficiency. When

4. **Growth in the number of students** is checked through questions P5 and P7

5. **Knowledge economy**: since the importance of the knowledge economy is increasing, I asked the respondent if he thought that the research institute was investigating this matter. Question P13 checks this out.

Also for the performance indicators, some were reversed in the questionnaire to keep the respondent thinking of his answers. Variables P3b, P4b, P9b and P10b were the reversed questions.

When defining the scientific output of each research institute, the university created a small difficulty for this research. The university classifies its output by research groups instead of per research institute, the research subjects. Using the official website of the university, www.uhasselt.be, an examination was made for each research group, leading to a classification (if possible) under one of the 9 research institutes. The activities and the members of the research group were used as guidelines. Underlying table gives a summary of this classification, but the complete explanation is given in Supplement 2.

Table 1: Research groups per research institute (RI)

	RI	RESEARH GROUP
1	IMO	• Laboratory of inorganic and physical chemistry • Laboratory of organic and polymer chemistry • 50% of applied chemistry • Theoretic chemistry • Materials physics • Institute for materials research in microelectronics
2	EDM	• Expertise centre for Digital Media
3	BIOMED	• Immunology – Biochemistry • Functional Morphology • Physiology
4	CMK	• Policy Management

		• Environmental Biology
		• Biodiversity, Phylogeny and Population studies
		• Laboratory of botany
		• 50% of applied chemistry
5	IMOB	• This institute was founded in 2003 and does not relate to 1 research group in particular
6	CenStat	• 50% of Data-analysis and modeling • Centre for statistics
7	SEIN	• Optimization of learning and problem solving abilities • SEIN
8	KIZOK	• Organization Theory and Fundamental Policy • Marketing • Strategy and Organization • 50% of Data-analysis and modeling • Finance, Entrepreneurship and Reporting
9	CTL	• Text research and language didactics • Centre for applied linguistics

The intention was to look at the data performance of each of the nine research institutes for the last 5 years, so 2002-2006. unfortunately, IMOB was only founded in 2003 so data were used from until 2006. the aim of the data was to detect some trends regarding the revenues, finished research,… . For the latter, secondary data were used, mainly the annual reports of the different institutes. It involved a lot of work to gather the data, because scientific publications are all displayed per research group. There are a number of performance measures used by the university, like scientific publications, participation in congresses, lectures,… . Counting all the different performance measure would be to far-reaching, so only the following three performance measures were used:

1. Revenues
2. Number of employees
3. Scientific publications

Other possible performance measures like the number of finished doctoral theses, expert and referee assignments, acquisition of externally funded research projects, prizes and awards, etcetera were excluded from my research.

3.4 Data collection

Since it is easy to contact personnel, the survey was sent to the entire population. The questionnaire was published on the server of the Hasselt university, thereby receiving a website address, which was sent to the academic staff. Also a personal email was sent to the directors of the different research institutes to kindly ask them to take part in the research.

One and a half week after the questionnaires was distributed, a reminder was sent to the staff in order to convince non-respondents. A week later, my research was started with the gathered data. Unfortunately, the response was rather low, out of the 407 sent questionnaires, only 41 responses were usable. More than 41 responses were sent, but not all of them were usable. Supplement 4 displays an excel-sheet with an explanation why every respondent was selected or deleted.

The following figure displays the response rate of each research institute. As you can see, most of the selected cases came from the research institute CTL, not one researcher of SEIN had the time to fill in the questionnaire, which of course is regrettable. Also just one person from KIZOK filled in the survey. As a consequence this is also not a usable research institute, since every time "the respondents" will fall for 100% in on or another group.
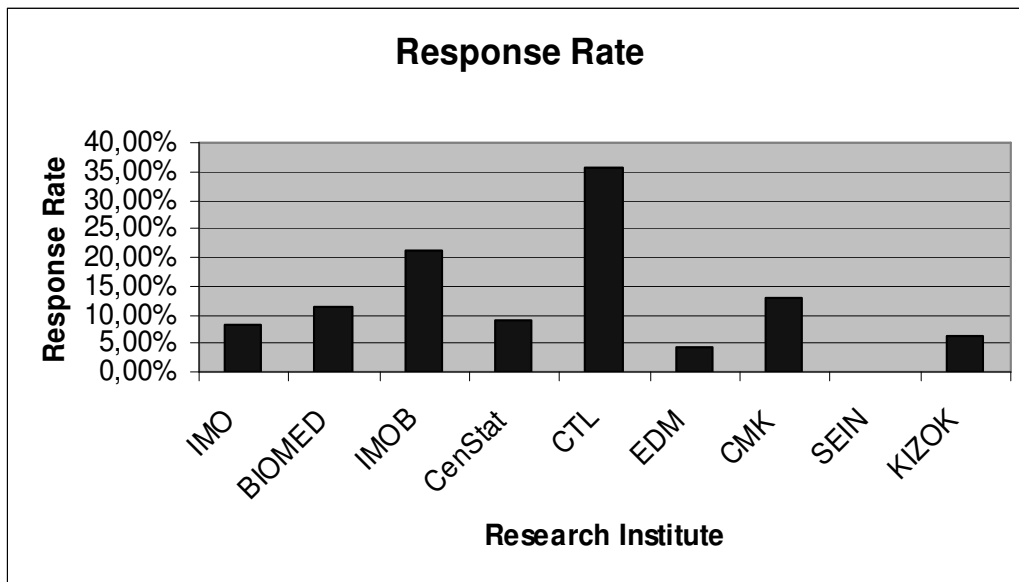
Figure 4: Response rate

Because of the low response, the statements presented in the research, should be read with a pinch of salt, keeping in mind the low response. The results of the study could of course

much be improved if the response was a lot higher, which off course is out of the reach of the researcher.

The fact that the response rate was not that high also can be an indication that people aren't engaged in the impact of trust and loyalty. A professor of mine, who would be kept anonymous, told me that although they are open with each other, new information was rather kept for themselves.

3.5 First level research

As a first step to get an idea of what the results might turn out to be, three variables were created: TRUST, LOYALTY and PERFORMANCE. These consisted of the sum of all the questions in relation to that topic. Next they were divided into 'Low', 'Moderate' and 'High' scores on the variables, using the frequency tables presented in supplement 5.1. Finally the labels low, moderate and high were cross analyzed with the research institutes. This is given in the next tables

Table 2: Cross tabulation of Trust and Employee loyalty

Total score on Trust * Total score on Loyalty Crosstabulation

			Total score on Loyalty			
			High	Moderate	Low	Total
Total score on Trust	High	Count	7	4	2	13
		% within Total score on Trust	53,8%	30,8%	15,4%	100,0%
	Moderate	Count	4	6	4	14
		% within Total score on Trust	28,6%	42,9%	28,6%	100,0%
	Low	Count	3	1	10	14
		% within Total score on Trust	21,4%	7,1%	71,4%	100,0%
Total		Count	14	11	16	41
		% within Total score on Trust	34,1%	26,8%	39,0%	100,0%

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	,421	,142	2,897	,006[c]
Ordinal by Ordinal	Spearman Correlation	,425	,144	2,934	,006[c]
N of Valid Cases		41			

[a]. Not assuming the null hypothesis.

[b]. Using the asymptotic standard error assuming the null hypothesis.

[c]. Based on normal approximation.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11,727[a]	4	,020
Likelihood Ratio	12,098	4	,017
Linear-by-Linear Association	7,083	1	,008
N of Valid Cases	41		

a. 6 cells (66,7%) have expected count less than 5. The minimum expected count is 3,49.

As you can see, 71,4% of the respondents who scored low on trust had also a lower score on employee loyalty. If he or she had a high level of trust, the respondent would in 53,8% of the times also have a high level of loyalty. There thus was a positive relation between trust and employee loyalty. This was also given in the positive correlation of 0,421 which has a confidence level of 99,4%, which was very high. As a consequence, the hypothesis that there was no significant correlation (H_0) could be rejected.

The Chi-square test showed that the null hypothesis (there is a relationship between employee loyalty and trust) was accepted up to a 2% significance level. So we could say with a confidence level of 98% that trust had an effect on the employee loyalty within the research institutes.

Table 3: Cross tabulation of Trust and Performance

Total score on Trust * Total score on Performance Crosstabulation

			Total score on Performance			
			High	Moderate	Low	Total
Total score on Trust	High	Count	7	4	2	13
		% within Total score on Trust	53,8%	30,8%	15,4%	100,0%
	Moderate	Count	5	4	5	14
		% within Total score on Trust	35,7%	28,6%	35,7%	100,0%
	Low	Count	2	4	7	13
		% within Total score on Trust	15,4%	30,8%	53,8%	100,0%
Total		Count	14	12	14	40
		% within Total score on Trust	35,0%	30,0%	35,0%	100,0%

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	,371	,137	2,460	,019[c]
Ordinal by Ordinal	Spearman Correlation	,371	,137	2,460	,019[c]
N of Valid Cases		40			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5,515[a]	4	,238
Likelihood Ratio	5,905	4	,206
Linear-by-Linear Association	5,357	1	,021
N of Valid Cases	40		

a. 9 cells (100,0%) have expected count less than 5. The minimum expected count is 3,90.

Trust and performance also had a positive relation, yet less significant as the relationship between trust and employee loyalty. In 53,8% of the cases, the respondents had a higher performance if they showed a higher level of trust. This was of course important since management could increase the performance by increasing the trust within the research institute. The chi-square test was unfortunately not that good. We could only say with 76,2% certainty that there existed an effect between trust and performance, which was much too low. The null hypothesis that there was a relationship between trust and performance was therefore rejected. Notice that this was in line with the results from Moeller (2006).

Table 4: Cross tabulation of Employee loyalty and Performance

Total score on Loyalty * Total score on Performance Crosstabulation

			Total score on Performance			Total
			High	Moderate	Low	
Total score on Loyalty	High	Count	6	4	4	14
		% within Total score on Loyalty	42,9%	28,6%	28,6%	100,0%
	Moderate	Count	5	4	2	11
		% within Total score on Loyalty	45,5%	36,4%	18,2%	100,0%
	Low	Count	3	4	8	15
		% within Total score on Loyalty	20,0%	26,7%	53,3%	100,0%
Total		Count	14	12	14	40
		% within Total score on Loyalty	35,0%	30,0%	35,0%	100,0%

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	,246	,153	1,563	,126[c]
Ordinal by Ordinal	Spearman Correlation	,248	,155	1,576	,123[c]
N of Valid Cases		40			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4,263[a]	4	,372
Likelihood Ratio	4,389	4	,356
Linear-by-Linear Association	2,355	1	,125
N of Valid Cases	40		

a. 7 cells (77,8%) have expected count less than 5. The minimum expected count is 3,30.

The impact of employee loyalty on the performance of the research institute was even less significant in comparison with the effect of trust on performance. When the level of employee loyalty was low, performance would probably also be low (53,3% chance), but this relationship cannot be told about the moderate level of loyalty, where a moderate level of loyalty was associated with a high level of performance in 45,5% of the cases. Also it was only in 42,9% of the cases that a high level of employee loyalty resulted in a high level of performance. The significance level wasn't that good either, this meant that the statements just given are only true in 87,4% of the cases. Again the chi-square table showed that there doesn't exist a very clear relationship. We can only say with 62,8% certainty that there was a relationship between employee loyalty and performance, which was not that good.

We could conclude this paragraph by stating that there might be a positive correlation between trust and employee loyalty and a limited relationship between trust and performance. The relationship between employee loyalty and performance was not significant enough.

3.6 Principal Component Analysis (PCA)

3.6.1 Trust

Table 5: Chronbach Alpha for Trust

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,877	,871	27

The first part of the analysis is to check whether if the items in the questionnaire represent the same thing. As discussed in paragraph 3.2, this is done by looking at the Chronbach Alpha. If this measure is above the minimum of 0,6, the questions V1 through V27 all measure the same thing, being trust. As shown in the below table, Chronbach's Alpha exceeded the required minimum, so the measurement scale for trust is reliable.

Table 6: KMO and Bartlett's Test Trust indicators

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,635
Bartlett's Test of Sphericity	Approx. Chi-Square	749,947
	Df	351
	Sig.	,000

Table 6 gives some measures of the first principal component analysis (PCA) performed for the trust indicators. The Kaiser-Meyer-Olkin (KMO-value) measure indicates whether if the variables are significantly connected with each other to lead to factors. This has to be high enough to be able to perform a good principal component analysis. Following the course of econometrics, a KMO value of 0,635 indicates that the degree of common variance among the 27 variables is "Mediocre". Since the KMO-value exceeded the required minimum of 0,5, the variables could be grouped into a smaller set of factors, so the dataset was usable to perform the PCA,. The Bartlett's Test of Sphericity tested the null hypothesis that the correlation matrix (R) of the variables is equal to the identity matrix (I). Since the p-value of 0,000 was much smaller than the required significance level of 0,05, the null hypothesis was rejected. This meant that there were some relationships between the variables, which was a good thing.

SPSS proposed a total of 8 indicators to explain 76,33% of the total variance of the variables (Supplement 5.2). One of the most important tables for the principal component analysis is the rotated component matrix (Supplement 5.2). This matrix is used instead of the (normal) component matrix, since in the rotated component matrix the structure with the factor loadings is more clearer to see which variable belongs to which factor. For almost every factor there was an overlap in variables. This made it of course more difficult to analyze the data, but this problem was solved by looking at the largest values for each component. In the following paragraphs, each factor is analyzed for the different research institutes.

Factor 1: This factor gives an indication about the appreciation of work and the perception of trust in colleagues. To further analyze the factor, each one was divided into three groups. A first group consists of people, who have a score on the factor, with values up to -0,53464, receive the label 'High'. A second group of respondents receive a 'Moderate' label and have values ranging from -0,53463 through 0,24315. Those with the label 'Low' score above 0,24316. Notice that lower scores received a higher label, since the questionnaire was set up in that way that 1 meant totally agreed and 5 totally disagreed. The distribution per research institute is given in table 6.

Table 7: Trust Factor 1: Cross tabulation

Crosstab

			Trust Factor 1			Total
			High	Moderate	Low	
research institute	IMO	Count	1	2	4	7
		% within research institute	14,3%	28,6%	57,1%	100,0%
	BIOMED	Count	4	2	1	7
		% within research institute	57,1%	28,6%	14,3%	100,0%
	IMOB	Count	1	4	3	8
		% within research institute	12,5%	50,0%	37,5%	100,0%
	CenStat	Count	2	0	2	4
		% within research institute	50,0%	,0%	50,0%	100,0%
	CTL	Count	1	4	0	5
		% within research institute	20,0%	80,0%	,0%	100,0%
	EDM	Count	2	1	0	3
		% within research institute	66,7%	33,3%	,0%	100,0%
	CMK	Count	3	0	3	6
		% within research institute	50,0%	,0%	50,0%	100,0%
	KIZOK	Count	0	0	1	1
		% within research institute	,0%	,0%	100,0%	100,0%
Total		Count	14	13	14	41
		% within research institute	34,1%	31,7%	34,1%	100,0%

Only IMO has a significantly higher score on this factor than other research institutes. Respondents from this research institute thus have a significantly lower level of work

appreciation and trust in colleagues. Both BIOMED and EDM perform better than the other institutes, their employees appreciate their work and have higher trust in their co-workers. IMOB and CTL have a rather moderate level op work appreciation.

Factor 2: This factor gives an indication about the amount of information and quality of the information flows. Following the same work method as for factor 1, the factors were divided into three groups: Low, Moderate and High. The frequencies can be found in supplement 5.3, since repeating the frequency tables over and over again would not be interesting. In table 8, you can see how each research institute scores on this factor.

Table 8: Trust Factor 2: Cross tabulation

Crosstab

			Trust Factor 2			
			High	Moderate	Low	Total
research institute	IMO	Count	4	2	1	7
		% within research institute	57,1%	28,6%	14,3%	100,0%
	BIOMED	Count	3	2	2	7
		% within research institute	42,9%	28,6%	28,6%	100,0%
	IMOB	Count	4	0	3	7
		% within research institute	57,1%	,0%	42,9%	100,0%
	CenStat	Count	0	3	1	4
		% within research institute	,0%	75,0%	25,0%	100,0%
	CTL	Count	0	3	2	5
		% within research institute	,0%	60,0%	40,0%	100,0%
	EDM	Count	0	1	2	3
		% within research institute	,0%	33,3%	66,7%	100,0%
	CMK	Count	2	1	3	6
		% within research institute	33,3%	16,7%	50,0%	100,0%
	KIZOK	Count	1	0	0	1
		% within research institute	100,0%	,0%	,0%	100,0%
Total		Count	14	12	14	40
		% within research institute	35,0%	30,0%	35,0%	100,0%

The amount and the quality of information is higher for both IMO and IMOB. EDM and CMK on the other hand don't share much information. The amount and quality of information for CenStat or CTL has a moderate level, so little can be said for these research institutes.

Factor 3: This factor gives an indication on the level of perceived trust. So if a research institute has a high label on this factor, its employees believe that the level of trust is high within their institute. It is important to investigate this factor, since it gives an indication of the degree in which respondents are dealing with this matter. If researchers don't spend attention on trust, they will not perceive it as high.

Table 9: Trust Factor 3: Cross tabulation

Crosstab

			High	Moderate	Low	Total
			Trust Factor 3	
research institute	IMO	Count	3	3	1	7
		% within research institute	42,9%	42,9%	14,3%	100,0%
	BIOMED	Count	3	4	0	7
		% within research institute	42,9%	57,1%	,0%	100,0%
	IMOB	Count	3	1	4	8
		% within research institute	37,5%	12,5%	50,0%	100,0%
	CenStat	Count	1	2	1	4
		% within research institute	25,0%	50,0%	25,0%	100,0%
	CTL	Count	1	1	3	5
		% within research institute	20,0%	20,0%	60,0%	100,0%
	EDM	Count	1	0	2	3
		% within research institute	33,3%	,0%	66,7%	100,0%
	CMK	Count	0	1	3	4
		% within research institute	,0%	25,0%	75,0%	100,0%
	KIZOK	Count	1	0	0	1
		% within research institute	100,0%	,0%	,0%	100,0%
Total		Count	13	12	14	39
		% within research institute	33,3%	30,8%	35,9%	100,0%

For IMO, BIOMED and CenStat the level of perceived trust is moderate through high. As you can see IMOB, CTL, EDM and CMK all have a lower level of perceived trust in relation to other research institutes. Since the levels of perceived trust aren't that high, we could assume that not much attention is given to the importance of trust.

Factor 4: This factor gives an indication on the degree of control. If the degree of control is high, then researchers are controlled to much and they feel that supervisors don't have a lot of trust in them. Notice that the questions, V16 and V23, are formulated in that way that when they fully agree (lowest score) they believe that the level of control is low and thus the trust is high.

Only CTL has a lower level of control, so the research institute has a higher score on this factor. Management of CTL thus believes that their researchers don't need to be controlled. For IMO and BIOMED the emphasis is on a moderate level of control, whereas IMOB and CenStat both have a higher level of control within the research institute indicating that the level of trust could be lower. The exact percentages are shown in table 10.

Table 10: Trust Factor 4: Cross tabulation

Crosstab

			Trust Factor 4			Total
			High	Moderate	Low	
research institute	IMO	Count	2	3	1	6
		% within research institute	33,3%	50,0%	16,7%	100,0%
	BIOMED	Count	1	3	2	6
		% within research institute	16,7%	50,0%	33,3%	100,0%
	IMOB	Count	2	2	4	8
		% within research institute	25,0%	25,0%	50,0%	100,0%
	CenStat	Count	1	1	2	4
		% within research institute	25,0%	25,0%	50,0%	100,0%
	CTL	Count	3	1	1	5
		% within research institute	60,0%	20,0%	20,0%	100,0%
	EDM	Count	1	1	1	3
		% within research institute	33,3%	33,3%	33,3%	100,0%
	CMK	Count	3	0	3	6
		% within research institute	50,0%	,0%	50,0%	100,0%
	KIZOK	Count	0	1	0	1
		% within research institute	,0%	100,0%	,0%	100,0%
Total		Count	13	12	14	39
		% within research institute	33,3%	30,8%	35,9%	100,0%

Factor 5: Factor 5 examines the perceived importance of trust. If a respondent fully agrees on these questions, he scores low and believes the importance of trust within the research institute is high. This factor can just as factor 4 be seen as an indication of the degree in which the researchers are dealing with trust.

Table 11: Trust Factor 5: Cross tabulation

Crosstab

			Trust Factor 5			Total
			High	Moderate	Low	
research institute	IMO	Count	1	5	1	7
		% within research institute	14,3%	71,4%	14,3%	100,0%
	BIOMED	Count	1	3	3	7
		% within research institute	14,3%	42,9%	42,9%	100,0%
	IMOB	Count	3	2	3	8
		% within research institute	37,5%	25,0%	37,5%	100,0%
	CenStat	Count	2	0	1	3
		% within research institute	66,7%	,0%	33,3%	100,0%
	CTL	Count	3	0	2	5
		% within research institute	60,0%	,0%	40,0%	100,0%
	EDM	Count	0	1	2	3
		% within research institute	,0%	33,3%	66,7%	100,0%
	CMK	Count	3	1	2	6
		% within research institute	50,0%	16,7%	33,3%	100,0%
Total		Count	13	12	14	39
		% within research institute	33,3%	30,8%	35,9%	100,0%

As can be seen in table 11, both BIOMED and EDM believe that trust isn't that important for the organization. They think that a higher level of trust cannot contribute to a higher performance level. On the other hand, CenStat, CTL and CMK are more convinced that this relationship does hold and that trust can influence the performance of the research institute.

Factor 6: This factor checks whether the integrity of the employees is high or low. A high score on this factor indicates that researchers within the organization are open and honest with each other, which could mean a higher level of trust.

Table 12: Trust Factor 6: Cross tabulation

Crosstab

			Trust Factor 6			
			High	Moderate	Low	Total
research institute	IMO	Count	2	1	4	7
		% within research institute	28,6%	14,3%	57,1%	100,0%
	BIOMED	Count	2	2	1	5
		% within research institute	40,0%	40,0%	20,0%	100,0%
	IMOB	Count	1	3	4	8
		% within research institute	12,5%	37,5%	50,0%	100,0%
	CenStat	Count	1	0	3	4
		% within research institute	25,0%	,0%	75,0%	100,0%
	CTL	Count	2	2	1	5
		% within research institute	40,0%	40,0%	20,0%	100,0%
	EDM	Count	1	2	0	3
		% within research institute	33,3%	66,7%	,0%	100,0%
	CMK	Count	3	2	1	6
		% within research institute	50,0%	33,3%	16,7%	100,0%
	KIZOK	Count	1	0	0	1
		% within research institute	100,0%	,0%	,0%	100,0%
Total		Count	13	12	14	39
		% within research institute	33,3%	30,8%	35,9%	100,0%

The integrity of the employees is not that good. Especially for IMO, IMOB and CenStat, these values are very low, indicating that this factor can lower the overall level of trust of the research institute. BIOMED and CTL both lean towards better integrity of the researchers and for CMK this level is good. The employees of CMK are more honest and they believe that the shared information will not be misused

Factor 7: This factor gives an indication about the task interdependence within the research institutes. Again the questions are formulated in that way that a low score (fully agree) leads towards a higher level of task interdependence and trust.

Table 13: Trust Factor 7: Cross tabulation

Crosstab

			Trust Factor 7			Total
			High	Moderate	Low	
research institute	IMO	Count	1	3	3	7
		% within research institute	14,3%	42,9%	42,9%	100,0%
	BIOMED	Count	2	2	3	7
		% within research institute	28,6%	28,6%	42,9%	100,0%
	IMOB	Count	2	2	4	8
		% within research institute	25,0%	25,0%	50,0%	100,0%
	CenStat	Count	4	0	0	4
		% within research institute	100,0%	,0%	,0%	100,0%
	CTL	Count	2	3	0	5
		% within research institute	40,0%	60,0%	,0%	100,0%
	EDM	Count	1	2	0	3
		% within research institute	33,3%	66,7%	,0%	100,0%
	CMK	Count	2	1	3	6
		% within research institute	33,3%	16,7%	50,0%	100,0%
	KIZOK	Count	0	0	1	1
		% within research institute	,0%	,0%	100,0%	100,0%
Total		Count	14	13	14	41
		% within research institute	34,1%	31,7%	34,1%	100,0%

Table 13 indicates that CenStat has a very high level of task interdependence (100%!). All the respondents believed that they have a significant freedom to perform their tasks, which could lead towards a higher level of trust within the research institute. For the other research institutes, the opinions were divided. CTL and EDM responded a more moderate level of task interdependence, while BIOMED, IMOB and CMK showed a lower level.

Factor 8: the last factor of trust just contains one variable, V10b. Although it was not needed to create a new variable to group these responses, I did do this to point out that it was a factor on its own. This factor looks at the degree of formalization within the institute. It indicates the level of bureaucracy, paperwork etcetera in order to fulfill your work. If this is high, the level of trust is ought to be lower. Notice again that if in the cross tabulation a research institute has a high score, this means that they should score higher on a level of trust, not on the level of formalization. The question V10 was reversed to V10, so that this would be clear.

Table 14 shows that only IMOB and CenStat displayed a lower degree of formalization, which means that the level of trust is higher than for other research institutes. The level of formalization was higher for both EDM and CMK, indicating that the level of trust could be a bit   lower.

Table 14: Trust Factor 8: Cross tabulation

Crosstab

			Trust Factor 8			Total
			High	Moderate	Low	
research institute	IMO	Count	3	3	1	7
		% within research institute	42,9%	42,9%	14,3%	100,0%
	BIOMED	Count	0	5	2	7
		% within research institute	,0%	71,4%	28,6%	100,0%
	IMOB	Count	5	0	2	7
		% within research institute	71,4%	,0%	28,6%	100,0%
	CenStat	Count	2	1	1	4
		% within research institute	50,0%	25,0%	25,0%	100,0%
	CTL	Count	1	2	2	5
		% within research institute	20,0%	40,0%	40,0%	100,0%
	EDM	Count	0	1	2	3
		% within research institute	,0%	33,3%	66,7%	100,0%
	CMK	Count	2	1	3	6
		% within research institute	33,3%	16,7%	50,0%	100,0%
	KIZOK	Count	0	0	1	1
		% within research institute	,0%	,0%	100,0%	100,0%
Total		Count	13	13	14	40
		% within research institute	32,5%	32,5%	35,0%	100,0%

3.6.2 Employee Loyalty

Table 15: Chrobach's Alpha for Employee loyalty

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,895	,895	26

The first step in the analysis of the employee loyalty indicators is again to check whether if the questions all represent the same thing. This was done by the Chrobach's Alpha given in table 15. A value of 0,895 is definitely high enough to state that the internal consistency of the measurement scales were good.

Table 16: KMO and Bartlett's Test Employee loyalty indicators

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,598
Bartlett's Test of Spchericity	Approx. Chi-Square	726,031
	df	325
	Sig.	,000

The KMO value again was not that high, but fortunately exceeded the required minimum of 0,5. This made the data set usable to conduct a principal component analysis. The Bartlett's Test of Sphericity showed that the correlation matrix was significantly different from the identity matrix and thus continuing the research could give some results. The p-value was lower than 0,05, so the null hypothesis, that R=I was rejected. The correlation matrix was thus significantly different from the identity matrix. With other words the null hypothesis, that the different items of the PCA are not correlated, could be rejected.

The communalities, given in supplement 5.4, indicated that some of the variables had a high communality, but most of them didn't. Especially for the indicators Satisfaction and Sense of belonging most of the time around 80% of their variance was explained by the factors. Again this shows that the results of the factor analysis aren't that good.

The total variance explained table is also given in supplement 5.4 and showed that 75,87% of the variance of the variables can be explained by 7 factors. Increasing the number of factors, of course will increase the explained variance, but the increase in the total explained variance will not be high enough to justify an extra factor. The different variables linked to each factor are shown in supplement 5.4. Each of the 7 factors will be explained in the following paragraphs.

Factor 1: this factor gives an indication of how satisfied the respondents are to work for the research institute. How each research institute scores on this factor is shown in table 15.

Table 17: Factor 1 Employee loyalty: Cross tabulation

Crosstab

			Loyalty Factor 1			
			High	Moderate	Low	Total
research institute	IMO	Count	2	1	3	6
		% within research institute	33,3%	16,7%	50,0%	100,0%
	BIOMED	Count	1	5	1	7
		% within research institute	14,3%	71,4%	14,3%	100,0%
	IMOB	Count	3	1	4	8
		% within research institute	37,5%	12,5%	50,0%	100,0%
	CenStat	Count	2	0	1	3
		% within research institute	66,7%	,0%	33,3%	100,0%
	CTL	Count	1	3	1	5
		% within research institute	20,0%	60,0%	20,0%	100,0%
	EDM	Count	1	1	1	3
		% within research institute	33,3%	33,3%	33,3%	100,0%
	CMK	Count	3	0	3	6
		% within research institute	50,0%	,0%	50,0%	100,0%
	KIZOK	Count	0	1	0	1
		% within research institute	,0%	100,0%	,0%	100,0%
Total		Count	13	12	14	39
		% within research institute	33,3%	30,8%	35,9%	100,0%

As you can see, most of the employees of CenStat and CMK have a moderate level of work satisfaction. They like their co-workers, with whom they 'share' moral values. This could indicate that they believe the research institute is worth their loyalty. While respondents from BIOMED and CTL have a more moderate level of loyalty, IMO and IMOB score rather low on this factor. The latter indicates that the employees from IMO and IMOB are not satisfied with their job.

Factor 2: by adding the variables L8, L10, L20b, L21b and L23b up, we become this factor. The questions corresponding to these variables all give an indication in how well you are feeling within the research institute. Low scores (remember this corresponds with the label 'High') indicate that the respondents are not looking for another place to work, moreover they would like to keep on working for the organization for at least a significant period.

As table 18 shows, both IMO and BIOMED had a moderate through high score on this factor, indicating that they were not willing to change jobs. Respondents from IMOB, CentStat or CTL didn't share this opinion. They pointed out that they did not feel good in the jobs they did. EDM had a moderate score on this factor and the opinions of CMK were perfectly divided. This prevented to draw some conclusions of these research institutes on the basis of this factor.

Table 18: Employee loyalty Factor 2: Cross tabulation

Crosstab

			Loyalty Factor 2			Total
			High	Moderate	Low	
research institute	IMO	Count	3	2	2	7
		% within research institute	42,9%	28,6%	28,6%	100,0%
	BIOMED	Count	3	3	1	7
		% within research institute	42,9%	42,9%	14,3%	100,0%
	IMOB	Count	2	2	4	8
		% within research institute	25,0%	25,0%	50,0%	100,0%
	CenStat	Count	1	1	2	4
		% within research institute	25,0%	25,0%	50,0%	100,0%
	CTL	Count	2	0	3	5
		% within research institute	40,0%	,0%	60,0%	100,0%
	EDM	Count	1	2	0	3
		% within research institute	33,3%	66,7%	,0%	100,0%
	CMK	Count	2	2	2	6
		% within research institute	33,3%	33,3%	33,3%	100,0%
	KIZOK	Count	0	1	0	1
		% within research institute	,0%	100,0%	,0%	100,0%
Total		Count	14	13	14	41
		% within research institute	34,1%	31,7%	34,1%	100,0%

Factor 3: this factor gave an indication of the degree in which you take your colleagues into account when making decisions. When the score on this factor is high, the respondent are more committed to their colleagues, and could be more loyal to the organization.

Table 19: Employee loyalty Factor 3: Cross tabulation

Crosstab

			Loyalty Factor 3			Total
			High	Moderate	Low	
research institute	IMO	Count	3	2	2	7
		% within research institute	42,9%	28,6%	28,6%	100,0%
	BIOMED	Count	0	2	5	7
		% within research institute	,0%	28,6%	71,4%	100,0%
	IMOB	Count	0	7	1	8
		% within research institute	,0%	87,5%	12,5%	100,0%
	CenStat	Count	2	0	1	3
		% within research institute	66,7%	,0%	33,3%	100,0%
	CTL	Count	5	0	0	5
		% within research institute	100,0%	,0%	,0%	100,0%
	EDM	Count	1	0	2	3
		% within research institute	33,3%	,0%	66,7%	100,0%
	CMK	Count	2	2	2	6
		% within research institute	33,3%	33,3%	33,3%	100,0%
	KIZOK	Count	0	0	1	1
		% within research institute	,0%	,0%	100,0%	100,0%
Total		Count	13	13	14	40
		% within research institute	32,5%	32,5%	35,0%	100,0%

Table 19 clearly displays the results for this factor. For IMO, CenStat and CTL emphasized that most of the time they take into account the effect of their decisions on their colleagues. Worth mentioning is the fact that this was answered by all the respondents. IMOB has a moderate level on this factor and BIOMED and EDM do not take into account the effect of decisions on their colleagues. The latter can indicate a lower level of trust within the research institute.

Factor 4: this indicator checks how satisfied the researchers are of their supervisors. If a respondent had a high label, then he was satisfied of his employer and would probably be more loyal to the organization.

In table 20 you can see that employees from IMO and BIOMED were more satisfied of their employers than those of EDM, who had a moderate level of satisfaction. CenStat and CTL had a lower score for this indicator, so they weren't satisfied at all. Notice that the opinions of CMK were for the third time in a row equally divided between the three levels of satisfaction. As a consequence, little can be said about this institute.

Table 20: Employee loyalty Factor 4: Cross tabulation

Crosstab

			Loyalty Factor 4			
			High	Moderate	Low	Total
research institute	IMO	Count	3	2	2	7
		% within research institute	42,9%	28,6%	28,6%	100,0%
	BIOMED	Count	3	2	1	6
		% within research institute	50,0%	33,3%	16,7%	100,0%
	IMOB	Count	2	3	3	8
		% within research institute	25,0%	37,5%	37,5%	100,0%
	CenStat	Count	1	1	2	4
		% within research institute	25,0%	25,0%	50,0%	100,0%
	CTL	Count	1	1	3	5
		% within research institute	20,0%	20,0%	60,0%	100,0%
	EDM	Count	0	2	1	3
		% within research institute	,0%	66,7%	33,3%	100,0%
	CMK	Count	2	2	2	6
		% within research institute	33,3%	33,3%	33,3%	100,0%
	KIZOK	Count	1	0	0	1
		% within research institute	100,0%	,0%	,0%	100,0%
Total		Count	13	13	14	40
		% within research institute	32,5%	32,5%	35,0%	100,0%

Factor 5: this factor gives an indication of the degree of work satisfaction. A higher score on this factor means that the respondents are satisfied with the job content and environment, which could lead to a higher level of employee loyalty.

Table 21: Employee loyalty Factor 5: Cross tabulation

Crosstab

			Loyalty Factor 5			Total
			High	Moderate	Low	
research institute	IMO	Count	1	4	2	7
		% within research institute	14,3%	57,1%	28,6%	100,0%
	BIOMED	Count	1	2	3	6
		% within research institute	16,7%	33,3%	50,0%	100,0%
	IMOB	Count	2	3	3	8
		% within research institute	25,0%	37,5%	37,5%	100,0%
	CenStat	Count	2	2	0	4
		% within research institute	50,0%	50,0%	,0%	100,0%
	CTL	Count	1	1	2	4
		% within research institute	25,0%	25,0%	50,0%	100,0%
	EDM	Count	1	0	2	3
		% within research institute	33,3%	,0%	66,7%	100,0%
	CMK	Count	5	0	1	6
		% within research institute	83,3%	,0%	16,7%	100,0%
	KIZOK	Count	0	0	1	1
		% within research institute	,0%	,0%	100,0%	100,0%
Total		Count	13	12	14	39
		% within research institute	33,3%	30,8%	35,9%	100,0%

Table 21 clearly shows that CMK was the only research institute from which the respondents had a higher level of work satisfaction. CenStat's opinions were perfectly divided between a high and moderate level, but all the other research institutes had a moderate to low level of work satisfaction. As management of the research institute, this would definitely be something which requires further investigation.

Factor 6: factor 6 considers the presence of some kind of moral obligation the respondents might feel towards the research institute. It can seem a bit strange, but when you feel that you have to mean something for the institute, you will probably be more loyal. This factor really displays a moral feeling of commitment

The results for this factor are given in table 22. Most of the respondents of IMO, BIOMED, IMOB and CenStat lean towards a higher level of commitment and moral obligation with respect tot their research institutes. For IMO and BIOMED these scores are moderate through high, whereas IMOB and CenStat perform the highest. CTL, EDM and CMK are not convinced that this sense of moral obligation is present within the research institute.

Table 22: Employee loyalty Factor 6: Cross tabulation

Crosstab

			Loyalty Factor 6			Total
			High	Moderate	Low	
research institute	IMO	Count	3	3	1	7
		% within research institute	42,9%	42,9%	14,3%	100,0%
	BIOMED	Count	3	3	1	7
		% within research institute	42,9%	42,9%	14,3%	100,0%
	IMOB	Count	4	1	2	7
		% within research institute	57,1%	14,3%	28,6%	100,0%
	CenStat	Count	2	1	1	4
		% within research institute	50,0%	25,0%	25,0%	100,0%
	CTL	Count	1	1	3	5
		% within research institute	20,0%	20,0%	60,0%	100,0%
	EDM	Count	0	0	3	3
		% within research institute	,0%	,0%	100,0%	100,0%
	CMK	Count	0	3	3	6
		% within research institute	,0%	50,0%	50,0%	100,0%
	KIZOK	Count	0	1	0	1
		% within research institute	,0%	100,0%	,0%	100,0%
Total		Count	13	13	14	40
		% within research institute	32,5%	32,5%	35,0%	100,0%

Factor 7: this final factor examines the dedication the academic staff has for the research institute.

Table 23: Employee loyalty Factor 7: Cross tabulation

Crosstab

			Loyalty Factor 7			Total
			High	Moderate	Low	
research institute	IMO	Count	3	3	1	7
		% within research institute	42,9%	42,9%	14,3%	100,0%
	BIOMED	Count	2	3	1	6
		% within research institute	33,3%	50,0%	16,7%	100,0%
	IMOB	Count	2	1	5	8
		% within research institute	25,0%	12,5%	62,5%	100,0%
	CenStat	Count	1	2	1	4
		% within research institute	25,0%	50,0%	25,0%	100,0%
	CTL	Count	1	2	2	5
		% within research institute	20,0%	40,0%	40,0%	100,0%
	EDM	Count	3	0	0	3
		% within research institute	100,0%	,0%	,0%	100,0%
	CMK	Count	2	1	3	6
		% within research institute	33,3%	16,7%	50,0%	100,0%
	KIZOK	Count	0	0	1	1
		% within research institute	,0%	,0%	100,0%	100,0%
Total		Count	14	12	14	40
		% within research institute	35,0%	30,0%	35,0%	100,0%

As for most of the other factors, the opinions on the questions corresponding to this factor were varied. EDM scored very high on this factor (100%!), indicating that the imployees of EDM are dedicated to the research institute. IMO, BIOMED and CenStat scored moderate through high, while IMOB, CTL and CMK had a lower level of dedication.

3.6.3 Performance

Table 24: Chronbach's Alpha for Performance

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,689	,679	13

The Chronbach's Alpha, given in table 24 is again acceptable, since it is above 0,6. The internal consistency of the performance items is not that high as for trust and employee loyalty, but because it is higher than 0,6 I will use the variables.

Table 25: KMO and Bartlett's Test Performance indicators

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,513
Bartlett's Test of Sphericity	Approx. Chi-Square	153,909
	df	78
	Sig.	,000

The second step of the analysis of the performance variables, was to check whether if a principal component analysis was usable or not. As the KMO-value of 0,513 suggested, it was not that high, but still better than the required minimum of 0,5. The Bartlett's Test of Sphericity showed that the correlation matrix was significantly different from the identity matrix and thus continuing the research could give some results. The p-value was lower than 0,05, so the null hypothesis, that R=I was rejected. The null hypothesis, that the different items of the PCA are not correlated, could be rejected.

The communalities of the principal component analysis for the performance variables is given in supplement 5.6. The smallest communality is 0,623 indicating that 62,3% of the

variance of the variable growth students 1 is explained by the factors. For the other 12 variables an average of 78,45% of the variance was explained by the factors, which is not particularly good (supplement 5.6).

The 6 suggested factors for which the eigenvalues are greater then 1 explain 77,217% of the total variance of the performance variables (supplement 5.6). The rotated component matrix showed which variable belonged to which factor. Also this latter matrix is added in supplement 5.6.

Remember that the answers give an indication of how the respondents perceive the level of performance within the research institute. The real data are discussed afterwards in section 3.7.

Factor 1: the first performance factor gives an indication of how well the research institute uses its resources. Are the budgets efficiently allocated, is the well spent and is the structure of the research institute good.

Table 26: Performance Factor 1: Cross tabulation

Crosstab

			Performance factor 1			Total
			High	Moderate	Low	
research institute	IMO	Count	3	2	2	7
		% within research institute	42,9%	28,6%	28,6%	100,0%
	BIOMED	Count	1	3	3	7
		% within research institute	14,3%	42,9%	42,9%	100,0%
	IMOB	Count	1	2	5	8
		% within research institute	12,5%	25,0%	62,5%	100,0%
	CenStat	Count	0	2	2	4
		% within research institute	,0%	50,0%	50,0%	100,0%
	CTL	Count	3	1	0	4
		% within research institute	75,0%	25,0%	,0%	100,0%
	EDM	Count	2	0	1	3
		% within research institute	66,7%	,0%	33,3%	100,0%
	CMK	Count	2	3	1	6
		% within research institute	33,3%	50,0%	16,7%	100,0%
	KIZOK	Count	1	0	0	1
		% within research institute	100,0%	,0%	,0%	100,0%
Total		Count	13	13	14	40
		% within research institute	32,5%	32,5%	35,0%	100,0%

Table 26 shows the results from the first factor. IMO, CTL and EDM all allocate their resources rather well, whereas this could not be said for IMOB who had a lower score on this factor. The other research institutes all had a moderate through low level of how they perceive that resources are allocated.

Factor 2: the second factor displays the perceived financial position of the research institute.

In table 27 is displayed that the respondents from IMO, CTL and EDM all perceived the financial position of their institute as very good. For EDM again 100% of the respondents agreed this statement, which could indicate that this institute performs rather well. The number of scientific publications, an important performance measure, also indicated this. EDM measured an average increase of 70% between 2003 and 2006, which is the highest from all the research institutes (see paragraph 3.7). Notice that all the respondents from BIOMED believed that they are not performing that good on this indicator. IMOB, CenStat and CMK believed that the financial position of the research institute had a moderate level.

Table 27: Performance Factor 2: Cross tabulation

Crosstab

			Performance factor 2			Total
			High	Moderate	Low	
research institute	IMO	Count	3	1	2	6
		% within research institute	50,0%	16,7%	33,3%	100,0%
	BIOMED	Count	0	0	7	7
		% within research institute	,0%	,0%	100,0%	100,0%
	IMOB	Count	3	4	1	8
		% within research institute	37,5%	50,0%	12,5%	100,0%
	CenStat	Count	0	3	1	4
		% within research institute	,0%	75,0%	25,0%	100,0%
	CTL	Count	2	0	1	3
		% within research institute	66,7%	,0%	33,3%	100,0%
	EDM	Count	3	0	0	3
		% within research institute	100,0%	,0%	,0%	100,0%
	CMK	Count	1	4	1	6
		% within research institute	16,7%	66,7%	16,7%	100,0%
	KIZOK	Count	0	0	1	1
		% within research institute	,0%	,0%	100,0%	100,0%
Total		Count	12	12	14	38
		% within research institute	31,6%	31,6%	36,8%	100,0%

Factor 3: this is a very important factor, because is gives an indication of how important the employees believe intangibles are. The first question checked how much employee loyalty could contribute to growth in the number of students and the second question investigated the attention given to the knowledge economy. This factor could give an indication of in how far the research institutes believe intangibles have an effect on the economy. As a consequence it can show the relevance of this paper. When no research institute spent much attention on this matter, then this research would be not that meaningful.

Table 28: Performance Factor 3: Cross tabulation

Crosstab

| | | | Performance factor 3 | | | |
			High	Moderate	Low	Total
research institute	IMO	Count	3	2	2	7
		% within research institute	42,9%	28,6%	28,6%	100,0%
	BIOMED	Count	2	3	2	7
		% within research institute	28,6%	42,9%	28,6%	100,0%
	IMOB	Count	3	1	4	8
		% within research institute	37,5%	12,5%	50,0%	100,0%
	CenStat	Count	1	2	0	3
		% within research institute	33,3%	66,7%	,0%	100,0%
	CTL	Count	1	2	1	4
		% within research institute	25,0%	50,0%	25,0%	100,0%
	EDM	Count	0	1	2	3
		% within research institute	,0%	33,3%	66,7%	100,0%
	CMK	Count	2	0	3	5
		% within research institute	40,0%	,0%	60,0%	100,0%
	KIZOK	Count	0	1	0	1
		% within research institute	,0%	100,0%	,0%	100,0%
Total		Count	12	12	14	38
		% within research institute	31,6%	31,6%	36,8%	100,0%

For the third factor, only IMO performed well. This meant that IMO believed that the knowledge economy and the importance of loyalty was becoming more important. The other research institutes showed a moderate through low score on this factor. Unfortunately this could indicate that the research institutes aren't dealing with the increased importance of intangibles and so this paper will probably not be used in these organizations. Hopefully this will change in the future.

Factor 4: the fourth factor investigates the financial means and the level of bureaucracy perceived by the respondents.

Table 29 shows that respondents from IMOB and CTL scored higher on this factor than the other research institute indicating that most of them believed that the financial means of the research institute are good and the level of bureaucracy is low. CenStat had a moderate level on this factor, so not much could be said about this factor. IMO, BIOMED, EDM and CMK all answered to believe that the financial means of the research institute weren't good and that the level of bureaucracy was high.

Table 29: Performance Factor 4: Cross tabulation

Crosstab

| | | | Performance factor 4 | | | |
			High	Moderate	Low	Total
research institute	IMO	Count	1	2	4	7
		% within research institute	14,3%	28,6%	57,1%	100,0%
	BIOMED	Count	1	3	3	7
		% within research institute	14,3%	42,9%	42,9%	100,0%
	IMOB	Count	5	2	1	8
		% within research institute	62,5%	25,0%	12,5%	100,0%
	CenStat	Count	1	2	1	4
		% within research institute	25,0%	50,0%	25,0%	100,0%
	CTL	Count	2	1	0	3
		% within research institute	66,7%	33,3%	,0%	100,0%
	EDM	Count	0	1	2	3
		% within research institute	,0%	33,3%	66,7%	100,0%
	CMK	Count	2	1	3	6
		% within research institute	33,3%	16,7%	50,0%	100,0%
	KIZOK	Count	0	1	0	1
		% within research institute	,0%	100,0%	,0%	100,0%
Total		Count	12	13	14	39
		% within research institute	30,8%	33,3%	35,9%	100,0%

Factor 5: this factor indicates the perceived degree in which the research institutes reach their objectives regarding value creation and scientific output.

Table 30: Performance Factor 5: Cross tabulation

Crosstab

| | | | Performance factor 5 | | | |
			High	Moderate	Low	Total
research institute	IMO	Count	2	3	2	7
		% within research institute	28,6%	42,9%	28,6%	100,0%
	BIOMED	Count	3	2	2	7
		% within research institute	42,9%	28,6%	28,6%	100,0%
	IMOB	Count	3	3	2	8
		% within research institute	37,5%	37,5%	25,0%	100,0%
	CenStat	Count	1	1	1	3
		% within research institute	33,3%	33,3%	33,3%	100,0%
	CTL	Count	1	1	1	3
		% within research institute	33,3%	33,3%	33,3%	100,0%
	EDM	Count	0	0	3	3
		% within research institute	,0%	,0%	100,0%	100,0%
	CMK	Count	2	1	3	6
		% within research institute	33,3%	16,7%	50,0%	100,0%
	KIZOK	Count	0	1	0	1
		% within research institute	,0%	100,0%	,0%	100,0%
Total		Count	12	12	14	38
		% within research institute	31,6%	31,6%	36,8%	100,0%

The objectives regarding value creation and scientific output were most perceived to be reached for BIOMED. IMO and IMOB perceived this as moderate through high. Both

respondents from CenStat as from CTL were equally divided between the three groups, so little could be said. CMK and especially EDM perceived their ability to reach their objectives as low, which wasn't a very good thing.

Factor 6: the final factor investigates the importance of working together and the ease to contact personnel. It seamed a bit strange that SPSS linked these two variables, but a possible explanation could be that when researchers work well together, they divide the work and make more time for students who have questions. Of course the latter is just a speculation, maybe this could be investigated in the future.

Table 31: Performance Factor 6: Cross tabulation

Crosstab

			Performance factor 6			Total
			High	Moderate	Low	
research institute	IMO	Count	3	2	2	7
		% within research institute	42,9%	28,6%	28,6%	100,0%
	BIOMED	Count	1	2	4	7
		% within research institute	14,3%	28,6%	57,1%	100,0%
	IMOB	Count	3	4	1	8
		% within research institute	37,5%	50,0%	12,5%	100,0%
	CenStat	Count	2	0	2	4
		% within research institute	50,0%	,0%	50,0%	100,0%
	CTL	Count	1	2	1	4
		% within research institute	25,0%	50,0%	25,0%	100,0%
	EDM	Count	0	1	2	3
		% within research institute	,0%	33,3%	66,7%	100,0%
	CMK	Count	2	1	2	5
		% within research institute	40,0%	20,0%	40,0%	100,0%
	KIZOK	Count	0	1	0	1
		% within research institute	,0%	100,0%	,0%	100,0%
Total		Count	12	13	14	39
		% within research institute	30,8%	33,3%	35,9%	100,0%

Actually, the cross tabulation isn't really revealing any clear relations. IMO and BIOMED performed rather well on the factor, while BIOMED and EDM scored low. The other research institutes were all inconclusive.

3.7 Secondary data

Like mentioned above the objective of the secondary data was mainly to confirm the perceived performance. Because nobody from SEIN answered the questionnaire and only one response was received from KIZOK, these two research institutes were excluded from the research.

The secondary data were gathered in collaboration with the university. Three types of documents were used: the annual reports from the university, the annual reports from the different research institutes (when available) and the research institutes[3]. Most of the used data, thus can be gathered when contacting the university or the websites from the different research institutes (Supplement 1).

Three important indicators of measurable performance were used (supplement 6). The first one was the average increase of revenues.
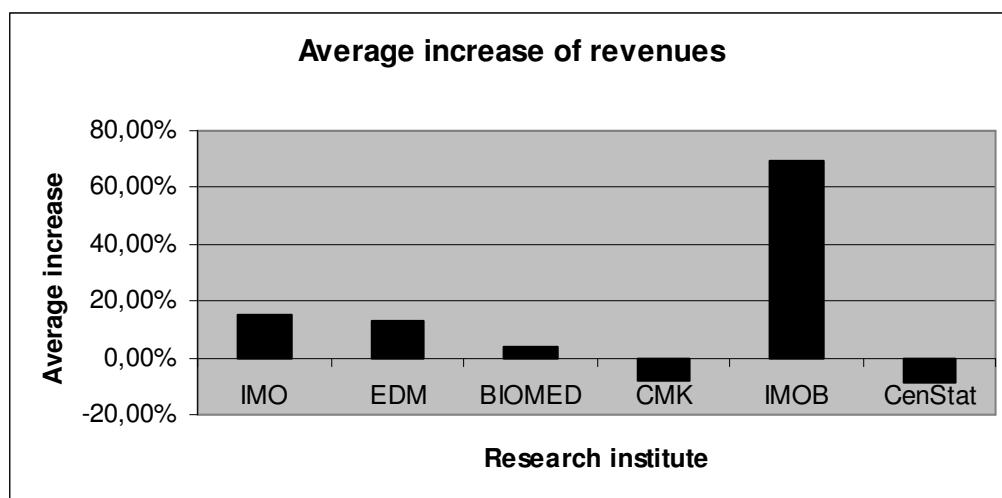
Figure 4: Average increase of Revenues

As you can see, the revenues of IMOB outperformed those of the other research institutes. During the last four years, IMOB had an average yearly increase of revenues of about 70%. CMK and CenStat even had an average decrease of the revenues, the others had an increase but not that high.

A second group of performance measures are the number of employees per research institute, which could give an indication of the growth of the institute over the last four years. This can be seen in when comparing the number of full time equivalents between 2003 and 2006. All the research institutes could see an increase of the number of people working for the institute with at least 60%. CMK outperformed the others with en increase of 150%.

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[3] For the general 2006 data, the annual report from the university can be found online on the following site: www.uhasselt.be/actueel/UniversiteitHasseltMagazine/jaarverslag2006.pdf
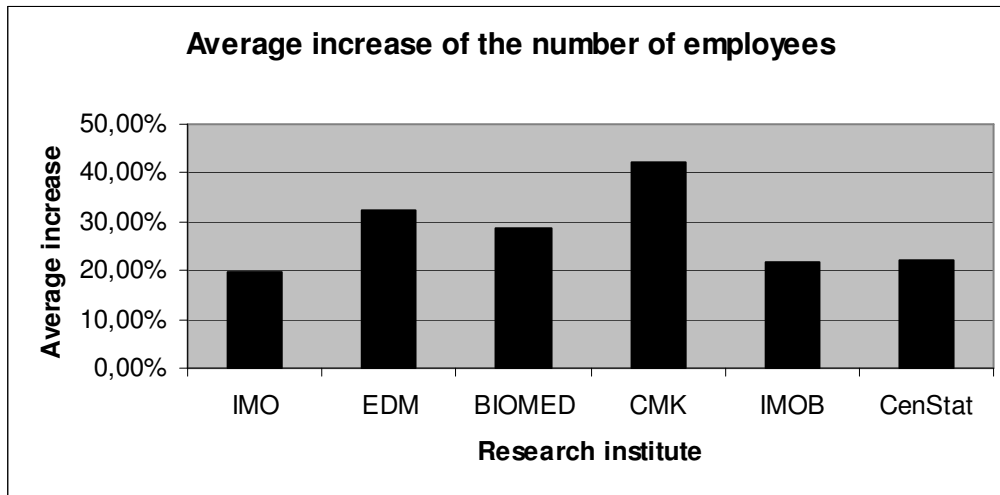
Figure 5: Number of employees

A final group of performance measures were the scientific publications. This is just one of the data that could be gathered from the annual reports of every research institute. Others are for example presentations at conferences, attendances at congresses, number of doctoral theses and so on. Including all these measures would take at least a couple of months to fully understand the system used by the university. With the latter is meant that every performance measure is reported by research group instead of research institute and there are overlaps.

Displaying a figure concerning an increase in the scientific output is very hard, since not all the data could be gathered. Especially for 2005, almost no data were found. For IMOB also no data were available. No research group was assigned to this research institute in particular, so the only data that could be used for this institute are the data from the revenues and the number of employees, since they are given in the annual reports the research groups. But the scientific publications are mentioned in the annual reports from the research institute, which were unfortunately not found. Of course I am fully aware of this whole in my research!
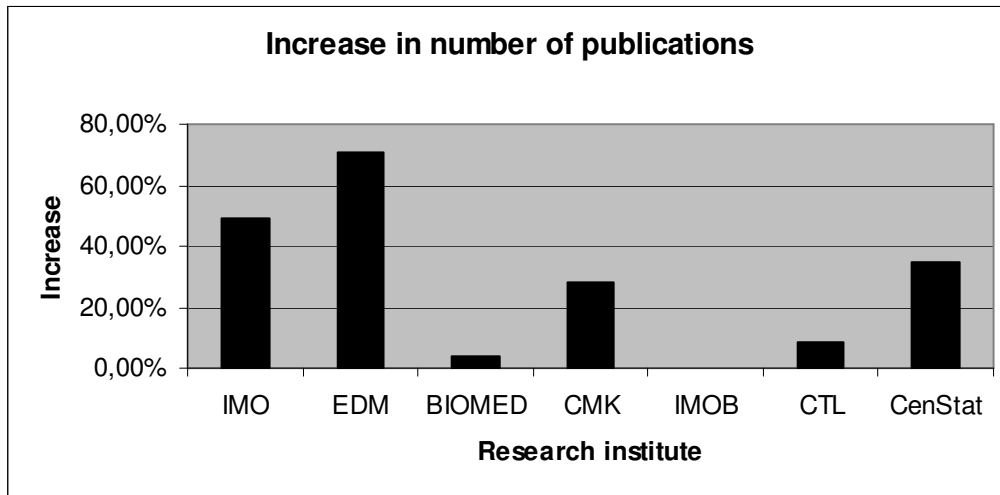
Figure 6: Scientific publications

Especially IMO, EDM, CMK and CenStat perform well on this factor. The number of scientific publications is a rather important measure since it provides a positive, scientific image of the research institute if pioneering research is performed.

4 Conclusions

Unfortunately, many respondents answered the questions about the performance of the research institute with the option 'no opinion', which prevented this research to conclude with concrete evidence of a relationship between trust, employee loyalty and performance.

To provide the reader with some conclusions, the averages were took for each variable (trust, employee loyalty and performance). Afterwards the figures were compared to find some relationships. It is thus not the intention to provide a solid statistically significant relationship for these variables. This would be an extension to this paper and would definitely be interesting, but by the lack of time is not further investigated.

The following table should be looked at as follows:

First of all, every group received a value (High = 3; Moderate = 2 and Low = 1), next the average on each factor was taken using the distribution in each cross tabulation. For instance the first variable for IMO had a distribution of 14,3% scored high (times 3) + 28,6% scored moderat (times 2) + 57,1% scored low (times 1) = 1,572 (Supplement 7). The averages for each indicator are given in supplement 7.

Table 32: Averages on the different factors

	IMO	BIOMED	IMOB	CenStat	CTL	EDM	CMK
Average Trust	1,933	2,027	1,915	2,073	2,050	1,875	1,905
Average Loyalty	2,100	2,004	1,880	2,128	1,924	1,916	2,000
Average Performance	2,029	1,692	2,083	1,931	2,236	1,722	1,939
Revenues	+14.95%	+4.18%	+69.55%	-8.83%	?	+13.43%	-8.19%
Number of employees	+19.84%	+28.53%	+21.90%	+22.09%	?	+32.39%	+42.26%
Scientific articles	+49.35%	+3.85%	?	+34.72%	+8.70%	+70.97%	+28.05%

As can be seen in the above table, almost every average of the outcomes from the questionnaire were around 2, indicating a moderate level. This could be explained by the design of the questionnaire. When a respondent didn't knew much about the topic they often answer with 'no opinion'. When they knew something about it they answer with 'agreed' or 'disagreed'. The fact just a few respondents answered questions with 'totally agreed' or 'totally disagreed' causes the averages to concentrate around a moderate level. This is an unfortunate consequence of the survey of which little could be done.

When trying to find some equal trends within table 33, the first thing that could be seen is that CenStat both has the highest average for trust and employee loyalty. Next BIOMED has the third highest average for both trust and employee loyalty. For the other results, comparable things could be said indicating that performance and trust could be interrelated. Remember that this was also showed in paragraph 3.5. So on the basis of these results we could state that there is likely a positive relationship between trust and employee loyalty.

The link between trust and performance is definitely not clear. CTL performed rather well on trust and had an average performance (results from the questionnaire), but didn't measured an high increase in the number of scientific publications. Also CenStat who performed very well on trust, did not perform so good on any of the performance measures. The opposite could be said from IMOB, whose average scores on trust weren't that high, but did have a higher score on average performance and on revenues. Finally CMK confirmed this by showing a lower average score on trust and having a increasingly important number of personnel. Apparently, there is no significant indication that trust has a positive or negative impact on the performance of the research institute. So the hypothesis that there is a positive correlation between the two could be rejected. Remember that there was only found a

significant relationship between trust and performance up to a significance level of 23,8%, which was too high. Notice that the outcome of this research is in line with Moeller (2006), who stipulated that the effect of trust on the performance of an organization is negligible.

The final hypothesis that remains unchecked is the one that stated that there is a positive relationship between employee loyalty and performance. In table 33, you can see that this could be true, when only looking at EDM and CMK. Both research institutes' averages are ranked sixth and fourth respectively. Unfortunately including the other research institutes rejected the hypotheses, just as what was done in paragraph 3.5.

To conclude the results of this paper we could say that there may be a significant relationship between trust and employee loyalty, but not between trust and performance nor between employee loyalty and performance.

5 Limitations of research

Just as most researches, there are limitations. The first one is of course the fact that the response was very low. This prevented me to draw solid statistical conclusions. A possible reason for the low response is the fact that the survey was distributed in Dutch. After distributing the questionnaire, I was informed that there are a significant number of foreign researchers at the different research institutes. Providing the questionnaire in English could have been answered by almost everybody, which was now not the case. Because of the low response, the results should of course be analyzed critically.

A second remark is that the principal component analysis is open for discussion, because a lot of the results depend on decisions made by the researcher. The reason why I used the methodology is that it is rater easy to use and appropriate for an exploratory factor analysis. Because the classification made in paragraph 3.3 was on the basis of my intuition, the principal component analysis provided a more founded way to classify the variables.

Thirdly, some of the methods used in my research are not that orthodox. This is because, I believe that it is impossible to get completely learn a statistical program such as SPSS in such a short period of time.

Finally, more performance measures could be used, but this is explained further in the following paragraph.

6 Suggestions for further research

The next thing that need to be done is to perform a regression model to find more solid statistical evidence of some relationships between trust, employee loyalty and performance.

A second suggestion would be to incorporate more performance measures, than the ones used in this paper. Extending these measures with variables such as participations in conferences, number of doctoral theses finished, etcetera would give a better understanding of the performance of the research institutes.

The research did not incorporates the number of academic staff per research institute, which I believe has an effect. The more co-workers you have, the less personal every contact will be. This makes it harder to gain trust and loyalty.

It could be very interesting to extend the research to other research institutes from other universities. Even institutes which aren't linked to one particular university or high school can be interesting. The extension could also be done towards other countries to investigate differences in levels of trust and employee loyalty. The investigation could of course also be performed for organizations.

As mentioned, trust and employee loyalty had no direct impact on the performance of research institute. What was not investigated, and is definitely worth researching is the fact that trust and employee loyalty might influence performance through intermediate variables such as effectiveness or structure.

Introducing other variables of intellectual capital could also be worth checking out. This research was limited to Trust and Employee loyalty, but for instance the effect of good relations to your customers or suppliers could also be investigated.

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Supplements

Supplement 1: Research institutes

1. **The institute for material research (IMO)**: this institution concentrates on activities such as wide band gap materials, synthesis, characterization and applications of organic semi-conductors, precursors for nanomaterials, electrical characterization and reliability, bioelectronics and physical and chemical characterization (Hasselt University, 2007).
Website: http://www.imo.uhasselt.be/

2. **The expertise centre for digital media (EDM)**: the research of EDM is concentrated in three domains. First of all Computer Graphics, which focuses on modeling, rendering, animation and virtual environments. Secondly, Human-Computer Interaction was built upon human-computer interaction research in 3D and virtual environments, context-sensitive interaction systems, interactive collaborative workspaces and user-centered design and usability. Finally Multimedia and Communication Technology, which concentrates on networked virtual environments and interactive multimedia systems (Hasselt University, 2007).
Website: http://www.edm.uhasselt.be/about/the_institute

3. **The biomedical research institute (BIOMED)**: BIOMED is an institute for fundamental and applied scientific research, scientific provision of services and education in the domain of molecular and cellular life sciences. It performs research on two main domains. The first domain focuses on neuro-inflammation and auto-immunity. This comprises the study processes of diseases in MS and rheumatoid arthritis and the development of new therapies and disease markers. A second domain focuses on the development of biosensors, which requires an intensive cooperation with IMO (Hasselt University, 2007).
Website: http://www.uhasselt.be/biomed/

4. **The centre for environmentology (CMK)**: this knowledge centre carries out research on biology, chemistry, economical law and cell physiology. It investigates the following themes (Hasselt University, 2007):
   a. Physiological, biochemical and molecular effects of stress factors with plants, funguses, animals and humans.
   b. Study of cellular mechanisms and identification of biomarkers for their effects and uses in (eco)toxic tests.
   c. Development of non-invasive technologies for pre-symptomatic detection of stress factors and their follow-up.

    d. Biodiversity and effects of stress factors on biodiversity.

    e. Durable governance and use of polluted soils and the development and study of fundamental mechanisms of new 'soft' chemical and biological techniques to remedy polluted soils and (ground)water.

    f. Valorization of waste products and statistical data processing of spectroscopic data.

    g. Risk evaluation of the transfer of soil contamination through the food chain.

    h. Study of industrial processes in function of their influence on the environment.

    i. Defilation of aquatic environment and the influence on organisms and the level of the ecosystem.

Website: http://alpha.uhasselt.be/~lucdk/CMK/

5. **The institute for mobility (IMOB)**: this institute bundles research groups from domains such as mobility and traffic science. They analyze the following themes (Hasselt University, 2007):

    a. Mobility data to forecast the transport behavior of people

    b. Traffic-safety data

    c. Economic and juridical research on traffic-safety and mobility

    d. The relation between mobility and spatial economy.

Website: http://www.imob.uhasselt.be/

6. **The centre for statistics (CenStat)**: performs research in the domain of theoretical and applied statistics. It focuses its research on mathematical statistics (smoothening, bootstrap method, survival analysis); Biostatistics (multivariate data, clustered data, risk determination) and Bioinformatics and statistical genetics (Hasselt University, 2007).
Website: http://www.censtat.uhasselt.be/

7. **The institute for behavioral sciences (SEIN)**: this institute carries out research on the four themes. The first theme comprises of equal chances and diversity, the second domain embraces the government and the society, the third domain is on development of human potential and finally the last theme covers well-being and health (Hasselt University, 2007).
Website: http://www.uhasselt.be/sein/

8. **The knowledge centre for entrepreneurship and innovation (KIZOK)**: KIZOK is active in policy-orientated research on entrepreneurship and innovation through the following themes: Corporate governance; Entrepreneurial finance; grow and innovation; and regional indicators (Hasselt University, 2007).
Website: http://www.kizok.uhasselt.be/

9. **The centre for applied linguistics (CTL)**: CTL is a collaboration between PHL (Provinciale Hogeschool Limburg), XIOS-college and the Hasselt University. It brings together Romanists, Germanics, marketers, linguists,… to investigate the economical approach of the learning process of foreign languages. They investigate the needs and problems associated with communication; the effectiveness and efficiency of language-education; and the influence of signs and culture on communication (Hasselt University, 2007).

   Website: http://www.uhasselt.be/ctl/

Supplement 2: Research groups per research institute

1. **Organization Theory and Fundamental Policy:** this research is situated within scientific disciplines such as economics, company policy and science of organisations. Therefore this group is allocated to KIZOK.

2. **Marketing:** this activity is also situated in the line of research of KIZOK, since 'marketing and innovation' is a part of 'entrepreneurship and innovation'.

3. **Strategy and Organization:** with participating researchers such as Wim Vanhaverbeke and Wilfred Schoenmakers, this research group is again most closely linked to KIZOK, since they perform research in the field of company policies, innovation and strategy.

4. **Data-analysis and modeling:** research of quantitative analytical methods such as data mining, multivariate statistics and econometrics. In my opinion this is in line with both CenStat and KIZOK. Therefore I will classify them as follows: 50% with CenStat and 50% with KIZOK. This is of course random and open for discussion, but for the meaning of this paper not that relevant.

5. **Finance, entrepreneurship and reporting:** with keywords of research like company performance, financial structure, growth, etcetera the domain of this research is in line with that of KIZOK.

6. **International economics:** within this research group the focus lies on macro economics and international trade. KIZOK performs more research on regional economics, so this category does not fit one research institute. I will therefore not include the research of this group in the results of my thesis.

7. **Policy management:** this research group focuses on economical and legal research of social problems. Also attention is given to the impact of government policies on the society and the business world. The focus of everything is on healthcare and environmental policies. I will therefore classify this group under the research institute CMK or Centre for Environmentoligy.

8. **Optimization of learning and problem solving abilities:** this research group investigates ways to develop and optimize learning and problem solving abilities in higher education. Topics like teaching approach, learning process and study time are frequently analyzed. The professor responsible for this group is professor Broeckmans, who is closely linked to SEIN, therefore I will assign this research group to SEIN.

9. **Text research and language didactics:** the focus of this group lies in the area of linguistics, didactics and literature. This is related to the centre for applied linguistics, so this group is assigned to CTL.

10. **SEIN:** as the name implies, this research group is assigned to the research institute SEIN

11. **The centre for applied linguistics:** just like the previous research group, the name of this group is the same as the research institute.

12. **Immunology – biochemistry; functional morphology; physiology:** these three research groups all perform research in the field of the human body. The research institute most comparable with these groups is BIOMED.

13. **Environmental biology:** the studies of the environment are a part of Centre for Environmentoligy.

14. **Biodiversity, phylogeny and population studies:** with topics like ecology, contamination and its effects this is most closely related to the centre for Environmentoligy.

15. The research groups **Laboratory of inorganic and physical chemistry**, **Theoretical chemistry** and **the Laboratory of organic and polymer chemistry** perform research on metal oxides, nanotechnology, polymers, etcetera. This is a part of the research done by the institute for material research (IMO).

16. **Laboratory of botany:** in this research group attention is given to the structure and the function of photosynthesis, bacterial infections in fruit trees and other environment related topics. Therefore CMK is the most appropriate research institute.

17. **Applied chemistry:** this group does scientific research, contract research and scientific service provision in collaboration with IMO and CMK. As a result I will assign performed research of this group equally to both research institutes.

18. **Expertise centre for Digital Media:** like the name suggests, this is the same as the research institute EDM.

19. **Materials Physics:** the focus of this group lies in the field of failure processes in electronic systems, the reliability of micro-electronic materials and coatings. This is one of the main research topics of IMO

20. **Centre for statistics:** like the name suggests, this is the same as the research institute CenStat.

21. **Institute for materials research in microelectronics:** this research group was integrated with the research institute for materials research IMO

Supplement 3: Survey

The importance of trust and loyalty on the performance of research institutes of the Hasselt University.

The last couple of years, many organizations perceive an increasing importance of intellectual capital. While in the past the most important means available to an enterprise were fysica lassets, nowadays more attention is given to intangible assets.

In the broader frame of the Bologna and Lisbon agenda, already pioneering research was conducted at Spanish universities by prof. Paloma Sánchez[4], where the importance of intellectual capital was emphasized. In research institutions, where the most important assets are of immaterial nature, the meaning of intellectual assets is worth researching. The objective of this questionnaire is to determine if there is a significant relationship between trust on the on hand and loyalty on the other hand on the performance of the research institutes of the Hasselt University

Your participation to this survey is completely free, but a higher response rate gives more accurate and reliable results. The answers given in the questionnaire are of course confidential and are only used for the purpose of this graduation paper.

Completion of the questionnaire will take about 15 minutes. The survey comprises a list of closed multiple choices with the alternative of no opinion. De choices are as follows:

1   Totally agree (TA)
2   Agree (A)
3   No opinion (NO)
4   Not agree (NA)
5   Totally disagree (TNA)

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[4] Sánchez, P., Castrillo, R., Elena, S., (2006), "Intellectual capital management and reporting in universities", [Electronic version], Paper presented at *the International Conference on Science Technology and Innovation Indicators. History and perspectives*, Lugano, 36p.

If you have any further questions, don't hesitate to contact me:

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- Personal data

Age   ……

Research institution:	O	IMO	O	EDM
	O	BIOMED	O	CMK
	O	IMOB	O	SEIN
	O	CenStat	O	KIZOK
	O	CTL	O	Other

How long have you been working for the university?   ……

How long have you been working for the research institute   ……

- Trust

		TA				TNA
V1	The degree of trust within the research institution is high	1	2	3	4	5
V2	The amount of communication is good	1	2	3	4	5
V3	I am followed through in everything I do	1	2	3	4	5
V4	The quality of communicated information is bad	1	2	3	4	5
V5	The degree of task interdependence is high	1	2	3	4	5
V6	I quickly have confidence in colleagues	1	2	3	4	5
V7	Within the research institution, we assume that colleagues are to be trusted	1	2	3	4	5

V8	In my opinion, there are little personal disadvantages of sharing information with colleagues	1	2	3	4	5
V9	I completely trust my colleagues	1	2	3	4	5
V10	The degree of formalization is high within the research institute	1	2	3	4	5
V11	I believe the things my colleagues tell me	1	2	3	4	5
V12	I don't think my colleagues are honest to me	1	2	3	4	5
V13	The quality of the information flows within the research institution is good	1	2	3	4	5
V14	Problems and conflicts are openly discussed	1	2	3	4	5
V15	The amount of communication transferred within the research institute could be improved	1	2	3	4	5
V16	Partners fulfil their duties, even if there is a lack of control	1	2	3	4	5
V17	The importance of trust in achieving results is high	1	2	3	4	5
V18	Without good confidential relationships, little good research could be done	1	2	3	4	5
V19	Sharing information could be misused	1	2	3	4	5
V20	Sometimes, there is a lack of trust within the research institute	1	2	3	4	5
V21	Trust has a positive impact on the performance of research institutions	1	2	3	4	5

V22	I am not fully appreciated for what I do	1	2	3	4	5
V23	There is no control so that colleagues correctly fulfill their duties	1	2	3	4	5
V24	Honesty is very important within the research institution	1	2	3	4	5
V25	Trust within the research institution is a good motivation to achieve good results	1	2	3	4	5
V26	The credibility of my colleagues is high	1	2	3	4	5
V27	The appreciation of my work is 'fair'	1	2	3	4	5

- <u>Employee loyalty</u>

L1	The loyalty of my colleagues has a positive effect on the performance of the research institute	1	2	3	4	5
L2	I am satisfied of the work I do	1	2	3	4	5
L3	I am satisfied of my colleagues	1	2	3	4	5
L4	I am satisfied of my supervisors	1	2	3	4	5
L5	The loyalty towards my colleagues is high	1	2	3	4	5
L6	The research institution deserves my loyalty	1	2	3	4	5
L7	I feel myself connected to the research institution	1	2	3	4	5
L8	I hope I can work for this research institution for a significant time	1	2	3	4	5

L9	I often bother on the moral values of my colleagues	1	2	3	4	5
L10	Even if some advantages were offered, I would still keep working for this institute	1	2	3	4	5
L11	I feel a moral pressure to do my very best for the research institute	1	2	3	4	5
L12	I am not inclined to leave the research institution because I have the feeling that I have difficult obligations towards my colleagues	1	2	3	4	5
L13	I am satisfied of the research institution in general	1	2	3	4	5
L14	My behavior within the research institution reflects the moral principles supported by my colleagues	1	2	3	4	5
L15	My moral values and those of my colleagues match	1	2	3	4	5
L16	When making decisions regarding work, I will always examine the effect on my colleagues	1	2	3	4	5
L17	The loyalty-consciousness towards my colleagues is small	1	2	3	4	5
L18	My satisfaction of the research institute can be improved	1	2	3	4	5
L19	The satisfaction of my supervisors can be improved	1	2	3	4	5
L20	I am not that attached to the research institute	1	2	3	4	5
L21	I can be easily convinced to choose for another research institute	1	2	3	4	5
L22	The research institute rarely deserves my loyalty	1	2	3	4	5

L23	I am looking for challenges outside this research institute	1	2	3	4	5
L24	I feel myself obliged to keep on working for this research institute	1	2	3	4	5
L25	The impact of my decisions on my colleagues is rarely taken into account	1	2	3	4	5
L26	I will easily be loyal towards the research institute	1	2	3	4	5

- Performance

P1	The degree in which the research institute reaches its objectives regarding the value creation is high	1	2	3	4	5
P2	The degree in which the research institute reaches its objectives regarding scientific output is high	1	2	3	4	5
P3	The research institute often has a shortage of financial means	1	2	3	4	5
P4	Budgets are sometimes misallocated	1	2	3	4	5
P5	The objectives regarding growth of the number of students can often be reached	1	2	3	4	5
P6	Improvements in research are often a consequence of cooperating well	1	2	3	4	5
P7	Increase/decrease in the number of students is a consequence of the loyalty of employees	1	2	3	4	5
P8	The financial position of the research institute is good	1	2	3	4	5

P9	The structure of the research institute could be improved	1	2	3	4	5
P10	By doing research, a lot of time is lost on paperwork	1	2	3	4	5
P11	Most of the time research is done on time	1	2	3	4	5
P12	The ease with which students can contact the department	1	2	3	4	5
P13	The importance of the knowledge economy increases, in our research institute a lot of attention is spend on this matter	1	2	3	4	5

Thank you for your cooperation!

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Supplement 4: Selected cases

CASE	Respondent in SPSS	Remarks	CASE	Respondent in SPSS	Remarks
1	1		**41**	35	
2			**42**	36	
3	2		**43**	37	
4		RI = Others	**44**	38	
5	3		**45**		RI = Others
6	4		**46**	39	
7	5		**47**		<1 year of service at RI
8	6		**49**	40	
9	7		**50**	41	
10	8				
11		<1 year of service at RI			
12	9				
13	10				
14		<1 year of service at RI			
15	11				
16	12				
17		no age, no RI			
18	13				
19	14				
20	15				
21	16				
22	17				
23	18				
24	19				
25	20				
26	21				
27		RI = Others			
28	22				
29	23				
30	24				
31	25				
32	26				
33	27				
34	28				
35	29				
36	30				
37	31				
38	32				
39	33				
40	34				

Supplement 5: SPSS Output

Supplement 5.1: Frequencies of total

1: Total of trust

Total score on Trust

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	51	1	2,4	2,4	2,4
	53	1	2,4	2,4	4,9
	59	3	7,3	7,3	12,2
	60	1	2,4	2,4	14,6
	61	3	7,3	7,3	22,0
	63	3	7,3	7,3	29,3
	64	1	2,4	2,4	31,7
	65	2	4,9	4,9	36,6
	68	1	2,4	2,4	39,0
	69	2	4,9	4,9	43,9
	70	2	4,9	4,9	48,8
	71	1	2,4	2,4	51,2
	72	2	4,9	4,9	56,1
	73	2	4,9	4,9	61,0
	75	1	2,4	2,4	63,4
	76	1	2,4	2,4	65,9
	77	1	2,4	2,4	68,3
	79	1	2,4	2,4	70,7
	80	3	7,3	7,3	78,0
	81	2	4,9	4,9	82,9
	83	1	2,4	2,4	85,4
	85	1	2,4	2,4	87,8
	86	1	2,4	2,4	90,2
	88	1	2,4	2,4	92,7
	89	1	2,4	2,4	95,1
	101	1	2,4	2,4	97,6
	113	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

2: Total of Employee loyalty

Total score on Loyalty

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	50	1	2,4	2,4	2,4
	53	1	2,4	2,4	4,9
	55	1	2,4	2,4	7,3
	60	2	4,9	4,9	12,2
	61	3	7,3	7,3	19,5
	62	1	2,4	2,4	22,0
	63	3	7,3	7,3	29,3
	64	2	4,9	4,9	34,1
	65	3	7,3	7,3	41,5
	66	3	7,3	7,3	48,8
	67	3	7,3	7,3	56,1
	68	1	2,4	2,4	58,5
	69	1	2,4	2,4	61,0
	70	5	12,2	12,2	73,2
	71	1	2,4	2,4	75,6
	72	1	2,4	2,4	78,0
	73	1	2,4	2,4	80,5
	75	2	4,9	4,9	85,4
	76	2	4,9	4,9	90,2
	77	1	2,4	2,4	92,7
	79	1	2,4	2,4	95,1
	86	1	2,4	2,4	97,6
	87	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

3: Total of Performance

Total score on Performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	26,00	1	2,4	2,5	2,5
	27,00	1	2,4	2,5	5,0
	30,00	1	2,4	2,5	7,5
	31,00	1	2,4	2,5	10,0
	32,00	2	4,9	5,0	15,0
	33,00	4	9,8	10,0	25,0
	34,00	1	2,4	2,5	27,5
	35,00	3	7,3	7,5	35,0
	36,00	5	12,2	12,5	47,5
	37,00	2	4,9	5,0	52,5
	38,00	5	12,2	12,5	65,0
	39,00	2	4,9	5,0	70,0
	40,00	5	12,2	12,5	82,5
	41,00	1	2,4	2,5	85,0
	42,00	1	2,4	2,5	87,5
	43,00	2	4,9	5,0	92,5
	47,00	1	2,4	2,5	95,0
	49,00	1	2,4	2,5	97,5
	50,00	1	2,4	2,5	100,0
	Total	40	97,6	100,0	
Missing	System	1	2,4		
Total		41	100,0		

Supplement 5.2: Principal Component analysis Trust

1: Communalities

Communalities

	Initial	Extraction
appreciation of work 1	1,000	,828
appreciation of work 2	1,000	,856
degree of taskinterdependence and control 1	1,000	,687
degree of taskinterdependence and control 2	1,000	,818
degree of taskinterdependence and control 3	1,000	,798
degree of taskinterdependence and control 4	1,000	,739
degree of taskinterdependence and control 5	1,000	,688
openness, honesty and credibility 1	1,000	,731
openness, honesty and credibility 2	1,000	,685
openness, honesty and credibility 3	1,000	,760
openness, honesty and credibility 4	1,000	,746
openness, honesty and credibility 5	1,000	,827
perceived importance of trust 1	1,000	,816
perceived importance of trust 2	1,000	,629
perceived importance of trust 3	1,000	,781
perceived importance of trust 4	1,000	,832
perception of trust 1	1,000	,839
perception of trust 2	1,000	,780
perception of trust 3	1,000	,811
perception of trust 4	1,000	,681
perception of trust 5	1,000	,838
quality of information 1	1,000	,787
quality of information 2	1,000	,767
quality of information 3	1,000	,772
sharing information 1	1,000	,693
sharing information 2	1,000	,703
sharing information 3	1,000	,718

Extraction Method: Principal Component Analysis.

2: Total variance explained

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9,138	33,846	33,846	9,138	33,846	33,846	5,221	19,335	19,335
2	2,468	9,142	42,987	2,468	9,142	42,987	3,114	11,532	30,867
3	2,261	8,374	51,361	2,261	8,374	51,361	2,710	10,039	40,906
4	1,640	6,075	57,437	1,640	6,075	57,437	2,244	8,309	49,215
5	1,476	5,468	62,904	1,476	5,468	62,904	2,163	8,012	57,228
6	1,310	4,852	67,757	1,310	4,852	67,757	1,879	6,957	64,185
7	1,250	4,630	72,387	1,250	4,630	72,387	1,787	6,617	70,802
8	1,065	3,943	76,330	1,065	3,943	76,330	1,493	5,528	76,330
9	,997	3,692	80,022						
10	,809	2,997	83,020						
11	,710	2,630	85,650						
12	,624	2,312	87,962						
13	,562	2,081	90,042						
14	,464	1,718	91,760						
15	,433	1,604	93,364						
16	,405	1,501	94,866						
17	,314	1,164	96,029						
18	,237	,879	96,908						
19	,208	,772	97,680						
20	,165	,610	98,290						
21	,124	,460	98,751						
22	,105	,389	99,140						
23	,078	,290	99,430						
24	,062	,230	99,660						
25	,036	,133	99,793						
26	,030	,110	99,903						
27	,026	,097	100,000						

Extraction Method: Principal Component Analysis.

3: Rotated Component Matrix

Rotated Component Matrix[a]

	Component							
	1	2	3	4	5	6	7	8
appreciation of work 2	,853	,314						
appreciation of work 1	-,820	-,296						,240
perception of trust 2	,694	-,304			,351			
perception of trust 4	,693		,278	,205		,256		
openness, honesty and credibility 1	,691		,433					
perception of trust 3	,616		,581					,218
openness, honesty and credibility 5	,560	,248	,329	,543				
openness, honesty and credibility 4	,527		,514	,283		,254		
sharing information 1	,481	,267		,354		,436		
quality of information 2		,867						
quality of information 3	,410	,693						,239
quality of information 1	,345	,663	,280	,260				
openness, honesty and credibility 3	,245	,582	,308	,287		,256		-,285
sharing information 2	,236	,540	,297			,365		,352
perception of trust 5			,841					-,215
perception of trust 1	,328	,270	,726			,252		
degree of taskinterdependence and control 5				,759				
degree of taskinterdependence and control 4		,282		,756				
perceived importance of trust 4					,868			
perceived importance of trust 1					,856			-,229
perceived importance of trust 2				,267	,514		,410	
sharing information 3				,328		,690	,200	
openness, honesty and credibility 2	,484	,253				,596		
degree of taskinterdependence and control 1	,487		,203			,547	-,258	
degree of taskinterdependence and control 2							,846	
perceived importance of trust 3					,308		,776	
degree of taskinterdependence and control 3								,867

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 9 iterations.

Supplement 5.3: Frequencies of trust factors

Statistics

		REGR factor score 1 for analysis 1	REGR factor score 2 for analysis 1	REGR factor score 3 for analysis 1	REGR factor score 4 for analysis 1	REGR factor score 5 for analysis 1	REGR factor score 6 for analysis 1	REGR factor score 7 for analysis 1	REGR factor score 8 for analysis 1
N	Valid	41	41	41	41	41	41	41	41
	Missing	0	0	0	0	0	0	0	0
Mean		,0000000	,0000000	,0000000	,0000000	,0000000	,0000000	,0000000	,0000000
Std. Deviation		1,00000000	1,00000000	1,00000000	1,00000000	1,00000000	1,00000000	1,00000000	1,00000000
Variance		1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Range		4,51881	3,41856	4,85235	4,36099	4,91354	4,41201	3,96667	3,93631
Percentiles	33,33333333	-,5346439	-,6333724	-,4613665	-,4702861	-,1275664	-,3181595	-,4559205	-,4158453
	66,66666667	,2600012	,6231020	,2849111	,3182524	,4080930	,5234814	,3195444	,4457145

1: Factor 1

REGR factor score   1 for analysis 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1,66400	1	2,4	2,4	2,4
	-1,45227	1	2,4	2,4	4,9
	-1,37694	1	2,4	2,4	7,3
	-1,24761	1	2,4	2,4	9,8
	-1,20192	1	2,4	2,4	12,2
	-1,15691	1	2,4	2,4	14,6
	-,89838	1	2,4	2,4	17,1
	-,69399	1	2,4	2,4	19,5
	-,68512	1	2,4	2,4	22,0
	-,61431	1	2,4	2,4	24,4
	-,60000	1	2,4	2,4	26,8
	-,58884	1	2,4	2,4	29,3
	-,53955	1	2,4	2,4	31,7
	-,53464	1	2,4	2,4	34,1
	-,49843	1	2,4	2,4	36,6
	-,48305	1	2,4	2,4	39,0
	-,44666	1	2,4	2,4	41,5
	-,38846	1	2,4	2,4	43,9
	-,35404	1	2,4	2,4	46,3
	-,24263	1	2,4	2,4	48,8
	-,20161	1	2,4	2,4	51,2
	-,19373	1	2,4	2,4	53,7
	-,08426	1	2,4	2,4	56,1
	,00353	1	2,4	2,4	58,5
	,08124	1	2,4	2,4	61,0
	,17375	1	2,4	2,4	63,4
	,24315	1	2,4	2,4	65,9

,26000	1	2,4	2,4	68,3
,39537	1	2,4	2,4	70,7
,44393	1	2,4	2,4	73,2
,58955	1	2,4	2,4	75,6
,79403	1	2,4	2,4	78,0
,90929	1	2,4	2,4	80,5
,91318	1	2,4	2,4	82,9
,91733	1	2,4	2,4	85,4
1,18508	1	2,4	2,4	87,8
1,26573	1	2,4	2,4	90,2
1,26674	1	2,4	2,4	92,7
1,61416	1	2,4	2,4	95,1
2,23649	1	2,4	2,4	97,6
2,85481	1	2,4	2,4	100,0
Total	41	100,0	100,0	

2: Factor 2

REGR factor score   2 for analysis 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1,57708	1	2,4	2,4	2,4
	-1,51142	1	2,4	2,4	4,9
	-1,39552	1	2,4	2,4	7,3
	-1,27143	1	2,4	2,4	9,8
	-1,26220	1	2,4	2,4	12,2
	-1,17995	1	2,4	2,4	14,6
	-1,10586	1	2,4	2,4	17,1
	-1,07434	1	2,4	2,4	19,5
	-1,06119	1	2,4	2,4	22,0
	-1,05493	1	2,4	2,4	24,4
	-1,00324	1	2,4	2,4	26,8
	-,83081	1	2,4	2,4	29,3
	-,64809	1	2,4	2,4	31,7
	-,63337	1	2,4	2,4	34,1
	-,50782	1	2,4	2,4	36,6
	-,47520	1	2,4	2,4	39,0
	-,40052	1	2,4	2,4	41,5
	-,32893	1	2,4	2,4	43,9
	-,30350	1	2,4	2,4	46,3
	-,00752	1	2,4	2,4	48,8
	,00634	1	2,4	2,4	51,2
	,08304	1	2,4	2,4	53,7
	,13743	1	2,4	2,4	56,1
	,23167	1	2,4	2,4	58,5
	,26232	1	2,4	2,4	61,0
	,29962	1	2,4	2,4	63,4
	,52203	1	2,4	2,4	65,9
	,62310	1	2,4	2,4	68,3
	,74195	1	2,4	2,4	70,7
	,74488	1	2,4	2,4	73,2
	,85428	1	2,4	2,4	75,6
	,92569	1	2,4	2,4	78,0
	1,08185	1	2,4	2,4	80,5
	1,13919	1	2,4	2,4	82,9
	1,18733	1	2,4	2,4	85,4
	1,22974	1	2,4	2,4	87,8
	1,24946	1	2,4	2,4	90,2
	1,26887	1	2,4	2,4	92,7
	1,48141	1	2,4	2,4	95,1
	1,72122	1	2,4	2,4	97,6
	1,84148	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

3: Factor 3

REGR factor score 3 for analysis 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-2,41623	1	2,4	2,4	2,4
	-1,81222	1	2,4	2,4	4,9
	-1,03988	1	2,4	2,4	7,3
	-,91216	1	2,4	2,4	9,8
	-,90112	1	2,4	2,4	12,2
	-,74033	1	2,4	2,4	14,6
	-,73311	1	2,4	2,4	17,1
	-,73061	1	2,4	2,4	19,5
	-,72430	1	2,4	2,4	22,0
	-,72093	1	2,4	2,4	24,4
	-,70533	1	2,4	2,4	26,8
	-,64018	1	2,4	2,4	29,3
	-,60236	1	2,4	2,4	31,7
	-,46137	1	2,4	2,4	34,1
	-,44006	1	2,4	2,4	36,6
	-,43858	1	2,4	2,4	39,0
	-,42604	1	2,4	2,4	41,5
	-,39456	1	2,4	2,4	43,9
	-,38160	1	2,4	2,4	46,3
	-,34412	1	2,4	2,4	48,8
	-,30278	1	2,4	2,4	51,2
	-,27486	1	2,4	2,4	53,7
	-,25663	1	2,4	2,4	56,1
	-,03141	1	2,4	2,4	58,5
	,18033	1	2,4	2,4	61,0
	,22910	1	2,4	2,4	63,4
	,24464	1	2,4	2,4	65,9
	,28491	1	2,4	2,4	68,3
	,30337	1	2,4	2,4	70,7
	,32761	1	2,4	2,4	73,2
	,58700	1	2,4	2,4	75,6
	,79202	1	2,4	2,4	78,0
	1,07523	1	2,4	2,4	80,5
	1,31061	1	2,4	2,4	82,9
	1,32264	1	2,4	2,4	85,4
	1,32366	1	2,4	2,4	87,8
	1,36326	1	2,4	2,4	90,2
	1,47964	1	2,4	2,4	92,7
	1,54805	1	2,4	2,4	95,1
	1,62260	1	2,4	2,4	97,6
	2,43612	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

4: Factor 4

REGR factor score   4 for analysis 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-2,12341	1	2,4	2,4	2,4
	-1,64685	1	2,4	2,4	4,9
	-1,53389	1	2,4	2,4	7,3
	-1,33492	1	2,4	2,4	9,8
	-1,26431	1	2,4	2,4	12,2
	-1,15692	1	2,4	2,4	14,6
	-,79814	1	2,4	2,4	17,1
	-,78945	1	2,4	2,4	19,5
	-,78653	1	2,4	2,4	22,0
	-,74720	1	2,4	2,4	24,4
	-,70842	1	2,4	2,4	26,8
	-,56397	1	2,4	2,4	29,3
	-,50683	1	2,4	2,4	31,7
	-,47029	1	2,4	2,4	34,1
	-,27391	1	2,4	2,4	36,6
	-,23280	1	2,4	2,4	39,0
	-,15615	1	2,4	2,4	41,5
	-,12337	1	2,4	2,4	43,9
	-,11007	1	2,4	2,4	46,3
	-,09850	1	2,4	2,4	48,8
	-,09241	1	2,4	2,4	51,2
	-,06439	1	2,4	2,4	53,7
	,04639	1	2,4	2,4	56,1
	,10252	1	2,4	2,4	58,5
	,25807	1	2,4	2,4	61,0
	,26332	1	2,4	2,4	63,4
	,27759	1	2,4	2,4	65,9
	,31825	1	2,4	2,4	68,3
	,34472	1	2,4	2,4	70,7
	,40335	1	2,4	2,4	73,2
	,41281	1	2,4	2,4	75,6
	,53435	1	2,4	2,4	78,0
	,64196	1	2,4	2,4	80,5
	,66683	1	2,4	2,4	82,9
	,88608	1	2,4	2,4	85,4
	1,00169	1	2,4	2,4	87,8
	1,49252	1	2,4	2,4	90,2
	1,83468	1	2,4	2,4	92,7
	1,86378	1	2,4	2,4	95,1
	1,99623	1	2,4	2,4	97,6
	2,23758	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

5: Factor 5

REGR factor score   5 for analysis 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1,85903	1	2,4	2,4	2,4
	-1,81305	1	2,4	2,4	4,9
	-1,72727	1	2,4	2,4	7,3
	-1,67952	1	2,4	2,4	9,8
	-1,48103	1	2,4	2,4	12,2
	-1,45929	1	2,4	2,4	14,6
	-1,43942	1	2,4	2,4	17,1
	-1,40051	1	2,4	2,4	19,5
	-,82550	1	2,4	2,4	22,0
	-,32606	1	2,4	2,4	24,4
	-,30854	1	2,4	2,4	26,8
	-,26845	1	2,4	2,4	29,3
	-,17209	1	2,4	2,4	31,7
	-,12757	1	2,4	2,4	34,1
	-,03708	1	2,4	2,4	36,6
	,10406	1	2,4	2,4	39,0
	,12764	1	2,4	2,4	41,5
	,14365	1	2,4	2,4	43,9
	,16923	1	2,4	2,4	46,3
	,21353	1	2,4	2,4	48,8
	,21913	1	2,4	2,4	51,2
	,27642	1	2,4	2,4	53,7
	,28913	1	2,4	2,4	56,1
	,29248	1	2,4	2,4	58,5
	,30940	1	2,4	2,4	61,0
	,31968	1	2,4	2,4	63,4
	,37373	1	2,4	2,4	65,9
	,40809	1	2,4	2,4	68,3
	,43685	1	2,4	2,4	70,7
	,43972	1	2,4	2,4	73,2
	,44424	1	2,4	2,4	75,6
	,47463	1	2,4	2,4	78,0
	,48587	1	2,4	2,4	80,5
	,49778	1	2,4	2,4	82,9
	,51488	1	2,4	2,4	85,4
	,60142	1	2,4	2,4	87,8
	,91944	1	2,4	2,4	90,2
	,94686	1	2,4	2,4	92,7
	1,21975	1	2,4	2,4	95,1
	1,64228	1	2,4	2,4	97,6
	3,05451	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

6: Factor 6

REGR factor score   6 for analysis 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-2,44618	1	2,4	2,4	2,4
	-2,02681	1	2,4	2,4	4,9
	-1,49662	1	2,4	2,4	7,3
	-1,44774	1	2,4	2,4	9,8
	-1,31321	1	2,4	2,4	12,2
	-1,13083	1	2,4	2,4	14,6
	-1,04977	1	2,4	2,4	17,1
	-,81493	1	2,4	2,4	19,5
	-,75407	1	2,4	2,4	22,0
	-,66892	1	2,4	2,4	24,4
	-,52148	1	2,4	2,4	26,8
	-,46756	1	2,4	2,4	29,3
	-,33988	1	2,4	2,4	31,7
	-,31816	1	2,4	2,4	34,1
	-,30600	1	2,4	2,4	36,6
	-,30585	1	2,4	2,4	39,0
	-,30396	1	2,4	2,4	41,5
	-,29039	1	2,4	2,4	43,9
	-,24919	1	2,4	2,4	46,3
	-,23715	1	2,4	2,4	48,8
	-,09134	1	2,4	2,4	51,2
	,28324	1	2,4	2,4	53,7
	,28898	1	2,4	2,4	56,1
	,35206	1	2,4	2,4	58,5
	,39282	1	2,4	2,4	61,0
	,45101	1	2,4	2,4	63,4
	,48568	1	2,4	2,4	65,9
	,52348	1	2,4	2,4	68,3
	,58921	1	2,4	2,4	70,7
	,62048	1	2,4	2,4	73,2
	,68290	1	2,4	2,4	75,6
	,69151	1	2,4	2,4	78,0
	,73931	1	2,4	2,4	80,5
	,80285	1	2,4	2,4	82,9
	,88526	1	2,4	2,4	85,4
	,94300	1	2,4	2,4	87,8
	1,13699	1	2,4	2,4	90,2
	1,21720	1	2,4	2,4	92,7
	1,64184	1	2,4	2,4	95,1
	1,88639	1	2,4	2,4	97,6
	1,96583	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

7: Factor 7

REGR factor score   7 for analysis 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1,68578	1	2,4	2,4	2,4
	-1,51772	1	2,4	2,4	4,9
	-1,46145	1	2,4	2,4	7,3
	-1,32349	1	2,4	2,4	9,8
	-1,29569	1	2,4	2,4	12,2
	-1,25006	1	2,4	2,4	14,6
	-1,14990	1	2,4	2,4	17,1
	-1,10680	1	2,4	2,4	19,5
	-,97695	1	2,4	2,4	22,0
	-,83618	1	2,4	2,4	24,4
	-,78785	1	2,4	2,4	26,8
	-,70846	1	2,4	2,4	29,3
	-,54631	1	2,4	2,4	31,7
	-,45592	1	2,4	2,4	34,1
	-,40547	1	2,4	2,4	36,6
	-,38273	1	2,4	2,4	39,0
	-,30597	1	2,4	2,4	41,5
	-,27827	1	2,4	2,4	43,9
	-,19695	1	2,4	2,4	46,3
	,01150	1	2,4	2,4	48,8
	,09618	1	2,4	2,4	51,2
	,11372	1	2,4	2,4	53,7
	,12427	1	2,4	2,4	56,1
	,14744	1	2,4	2,4	58,5
	,17368	1	2,4	2,4	61,0
	,21185	1	2,4	2,4	63,4
	,29893	1	2,4	2,4	65,9
	,31954	1	2,4	2,4	68,3
	,35577	1	2,4	2,4	70,7
	,56824	1	2,4	2,4	73,2
	,72541	1	2,4	2,4	75,6
	,82698	1	2,4	2,4	78,0
	,89232	1	2,4	2,4	80,5
	,93499	1	2,4	2,4	82,9
	1,06801	1	2,4	2,4	85,4
	1,37633	1	2,4	2,4	87,8
	1,44487	1	2,4	2,4	90,2
	1,48145	1	2,4	2,4	92,7
	1,51856	1	2,4	2,4	95,1
	1,70099	1	2,4	2,4	97,6
	2,28090	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

8: Factor 8

REGR factor score   8 for analysis 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1,88519	1	2,4	2,4	2,4
	-1,84005	1	2,4	2,4	4,9
	-1,31571	1	2,4	2,4	7,3
	-1,19458	1	2,4	2,4	9,8
	-1,19262	1	2,4	2,4	12,2
	-1,12994	1	2,4	2,4	14,6
	-1,05384	1	2,4	2,4	17,1
	-,93635	1	2,4	2,4	19,5
	-,89056	1	2,4	2,4	22,0
	-,78684	1	2,4	2,4	24,4
	-,77838	1	2,4	2,4	26,8
	-,72106	1	2,4	2,4	29,3
	-,48290	1	2,4	2,4	31,7
	-,41585	1	2,4	2,4	34,1
	-,39648	1	2,4	2,4	36,6
	-,38030	1	2,4	2,4	39,0
	-,33674	1	2,4	2,4	41,5
	-,24670	1	2,4	2,4	43,9
	-,24399	1	2,4	2,4	46,3
	-,24319	1	2,4	2,4	48,8
	-,12812	1	2,4	2,4	51,2
	-,06233	1	2,4	2,4	53,7
	-,03420	1	2,4	2,4	56,1
	-,00404	1	2,4	2,4	58,5
	,10636	1	2,4	2,4	61,0
	,19484	1	2,4	2,4	63,4
	,33011	1	2,4	2,4	65,9
	,44571	1	2,4	2,4	68,3
	,65800	1	2,4	2,4	70,7
	,68373	1	2,4	2,4	73,2
	,71289	1	2,4	2,4	75,6
	,80187	1	2,4	2,4	78,0
	1,00508	1	2,4	2,4	80,5
	1,02518	1	2,4	2,4	82,9
	1,19767	1	2,4	2,4	85,4
	1,20094	1	2,4	2,4	87,8
	1,25495	1	2,4	2,4	90,2
	1,46484	1	2,4	2,4	92,7
	1,68179	1	2,4	2,4	95,1
	1,88487	1	2,4	2,4	97,6
	2,05112	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

Supplement 5.4: Principal Component Analysis Employee loyalty

1: Communalities

Communalities

	Initial	Extraction
colleagues 1	1,000	,649
colleagues 2	1,000	,721
loyalty consciousness 1	1,000	,758
loyalty consciousness 2	1,000	,708
loyalty consciousness 3	1,000	,507
moral values 1	1,000	,726
moral values 2	1,000	,669
moral values 3	1,000	,840
perceived importance of loyalty 1	1,000	,693
perceived importance of loyalty 2	1,000	,844
perceived importance of loyalty 3	1,000	,791
satisfaction 1	1,000	,825
satisfaction 2	1,000	,697
satisfaction 3	1,000	,733
satisfaction 4	1,000	,856
satisfaction 5	1,000	,745
satisfaction 6	1,000	,756
satisfaction 7	1,000	,697
satisfaction 8	1,000	,812
satisfaction 9	1,000	,797
sense of belonging 1	1,000	,870
sense of belonging 2	1,000	,847
sense of belonging 3	1,000	,751
sense of belonging 4	1,000	,867
sense of belonging 5	1,000	,771
sense of belonging 6	1,000	,792

Extraction Method: Principal Component Analysis.

2: Total variance explained

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8,376	32,214	32,214	8,376	32,214	32,214
2	2,596	9,985	42,199	2,596	9,985	42,199
3	2,309	8,879	51,077	2,309	8,879	51,077
4	2,015	7,749	58,826	2,015	7,749	58,826
5	1,798	6,916	65,743	1,798	6,916	65,743
6	1,344	5,171	70,913	1,344	5,171	70,913
7	1,289	4,957	75,870	1,289	4,957	75,870
8	,988	3,799	79,669			
9	,771	2,967	82,636			
10	,734	2,821	85,457			
11	,703	2,705	88,162			
12	,468	1,801	89,963			
13	,390	1,499	91,462			
14	,371	1,428	92,890			
15	,306	1,175	94,066			
16	,292	1,122	95,188			
17	,282	1,084	96,272			
18	,227	,873	97,145			
19	,179	,690	97,834			
20	,163	,627	98,461			
21	,140	,540	99,001			
22	,074	,283	99,284			
23	,070	,270	99,554			
24	,061	,233	99,787			
25	,032	,123	99,910			
26	,023	,090	100,000			

Extraction Method: Principal Component Analysis.

3: Rotated Component Matrix

Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
satisfaction 6	,785			,222	,241		
satisfaction 7	,769		-,223				
perceived importance of loyalty 3	,767		,316	,230			
satisfaction 2	,713				,323	-,259	
sense of belonging 1	,694	,317	,313			,265	,321
perceived importance of loyalty 2	,679		,484	,293			,206
moral values 3	,616	,309			-,254	,484	-,248
moral values 1	,579	,205		,301		,460	
satisfaction 4		,815					,248
satisfaction 9		,802	,265			-,222	
satisfaction 5		,785				-,296	
sense of belonging 4	,433	,784					
sense of belonging 5	,317	,705			,299	,220	
colleagues 1		,210	,763				
loyalty consciousness 3			,644				
moral values 2	,331	,353	,471	,245		,281	-,269
satisfaction 8		,251		,850			
satisfaction 3	,286		-,267	,735			
loyalty consciousness 2	,474		,444	,507			
loyalty consciousness 1	,336	-,213	,408	,488	,412		
satisfaction 1					,847		
perceived importance of loyalty 1		,204			,767		-,201
sense of belonging 6			,266			-,791	
sense of belonging 3	,387	,252	-,322			-,558	,291
sense of belonging 2							,893
colleagues 2			,283	,505	-,241		,521

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 33 iterations.

Supplement 5.5: Frequencies of Employee loyalty factors

Statistics

		REGR factor score 1 for analysis 2	REGR factor score 2 for analysis 2	REGR factor score 3 for analysis 2	REGR factor score 4 for analysis 2	REGR factor score 5 for analysis 2	REGR factor score 6 for analysis 2	REGR factor score 7 for analysis 2
N	Valid	41	41	41	41	41	41	41
	Missing	0	0	0	0	0	0	0
Mean		,0000000	,0000000	,0000000	,0000000	,0000000	,0000000	,0000000
Std. Deviation		1,00000000	1,00000000	1,00000000	1,00000000	1,00000000	1,00000000	1,00000000
Variance		1,000	1,000	1,000	1,000	1,000	1,000	1,000
Range		4,34424	4,39112	4,82980	4,02722	5,22826	3,96565	3,86991
Percentiles	33,33333333	-,4718775	-,4704302	-,5667758	-,5965596	-,4079073	-,3476652	-,6607842
	66,66666667	,4299684	,2987681	,3837327	,4236945	,5568865	,5586059	,2014338

1: Factor 1

REGR factor score   1 for analysis 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1,66056	1	2,4	2,4	2,4
	-1,59334	1	2,4	2,4	4,9
	-1,51816	1	2,4	2,4	7,3
	-1,28134	1	2,4	2,4	9,8
	-1,21565	1	2,4	2,4	12,2
	-,92907	1	2,4	2,4	14,6
	-,90580	1	2,4	2,4	17,1
	-,83942	1	2,4	2,4	19,5
	-,76978	1	2,4	2,4	22,0
	-,75495	1	2,4	2,4	24,4
	-,70022	1	2,4	2,4	26,8
	-,66784	1	2,4	2,4	29,3
	-,60458	1	2,4	2,4	31,7
	-,47188	1	2,4	2,4	34,1
	-,39482	1	2,4	2,4	36,6
	-,38573	1	2,4	2,4	39,0
	-,34488	1	2,4	2,4	41,5
	-,29883	1	2,4	2,4	43,9
	-,26471	1	2,4	2,4	46,3
	-,23999	1	2,4	2,4	48,8
	-,18918	1	2,4	2,4	51,2
	-,14784	1	2,4	2,4	53,7
	-,04755	1	2,4	2,4	56,1
	,00378	1	2,4	2,4	58,5
	,09933	1	2,4	2,4	61,0
	,25158	1	2,4	2,4	63,4
	,26628	1	2,4	2,4	65,9
	,42997	1	2,4	2,4	68,3
	,43593	1	2,4	2,4	70,7
	,54188	1	2,4	2,4	73,2
	,57702	1	2,4	2,4	75,6
	,75394	1	2,4	2,4	78,0
	,79585	1	2,4	2,4	80,5
	,79870	1	2,4	2,4	82,9
	,90450	1	2,4	2,4	85,4
	,92922	1	2,4	2,4	87,8
	1,44493	1	2,4	2,4	90,2
	1,45679	1	2,4	2,4	92,7
	1,88936	1	2,4	2,4	95,1
	1,96338	1	2,4	2,4	97,6
	2,68368	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

2: Factor 2

REGR factor score   2 for analysis 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1,59790	1	2,4	2,4	2,4
	-1,22286	1	2,4	2,4	4,9
	-1,22261	1	2,4	2,4	7,3
	-1,19390	1	2,4	2,4	9,8
	-,91419	1	2,4	2,4	12,2
	-,90741	1	2,4	2,4	14,6
	-,88671	1	2,4	2,4	17,1
	-,79271	1	2,4	2,4	19,5
	-,78538	1	2,4	2,4	22,0
	-,76409	1	2,4	2,4	24,4
	-,69054	1	2,4	2,4	26,8
	-,68677	1	2,4	2,4	29,3
	-,57865	1	2,4	2,4	31,7
	-,47043	1	2,4	2,4	34,1
	-,43790	1	2,4	2,4	36,6
	-,43687	1	2,4	2,4	39,0
	-,40816	1	2,4	2,4	41,5
	-,38719	1	2,4	2,4	43,9
	-,29190	1	2,4	2,4	46,3
	-,25056	1	2,4	2,4	48,8
	-,20256	1	2,4	2,4	51,2
	-,17627	1	2,4	2,4	53,7
	-,17411	1	2,4	2,4	56,1
	-,16485	1	2,4	2,4	58,5
	-,15086	1	2,4	2,4	61,0
	,02930	1	2,4	2,4	63,4
	,05896	1	2,4	2,4	65,9
	,29877	1	2,4	2,4	68,3
	,37379	1	2,4	2,4	70,7
	,45532	1	2,4	2,4	73,2
	,55072	1	2,4	2,4	75,6
	,57849	1	2,4	2,4	78,0
	,61505	1	2,4	2,4	80,5
	,66218	1	2,4	2,4	82,9
	,85198	1	2,4	2,4	85,4
	,86762	1	2,4	2,4	87,8
	1,50167	1	2,4	2,4	90,2
	1,72654	1	2,4	2,4	92,7
	2,11505	1	2,4	2,4	95,1
	2,31671	1	2,4	2,4	97,6
	2,79322	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

3: Factor 3

REGR factor score   3 for analysis 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-2,29069	1	2,4	2,4	2,4
	-1,92294	1	2,4	2,4	4,9
	-1,16891	1	2,4	2,4	7,3
	-1,03205	1	2,4	2,4	9,8
	-1,01483	1	2,4	2,4	12,2
	-,99820	1	2,4	2,4	14,6
	-,98915	1	2,4	2,4	17,1
	-,91254	1	2,4	2,4	19,5
	-,77962	1	2,4	2,4	22,0
	-,75212	1	2,4	2,4	24,4
	-,73477	1	2,4	2,4	26,8
	-,67106	1	2,4	2,4	29,3
	-,65966	1	2,4	2,4	31,7
	-,56678	1	2,4	2,4	34,1
	-,40506	1	2,4	2,4	36,6
	-,37072	1	2,4	2,4	39,0
	-,36664	1	2,4	2,4	41,5
	-,22781	1	2,4	2,4	43,9
	-,10024	1	2,4	2,4	46,3
	-,01813	1	2,4	2,4	48,8
	-,01586	1	2,4	2,4	51,2
	,12581	1	2,4	2,4	53,7
	,16784	1	2,4	2,4	56,1
	,16875	1	2,4	2,4	58,5
	,17911	1	2,4	2,4	61,0
	,23500	1	2,4	2,4	63,4
	,36141	1	2,4	2,4	65,9
	,38373	1	2,4	2,4	68,3
	,42720	1	2,4	2,4	70,7
	,52216	1	2,4	2,4	73,2
	,59869	1	2,4	2,4	75,6
	,75307	1	2,4	2,4	78,0
	,86107	1	2,4	2,4	80,5
	,87993	1	2,4	2,4	82,9
	,96783	1	2,4	2,4	85,4
	,98407	1	2,4	2,4	87,8
	1,04826	1	2,4	2,4	90,2
	1,17946	1	2,4	2,4	92,7
	1,23478	1	2,4	2,4	95,1
	2,38049	1	2,4	2,4	97,6
	2,53911	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

4: Factor 4

REGR factor score   4 for analysis 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1,85018	1	2,4	2,4	2,4
	-1,35077	1	2,4	2,4	4,9
	-1,31799	1	2,4	2,4	7,3
	-1,22454	1	2,4	2,4	9,8
	-1,21586	1	2,4	2,4	12,2
	-1,13447	1	2,4	2,4	14,6
	-1,08572	1	2,4	2,4	17,1
	-,91345	1	2,4	2,4	19,5
	-,82993	1	2,4	2,4	22,0
	-,76501	1	2,4	2,4	24,4
	-,75834	1	2,4	2,4	26,8
	-,73994	1	2,4	2,4	29,3
	-,65516	1	2,4	2,4	31,7
	-,59656	1	2,4	2,4	34,1
	-,47321	1	2,4	2,4	36,6
	-,46994	1	2,4	2,4	39,0
	-,36992	1	2,4	2,4	41,5
	-,31242	1	2,4	2,4	43,9
	-,30335	1	2,4	2,4	46,3
	-,20883	1	2,4	2,4	48,8
	-,16304	1	2,4	2,4	51,2
	-,12867	1	2,4	2,4	53,7
	-,10653	1	2,4	2,4	56,1
	,12454	1	2,4	2,4	58,5
	,20101	1	2,4	2,4	61,0
	,21194	1	2,4	2,4	63,4
	,31833	1	2,4	2,4	65,9
	,42369	1	2,4	2,4	68,3
	,52573	1	2,4	2,4	70,7
	,56168	1	2,4	2,4	73,2
	,57769	1	2,4	2,4	75,6
	,90363	1	2,4	2,4	78,0
	1,00819	1	2,4	2,4	80,5
	1,07447	1	2,4	2,4	82,9
	1,10369	1	2,4	2,4	85,4
	1,15087	1	2,4	2,4	87,8
	1,32764	1	2,4	2,4	90,2
	1,63771	1	2,4	2,4	92,7
	1,72821	1	2,4	2,4	95,1
	1,91775	1	2,4	2,4	97,6
	2,17704	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

5: Factor 5

REGR factor score   5 for analysis 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1,97773	1	2,4	2,4	2,4
	-1,90199	1	2,4	2,4	4,9
	-1,52152	1	2,4	2,4	7,3
	-1,43193	1	2,4	2,4	9,8
	-1,39651	1	2,4	2,4	12,2
	-1,09277	1	2,4	2,4	14,6
	-1,03906	1	2,4	2,4	17,1
	-,89200	1	2,4	2,4	19,5
	-,81530	1	2,4	2,4	22,0
	-,73346	1	2,4	2,4	24,4
	-,54522	1	2,4	2,4	26,8
	-,51444	1	2,4	2,4	29,3
	-,41277	1	2,4	2,4	31,7
	-,40791	1	2,4	2,4	34,1
	-,38188	1	2,4	2,4	36,6
	-,35037	1	2,4	2,4	39,0
	-,29255	1	2,4	2,4	41,5
	-,12199	1	2,4	2,4	43,9
	-,05174	1	2,4	2,4	46,3
	-,01966	1	2,4	2,4	48,8
	,10539	1	2,4	2,4	51,2
	,21698	1	2,4	2,4	53,7
	,24276	1	2,4	2,4	56,1
	,28170	1	2,4	2,4	58,5
	,34467	1	2,4	2,4	61,0
	,41932	1	2,4	2,4	63,4
	,44883	1	2,4	2,4	65,9
	,55689	1	2,4	2,4	68,3
	,56446	1	2,4	2,4	70,7
	,59488	1	2,4	2,4	73,2
	,65661	1	2,4	2,4	75,6
	,70090	1	2,4	2,4	78,0
	,79215	1	2,4	2,4	80,5
	,79401	1	2,4	2,4	82,9
	,80476	1	2,4	2,4	85,4
	,83220	1	2,4	2,4	87,8
	,84559	1	2,4	2,4	90,2
	,94270	1	2,4	2,4	92,7
	1,01984	1	2,4	2,4	95,1
	1,48559	1	2,4	2,4	97,6
	3,25053	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

6: Factor 6

REGR factor score 6 for analysis 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1,88708	1	2,4	2,4	2,4
	-1,75149	1	2,4	2,4	4,9
	-1,60729	1	2,4	2,4	7,3
	-1,51659	1	2,4	2,4	9,8
	-1,50254	1	2,4	2,4	12,2
	-1,28592	1	2,4	2,4	14,6
	-1,01537	1	2,4	2,4	17,1
	-,94482	1	2,4	2,4	19,5
	-,83615	1	2,4	2,4	22,0
	-,82359	1	2,4	2,4	24,4
	-,50655	1	2,4	2,4	26,8
	-,49958	1	2,4	2,4	29,3
	-,35631	1	2,4	2,4	31,7
	-,34767	1	2,4	2,4	34,1
	-,33952	1	2,4	2,4	36,6
	-,30256	1	2,4	2,4	39,0
	-,24475	1	2,4	2,4	41,5
	-,14619	1	2,4	2,4	43,9
	-,05917	1	2,4	2,4	46,3
	-,05324	1	2,4	2,4	48,8
	-,00517	1	2,4	2,4	51,2
	,03061	1	2,4	2,4	53,7
	,04662	1	2,4	2,4	56,1
	,08785	1	2,4	2,4	58,5
	,11663	1	2,4	2,4	61,0
	,22083	1	2,4	2,4	63,4
	,43617	1	2,4	2,4	65,9
	,55861	1	2,4	2,4	68,3
	,59762	1	2,4	2,4	70,7
	,60907	1	2,4	2,4	73,2
	,63063	1	2,4	2,4	75,6
	,63834	1	2,4	2,4	78,0
	,70271	1	2,4	2,4	80,5
	,78859	1	2,4	2,4	82,9
	1,03575	1	2,4	2,4	85,4
	1,04077	1	2,4	2,4	87,8
	1,33658	1	2,4	2,4	90,2
	1,38444	1	2,4	2,4	92,7
	1,77252	1	2,4	2,4	95,1
	1,91865	1	2,4	2,4	97,6
	2,07856	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

7: Factor 7

REGR factor score 7 for analysis 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1,69193	1	2,4	2,4	2,4
	-1,60561	1	2,4	2,4	4,9
	-1,38456	1	2,4	2,4	7,3
	-1,10788	1	2,4	2,4	9,8
	-1,09500	1	2,4	2,4	12,2
	-1,06888	1	2,4	2,4	14,6
	-1,05889	1	2,4	2,4	17,1
	-,80170	1	2,4	2,4	19,5
	-,77924	1	2,4	2,4	22,0
	-,73620	1	2,4	2,4	24,4
	-,72606	1	2,4	2,4	26,8
	-,72420	1	2,4	2,4	29,3
	-,67543	1	2,4	2,4	31,7
	-,66078	1	2,4	2,4	34,1
	-,39071	1	2,4	2,4	36,6
	-,37029	1	2,4	2,4	39,0
	-,36852	1	2,4	2,4	41,5
	-,31805	1	2,4	2,4	43,9
	-,29138	1	2,4	2,4	46,3
	-,14963	1	2,4	2,4	48,8
	-,12329	1	2,4	2,4	51,2
	-,09889	1	2,4	2,4	53,7
	-,05447	1	2,4	2,4	56,1
	-,04730	1	2,4	2,4	58,5
	-,02521	1	2,4	2,4	61,0
	,17334	1	2,4	2,4	63,4
	,19001	1	2,4	2,4	65,9
	,20143	1	2,4	2,4	68,3
	,40551	1	2,4	2,4	70,7
	,44040	1	2,4	2,4	73,2
	,65367	1	2,4	2,4	75,6
	,85570	1	2,4	2,4	78,0
	,88852	1	2,4	2,4	80,5
	1,01355	1	2,4	2,4	82,9
	1,13082	1	2,4	2,4	85,4
	1,24049	1	2,4	2,4	87,8
	1,27352	1	2,4	2,4	90,2
	1,70167	1	2,4	2,4	92,7
	1,98176	1	2,4	2,4	95,1
	2,02571	1	2,4	2,4	97,6
	2,17799	1	2,4	2,4	100,0
	Total	41	100,0	100,0	

Supplement 5.6: Principal Component Analysis Performance

1: Communalities

Communalities

	Initial	Extraction
collaboration, structure and bureaucracy 1	1,000	,742
collaboration, structure and bureaucracy 2	1,000	,681
collaboration, structure and bureaucracy 3	1,000	,793
collaboration, structure and bureaucracy 4	1,000	,785
financial means 1	1,000	,833
financial means 2	1,000	,882
financial means 3	1,000	,796
growth students 1	1,000	,623
growth students 2	1,000	,797
knowledge economy	1,000	,740
value creation 2	1,000	,797
value creation 3	1,000	,747
value creation 1	1,000	,822

Extraction Method: Principal Component Analysis.

2: Total variance explained

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,398	26,138	26,138	3,398	26,138	26,138	2,163	16,639	16,639
2	1,573	12,098	38,235	1,573	12,098	38,235	1,870	14,383	31,022
3	1,451	11,162	49,398	1,451	11,162	49,398	1,592	12,245	43,267
4	1,395	10,731	60,128	1,395	10,731	60,128	1,478	11,369	54,636
5	1,201	9,238	69,367	1,201	9,238	69,367	1,477	11,365	66,000
6	1,021	7,850	77,217	1,021	7,850	77,217	1,458	11,216	77,217
7	,737	5,668	82,885						
8	,666	5,125	88,010						
9	,581	4,471	92,481						
10	,364	2,803	95,284						
11	,271	2,082	97,367						
12	,202	1,554	98,921						
13	,140	1,079	100,000						

Extraction Method: Principal Component Analysis.

3: Rotated Component Matrix

Rotated Component Matrix^a

	Component					
	1	2	3	4	5	6
financial means 2	,791	,328	,266	,233		
value creation 3	,761				,341	
collaboration, structure and bureaucracy 2	,713		,342			
financial means 3		,824	,283			
growth students 1		-,768				
growth students 2			,816	,214	,242	
knowledge economy			,728			,364
collaboration, structure and bureaucracy 3				,871		
financial means 1	,339	,582		,606		
value creation 1			,203		,873	
value creation 2	,428	,312			,671	,232
collaboration, structure and bureaucracy 4				,326		,809
collaboration, structure and bureaucracy 1	,290			-,325		,717

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 8 iterations.

Supplement 5.7: Frequencies of Performance indicators

Statistics

		REGR factor score 1 for analysis 3	REGR factor score 2 for analysis 3	REGR factor score 3 for analysis 3	REGR factor score 4 for analysis 3	REGR factor score 5 for analysis 3	REGR factor score 6 for analysis 3
N	Valid	40	40	40	40	40	40
	Missing	1	1	1	1	1	1
Mean		,0000000	,0000000	,0000000	,0000000	,0000000	,0000000
Std. Deviation		1,00000000	1,00000000	1,00000000	1,00000000	1,00000000	1,00000000
Variance		1,000	1,000	1,000	1,000	1,000	1,000
Percentiles	33,33333333	-,5283924	-,4048246	-,4814822	-,3354813	-,4189016	-,2374231
	66,66666667	,4073245	,4037315	,4042253	,4605726	,5804580	,4797847

1: Factor 1

REGR factor score 1 for analysis 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-2,11320	1	2,4	2,5	2,5
	-1,96179	1	2,4	2,5	5,0
	-1,59092	1	2,4	2,5	7,5
	-1,08102	1	2,4	2,5	10,0
	-1,03991	1	2,4	2,5	12,5
	-1,01525	1	2,4	2,5	15,0
	-,99959	1	2,4	2,5	17,5
	-,99771	1	2,4	2,5	20,0
	-,98331	1	2,4	2,5	22,5
	-,88390	1	2,4	2,5	25,0
	-,85741	1	2,4	2,5	27,5
	-,76821	1	2,4	2,5	30,0
	-,64584	1	2,4	2,5	32,5
	-,46967	1	2,4	2,5	35,0
	-,37638	1	2,4	2,5	37,5
	-,33421	1	2,4	2,5	40,0
	-,08645	1	2,4	2,5	42,5
	,02077	1	2,4	2,5	45,0
	,09449	1	2,4	2,5	47,5
	,14117	1	2,4	2,5	50,0
	,14542	1	2,4	2,5	52,5
	,17109	1	2,4	2,5	55,0
	,18312	1	2,4	2,5	57,5
	,21977	1	2,4	2,5	60,0
	,35827	1	2,4	2,5	62,5
	,35989	1	2,4	2,5	65,0
	,39006	1	2,4	2,5	67,5
	,44185	1	2,4	2,5	70,0
	,54886	1	2,4	2,5	72,5
	,60868	1	2,4	2,5	75,0
	,63528	1	2,4	2,5	77,5
	,70122	1	2,4	2,5	80,0
	,83071	1	2,4	2,5	82,5
	1,14669	1	2,4	2,5	85,0
	1,17487	1	2,4	2,5	87,5
	1,24375	1	2,4	2,5	90,0
	1,50608	1	2,4	2,5	92,5
	1,61914	1	2,4	2,5	95,0
	1,68926	1	2,4	2,5	97,5
	1,97431	1	2,4	2,5	100,0
	Total	40	97,6	100,0	
Missing	System	1	2,4		
Total		41	100,0		

2: Factor 2

REGR factor score   2 for analysis 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-2,47419	1	2,4	2,5	2,5
	-1,86389	1	2,4	2,5	5,0
	-1,40160	1	2,4	2,5	7,5
	-1,17133	1	2,4	2,5	10,0
	-1,10969	1	2,4	2,5	12,5
	-1,00469	1	2,4	2,5	15,0
	-,82598	1	2,4	2,5	17,5
	-,77872	1	2,4	2,5	20,0
	-,75725	1	2,4	2,5	22,5
	-,69561	1	2,4	2,5	25,0
	-,54567	1	2,4	2,5	27,5
	-,53658	1	2,4	2,5	30,0
	-,40806	1	2,4	2,5	32,5
	-,40321	1	2,4	2,5	35,0
	-,40292	1	2,4	2,5	37,5
	-,38942	1	2,4	2,5	40,0
	-,37207	1	2,4	2,5	42,5
	-,33978	1	2,4	2,5	45,0
	-,27385	1	2,4	2,5	47,5
	-,23433	1	2,4	2,5	50,0
	-,09600	1	2,4	2,5	52,5
	,22100	1	2,4	2,5	55,0
	,31597	1	2,4	2,5	57,5
	,32920	1	2,4	2,5	60,0
	,34894	1	2,4	2,5	62,5
	,36688	1	2,4	2,5	65,0
	,38800	1	2,4	2,5	67,5
	,43519	1	2,4	2,5	70,0
	,53123	1	2,4	2,5	72,5
	,57220	1	2,4	2,5	75,0
	,64657	1	2,4	2,5	77,5
	,67446	1	2,4	2,5	80,0
	,82555	1	2,4	2,5	82,5
	,90532	1	2,4	2,5	85,0
	1,02890	1	2,4	2,5	87,5
	1,34412	1	2,4	2,5	90,0
	1,40770	1	2,4	2,5	92,5
	1,61231	1	2,4	2,5	95,0
	1,92066	1	2,4	2,5	97,5
	2,21061	1	2,4	2,5	100,0
	Total	40	97,6	100,0	
Missing	System	1	2,4		
Total		41	100,0		

3: Factor 3

REGR factor score   3 for analysis 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-2,21512	1	2,4	2,5	2,5
	-2,03463	1	2,4	2,5	5,0
	-1,41001	1	2,4	2,5	7,5
	-1,38247	1	2,4	2,5	10,0
	-1,09062	1	2,4	2,5	12,5
	-,93821	1	2,4	2,5	15,0
	-,90813	1	2,4	2,5	17,5
	-,78020	1	2,4	2,5	20,0
	-,75645	1	2,4	2,5	22,5
	-,74201	1	2,4	2,5	25,0
	-,72511	1	2,4	2,5	27,5
	-,56863	1	2,4	2,5	30,0
	-,49953	1	2,4	2,5	32,5
	-,47246	1	2,4	2,5	35,0
	-,39594	1	2,4	2,5	37,5
	-,23883	1	2,4	2,5	40,0
	-,20291	1	2,4	2,5	42,5
	-,18072	1	2,4	2,5	45,0
	-,17995	1	2,4	2,5	47,5
	-,15765	1	2,4	2,5	50,0
	-,07463	1	2,4	2,5	52,5
	,07195	1	2,4	2,5	55,0
	,14871	1	2,4	2,5	57,5
	,19349	1	2,4	2,5	60,0
	,30493	1	2,4	2,5	62,5
	,31297	1	2,4	2,5	65,0
	,38716	1	2,4	2,5	67,5
	,43835	1	2,4	2,5	70,0
	,50815	1	2,4	2,5	72,5
	,67161	1	2,4	2,5	75,0
	,81498	1	2,4	2,5	77,5
	,89072	1	2,4	2,5	80,0
	,94100	1	2,4	2,5	82,5
	1,02253	1	2,4	2,5	85,0
	1,12839	1	2,4	2,5	87,5
	1,17278	1	2,4	2,5	90,0
	1,38947	1	2,4	2,5	92,5
	1,58608	1	2,4	2,5	95,0
	1,78387	1	2,4	2,5	97,5
	2,18706	1	2,4	2,5	100,0
	Total	40	97,6	100,0	
Missing	System	1	2,4		
Total		41	100,0		

4: Factor 4

REGR factor score 4 for analysis 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-2,00567	1	2,4	2,5	2,5
	-1,63576	1	2,4	2,5	5,0
	-1,57011	1	2,4	2,5	7,5
	-1,53025	1	2,4	2,5	10,0
	-1,40611	1	2,4	2,5	12,5
	-1,25446	1	2,4	2,5	15,0
	-1,22707	1	2,4	2,5	17,5
	-1,16062	1	2,4	2,5	20,0
	-,72964	1	2,4	2,5	22,5
	-,67978	1	2,4	2,5	25,0
	-,66316	1	2,4	2,5	27,5
	-,65217	1	2,4	2,5	30,0
	-,40994	1	2,4	2,5	32,5
	-,29825	1	2,4	2,5	35,0
	-,22021	1	2,4	2,5	37,5
	-,18063	1	2,4	2,5	40,0
	-,14105	1	2,4	2,5	42,5
	-,11278	1	2,4	2,5	45,0
	-,04463	1	2,4	2,5	47,5
	-,03941	1	2,4	2,5	50,0
	,10079	1	2,4	2,5	52,5
	,20704	1	2,4	2,5	55,0
	,26018	1	2,4	2,5	57,5
	,37318	1	2,4	2,5	60,0
	,42755	1	2,4	2,5	62,5
	,43052	1	2,4	2,5	65,0
	,45987	1	2,4	2,5	67,5
	,46198	1	2,4	2,5	70,0
	,46599	1	2,4	2,5	72,5
	,49698	1	2,4	2,5	75,0
	,66844	1	2,4	2,5	77,5
	,69553	1	2,4	2,5	80,0
	,72612	1	2,4	2,5	82,5
	,87630	1	2,4	2,5	85,0
	1,10723	1	2,4	2,5	87,5
	1,33929	1	2,4	2,5	90,0
	1,45116	1	2,4	2,5	92,5
	1,52857	1	2,4	2,5	95,0
	1,71267	1	2,4	2,5	97,5
	2,17233	1	2,4	2,5	100,0
	Total	40	97,6	100,0	
Missing	System	1	2,4		
Total		41	100,0		

5: Factor 5

REGR factor score 5 for analysis 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-2,77964	1	2,4	2,5	2,5
	-1,56052	1	2,4	2,5	5,0
	-1,49111	1	2,4	2,5	7,5
	-1,48433	1	2,4	2,5	10,0
	-1,35337	1	2,4	2,5	12,5
	-1,23788	1	2,4	2,5	15,0
	-1,03650	1	2,4	2,5	17,5
	-,94799	1	2,4	2,5	20,0
	-,83262	1	2,4	2,5	22,5
	-,77260	1	2,4	2,5	25,0
	-,63029	1	2,4	2,5	27,5
	-,52263	1	2,4	2,5	30,0
	-,50901	1	2,4	2,5	32,5
	-,37385	1	2,4	2,5	35,0
	-,28141	1	2,4	2,5	37,5
	-,20991	1	2,4	2,5	40,0
	-,19036	1	2,4	2,5	42,5
	-,06224	1	2,4	2,5	45,0
	,02159	1	2,4	2,5	47,5
	,21049	1	2,4	2,5	50,0
	,26942	1	2,4	2,5	52,5
	,38699	1	2,4	2,5	55,0
	,39277	1	2,4	2,5	57,5
	,45250	1	2,4	2,5	60,0
	,46720	1	2,4	2,5	62,5
	,51908	1	2,4	2,5	65,0
	,57643	1	2,4	2,5	67,5
	,58852	1	2,4	2,5	70,0
	,70212	1	2,4	2,5	72,5
	,72711	1	2,4	2,5	75,0
	,73167	1	2,4	2,5	77,5
	,73926	1	2,4	2,5	80,0
	,75767	1	2,4	2,5	82,5
	,77687	1	2,4	2,5	85,0
	,82907	1	2,4	2,5	87,5
	,98169	1	2,4	2,5	90,0
	1,13127	1	2,4	2,5	92,5
	1,35165	1	2,4	2,5	95,0
	1,75331	1	2,4	2,5	97,5
	1,90957	1	2,4	2,5	100,0
	Total	40	97,6	100,0	
Missing	System	1	2,4		
Total		41	100,0		

6: Factor 6

REGR factor score   6 for analysis 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-2,08496	1	2,4	2,5	2,5
	-1,73431	1	2,4	2,5	5,0
	-1,66243	1	2,4	2,5	7,5
	-1,60971	1	2,4	2,5	10,0
	-1,51354	1	2,4	2,5	12,5
	-1,43211	1	2,4	2,5	15,0
	-1,40489	1	2,4	2,5	17,5
	-1,09685	1	2,4	2,5	20,0
	-,91321	1	2,4	2,5	22,5
	-,76729	1	2,4	2,5	25,0
	-,57859	1	2,4	2,5	27,5
	-,35545	1	2,4	2,5	30,0
	-,27906	1	2,4	2,5	32,5
	-,21661	1	2,4	2,5	35,0
	,04604	1	2,4	2,5	37,5
	,09553	1	2,4	2,5	40,0
	,09647	1	2,4	2,5	42,5
	,11357	1	2,4	2,5	45,0
	,13584	1	2,4	2,5	47,5
	,27363	1	2,4	2,5	50,0
	,28237	1	2,4	2,5	52,5
	,36772	1	2,4	2,5	55,0
	,38700	1	2,4	2,5	57,5
	,39027	1	2,4	2,5	60,0
	,45078	1	2,4	2,5	62,5
	,45485	1	2,4	2,5	65,0
	,46474	1	2,4	2,5	67,5
	,50987	1	2,4	2,5	70,0
	,51428	1	2,4	2,5	72,5
	,51587	1	2,4	2,5	75,0
	,53773	1	2,4	2,5	77,5
	,61286	1	2,4	2,5	80,0
	,66529	1	2,4	2,5	82,5
	,74194	1	2,4	2,5	85,0
	,86836	1	2,4	2,5	87,5
	,91836	1	2,4	2,5	90,0
	1,12302	1	2,4	2,5	92,5
	1,15748	1	2,4	2,5	95,0
	1,20659	1	2,4	2,5	97,5
	2,71857	1	2,4	2,5	100,0
	Total	40	97,6	100,0	
Missing	System	1	2,4		
Total		41	100,0		

Supplement 6: Performance measures

Revenues

	2003	2004	2005	2006	Average % increase
IMO	3.557.512	5.349.385	5.909.636	4.963.913	14,95%
EDM	2.553.029	2.537.617	3.256.194	3.666.062	13,43%
BIOMED	1.532.824	1.612.802	1.960.765	1.681.395	4,18%
CMK	1.008.037	952.735	1.072.053	733.250	-8,19%
IMOB	369.119	977.605	929.627	1.382.558	69,55%
CenStat	1.334.210	859.883	1.140.741	871.483	-8,83%

Full Time Equivalents

	2003	2004	2005	2006	average % increase
IMO	66	100	100	108	19,84%
EDM	37	60	60	81	32,39%
BIOMED	40	65	65	80	28,53%
CMK	22	45	45	55	42,26%
IMOB	25	35	35	44	21,90%
CenStat	29	45	45	50	22,09%

Costs

	2003	2004	2005	2006	% increase
IMO	3.664.055	4.550.326	5.225.183	4.664.671	27,31%
EDM	2.285.144	2.423.319	3.135.615	3.685.499	61,28%
BIOMED	1.753.932	1.737.527	1.857.318	1.724.177	-1,70%
CMK	924.053	818.912	1.091.957	836.177	-9,51%
IMOB	407.222	830.629	940.680	1.228.098	201,58%
CenStat	720.761	953.267	1.132.474	1.245.794	72,84%

(source: research report 2003)

Increase scientific output for the last 4 years

	2003	2004	2005	2006	% increase
IMO	81	77	?	115	49,35%
EDM	22	31	47	53	70,97%
BIOMED	56	52	?	54	3,85%
CMK	69	82	?	105	28,05%
IMOB	?	?	?	64	0,00%
CTL	87	23	?	25	8,70%
CenStat	79	72	?	97	34,72%

Supplement 7: Averages for each factor

1= Low performance

2=Moderate performance

3=High performance

	IMO	BIOMED	IMOB	CenStat	CTL	EDM	CMK
Trust Factor 1	1,572	2,428	1,75	2	2,2	2,667	2
Trust Factor 2	2,428	2,145	2,142	1,75	1,6	1,333	1,83
Trust Factor 3	2,288	2,321	1,875	2	1,6	1,665	1,25
Trust Factor 4	2,166	1,834	1,75	1,75	2,4	2	2
Trust Factor 5	1,286	1,716	2	2,33	2,2	1,333	2,167
Trust Factor 6	1,716	2,2	1,625	1,5	2,2	2,333	2,33
Trust Factor 7	1,716	1,859	1,75	3	2,4	2,333	1,833
Trust Factor 8	2,288	1,714	2,428	2,25	1,8	1,333	1,833
Loyalty Factor 1	1,833	2	1,875	2,334	2	2	2
Loyalty Factor 2	2,145	2,288	1,75	1,75	1,8	2,333	2
Loyalty Factor 3	2,145	1,286	1,875	2,334	3	1,666	2
Loyalty Factor 4	2,145	2,333	1,875	1,75	1,6	1,666	2
Loyalty Factor 5	1,857	1,667	1,875	2,5	1,667	1,75	2,666
Loyalty Factor 6	2,288	2,288	2,285	2,225	1,6	1	1,5
Loyalty Factor 7	2,288	2,166	1,625	2	1,8	3	1,833
Performance Factor 1	2,145	1,716	1,5	1,5	2,75	2,334	2,166
Performance Factor 2	2,167	1	2,25	1,75	2,334	3	2,002
Performance Factor 3	2,145	2,002	1,875	2,333	2	1,333	1,8
Performance Factor 4	1,572	1,716	2,5	2	2,334	1,333	1,833
Performance Factor 5	2,002	2,145	2,125	2	2	1	1,833
Performance Factor 6	2,145	1,572	2,25	2	2	1,333	2
Average Trust	1,933	2,027	1,915	2,073	2,050	1,875	1,905
Average Loyalty	2,100	2,004	1,880	2,128	1,924	1,916	2,000
Average Performance	2,029	1,692	2,083	1,931	2,236	1,722	1,939
Revenues	+14.95%	+4.18%	+69.55%	-8.83%	?	+13.43%	-8.19%
Number of employees	+19.84%	+28.53%	+21.90%	+22.09%	?	+32.39%	+42.26%
Scientific articles	+49.35%	+3.85%	?	+34.72%	+8.70%	+70.97%	+28.05%