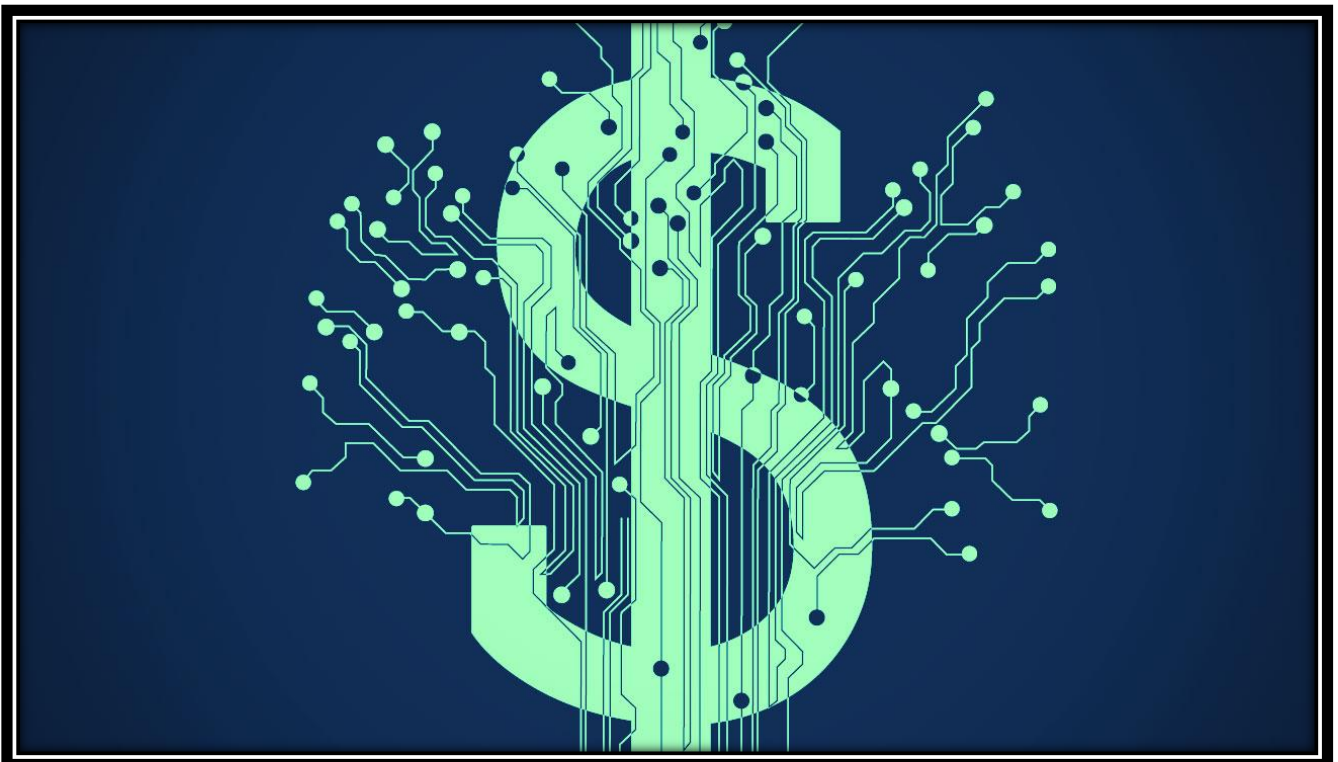


The influence of Technological Distance to the Market on the performance of New Technology Based Firms



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Abstract

This study set out to find an explanation of the difference in performance between different types of new technology based firms (NTBFs), especially an explanation of why university spin-offs (USOs) seem to be outperformed by corporate spin-offs (CSOs) and independent ventures (IVs) on the short term, but outperform CSOs and IVs after four years. While the difference in NTBF performance has been researched in previous studies, there has been a lack of focus on the technological basis of these NTBFs, the so-called technological distance to the market (TDM) of the patents these firms are based on. This study argues that NTBFs with a high TDM, firms that are based on a more novel and radical technology, require a longer period of technological development. Entering the market too soon could result in such a firm's bankruptcy. However, firms with a high TDM have also shown to lead to a relatively high firm performance on the long run.

To test the influence of TDM on firm performance and to analyze if USOs indeed have a larger TDM than other types of NTBFs, this study used patent data of all patents applied for by Dutch universities since 2005. Patents since 2005 applied for by Dutch inventors that worked at a Dutch university between 1977 and 2005 were used to complement this database. Additionally, the inventors listed in these patents were sent an invitation to participate in a survey, to provide additional information about the potential NTBFs based on these patents. Because of a small sample size, a robust sample analysis has been used to be able to assess the relation between TDM and firm performance, while a Kruskal-Wallis test has been used to statistically test the difference in variance of TDM between the three types of NTBFs.

This study found that in our sample, TDM indeed has a positive relation with firm performance in the later phases of NTBF development. Firms with a high TDM seem to be able to achieve higher success than firms with a low TDM, but also come with a higher risk of failing. Furthermore, USOs are found to have a higher average TDM than other types of TDM, which is unrelated to differences in technological fields. TDM thus seems to be the cause of the difference in performance between different types of TDM, resulting in a need for a more differentiated management of NTBFs and further academic research on the performance of NTBFs.

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1. Introduction

In 1980, the US enacted the Bayh-Dole act, as a part of a set of reforms targeted at improving the transfer of public research results to industry. This act was aimed at enhancing the incentives for companies and universities to commercialize technology developed at universities, by removing many licensing restrictions and by granting universities ownership of patents arising from federal research grants (Grimaldi et al, 2011; Coriat and Orsi, 2002; Florida and Kenney, 1990). These changes in legislations have led to an increase of entrepreneurial activities within universities, such as patenting and licensing, creating incubators, science parks, and university spin-outs, and investing equity in start-ups (Mowery et al., 2004; Siegel, 2006; Phan and Siegel, 2006). During the 1990's, similar legislation was enacted by the EU and individual European countries, resulting in a rise of university entrepreneurship in Europe (EIMS, 1995; Wright et al, 2008).

These entrepreneurial activities are beneficial for universities: it provides them with more and better access to industry facilities, industrial know-how and industrial laboratory facilities (Grimaldi and Von Tunzelmann, 2002). This is complemented by revenues from licensing, professorial consulting, selling shares in university spin-offs (USOs), donations from successful entrepreneurs, opportunities for research sponsored by USOs and increased patenting activity (Quintas and Guy, 1995; Merrill and Mazza, 2010). Governments also view USOs as promising in terms of the creation and growth of knowledge intensive firms (Wright et al, 2008). Supporting academic entrepreneurship can improve the recruitment of excellent faculty and students (Florida, 1999). Lastly, universities can support entrepreneurship by creating a protected environment for students to experiment with new ideas. There is worldwide agreement on the value of promoting the commercialization of knowledge and research generated at public and private universities (Grimaldi et al, 2011).

However, there are also concerns about USOs. They have relative high death rates over time (Grimaldi et al, 2011) and perform worse than corporate spin-offs (CSOs) in terms of both firm survival and growth (Wennberg et al, 2011). Commercial knowledge gained by industry experience was found to be more valuable for entrepreneurial performance than academic knowledge gained by additional research experience at a university. Furthermore, USOs are also less successful than independent ventures (IVs), as they are less likely to generate profit (Zhang, 2009). Another comparison between USOs and IVs in Europe between 1995 and 2003 shows that the market value of USOs is lower than that of IVs: five years after the USOs' initial listings, they did not outperform IVs on buy-and-hold abnormal returns and their operating performance was significantly worse in terms of return on assets (ROA) and return on equity (ROE) (Bonardo et al, 2010). USOs are also found to have more homogenous management teams with less developed dynamics than IVs, leading to a lower performance in terms of net cash flow and revenue growth than new IVs (Ensley and Hmieleski, 2005).

While USOs generally perform worse than CSOs and IVs, research findings also show that USOs increase their performance over time. Their total factor productivity (TFP) is significantly lower than that of other new technology based firms (NTBFs) in the first year of existence, but after two to three years they achieve the same TFP, and in the fifth year their TFP was found to be larger than that of the other NTBFs (Ortín-Ángel and Vendrell-Herrero, 2014). Apparently, USOs go through the same phases of development as other NTBFs, but initially with lower and later with higher performances. Clarysse and Moray (2004) identified three phases high-tech start-ups go through based on their team formation and development: the pre start-up, start-up and post start-up phases. The authors

found that when new ventures age, they encounter some crises due to a lack of adaptability of the management team, since different capabilities are required in the different phases. In the pre start-up phase there is a need for researchers and technological development. In the start-up phase there is much more need for a diversified organization with a focus on commercialization. In the post start-up phase there is a need for a structured organization focused on business development.

In other words, Ortín-Ángel and Vendrell-Herrero (2014) show that USOs take more time to become commercially viable and to create revenues (two to three years more than CSOs). It thus seems that they need more time to develop their technology before it is ready for the market. In terms of the different NTBF phases of Clarysse and Moray (2004), it seems as if USOs need a longer pre start-up phase when compared to CSOs. This could be caused by generation and selection of university patents. Research carried out at a university found attractive by a corporate firm will induce the firm to (partially) fund the research by means of contract-research to co-own the patent and to be able to develop the innovation either in-house or through a CSO. Firms will most likely focus on university research which is related to their own core competences. Patents that are derived from research funded from only public sources are more likely to be radical in nature and will take longer to reach the technological maturity needed for commercialization. These patents will be developed by universities through a USO or in an IV with help of a venture capitalist (VC). VCs may choose to fund the development of a promising innovation, but are not likely to fund the development of innovations which need a rather long time of development before they can be commercialized. This is because VCs are not likely to fund rather radical innovations, because these innovations have a large risk of failure due to their relatively long time of development and the associated uncertainty of whether they may actually become viable for commercialization. Patents not funded by a corporate firm or a VC are left to USOs for further development. The patents developed by an IV will therefore be less radical in nature than patents developed by USOs. Since radicalism has a positive influence on a new venture's performance in terms of ROE and growth of market share (GMS) and will thus lead to higher profits than other types of NTBFs, the aforementioned division of patents in terms of radicalism could explain the better performance of IVs when compared to CSOs and the better performance of USOs surviving in the fifth year when the technology has matured enough for commercialization (Zahra and Bogner, 2000; Kerin et al, 1992).

In this paper it will therefore be argued that the difference in TFP between CSOs and USOs depends on the technological distance to the market (TDM) of the patent each type of firm is working on. An innovation's initial TDM will thus have a large influence on the performance of the venture developing it: the larger it's TDM, the lower its early-stage performance since it needs to be further developed before it is commercially viable, but the higher its late-stage revenues will be after survival due to the novelty of the innovation developed. A company with a low TDM has a much shorter pre start-up phase and can generate revenues faster, but will receive less late-stage revenues due to less novelty of the innovation developed.

If TDM indeed has an effect on the early-stage (pre start-up) performance of a firm, USOs should also be managed differently from CSOs and IVs: the pre start-up focus should not be on commercialization of the product, but rather on further maturing the technology, much alike the activities conducted within the R&D department of an established firm. Only in a later phase, when the technology has matured enough to be transferred into marketable value proposal, it should be commercialized with a focus on business development. Accordingly, the capabilities and focus of the

management teams of USOs should change after technological maturation. The focus on technological development should be followed-up by a focus on commercialization. A differentiated management approach based on TDM and the different NTBF phases discerned may therefore increase the survival and performance of USOs, since it would avert the crises in the management teams of USOs stemming from the transition to successive NTBF phases. Accordingly, the main research question of this paper is formulated as:

To what extent does a technology's initial distance to market influence the performance of a new technology based firm in different phases of NTBF development?

By differentiating performances of NTBFs based on the TDMs of the patents they are working on, a better comparison of the performance of the different types of NTBFs will be realized. The consensus about USOs performing poorly when compared to CSOs and IVs will be no longer valid as the comparison should be aligned to the different growth patterns of USOs, CSOs and IVs. Lastly, if TDM influences firm performance, a differentiated management style regarding the management of patents with a higher TDM will be required in order to increase USOs' revenues and chances of survival.

This paper is structured as follows: the next section will elaborate a theoretical framework, which will provide a preliminary answer to the research question, and formulate hypotheses to be assessed later in this study. The section afterwards will explain the methods used for data collection and elaborate on the variables to be measured and the statistical methods to be applied. The next section presents the findings of the analyses performed. The final section will provide conclusions and a discussion of the conducted research.

2. Theory

This section will elaborate on the research question and the concepts mentioned in the introduction. A conceptual framework and related hypotheses will be derived to be assessed later in this study.

2.1. Dependent variable: Performance

The dependent variable used in this study is firm performance. Three commonly used indicators of the performance of a NTBF are survival, profitability and business growth (Bonardo et al, 2010; Gilbert et al, 2006; Steffens et al, 2009; Zhang, 2009). Recent research has shown that these three phenomena affect each other. Profitability has a positive effect on both survival and business growth, and business growth has a positive effect on profitability but a negative effect on survival (Delmar et al, 2013). However, not all three indicators will be used in this research.

This study does include firm survival as an indicator of firm performance. Firm survival is a biased indicator since USOs have visible deaths when switching from the pre start-up phase to the start-up phase which are is not visible at CSOs. USOs and IVs are established to further develop an innovation through the pre start-up phase, CSOs are established after technologies have survived the selection and pre start-up phase within the R&D departments of established firms (this will be further elaborated upon in section 2.2.1). This results in the inability to analyze CSO's firm survival in their first phase, since these data is not available. However, it is still relevant to compare USOs with different TDMs in the first phase on survival rates, because the relation between TDM and firm performance still has to be assessed. Firm survival is also relevant as an indicator of firm performance in the start-up and post start-up phases, since it shows the bottlenecks of switching between successive NTBF phases.

Another commonly used indicator of firm performance is profit. However, this indicator is flawed when using a long-term perspective: profits do not indicate a well-performing firm, since a firm with diminishing profits which is thus not performing well, can still have relatively high profits. Furthermore, a weak second or third year does not mean that a firm cannot become profitable in the long run. When using profit growth instead of profit, recovery from a weak year will give a high value for profit growth, indicating a strong firm. Additionally, with decreasing profits, profit growth shows a weak firm. For these reasons, profit growth will be used, which is the difference in profits compared to the previous profits in percentages. Accordingly, there are no data for this indicator in the first year of existence of the NTBF (the pre start-up phase). The absence of these data is not a serious problem, because profit growth should not be the focus in the pre-start up phase. Instead, the focus should be on technological development and survival in order to realize long-term firm performance in terms of profit growth and survival.

The third commonly used indicator of firm performance is business growth. This indicator will not be used in this study. This is because business growth has been shown to follow different paths for large firms and small firms: small firms show a negative auto correction and cannot sustain their growth, especially with extreme growth rates, whereas large firms are more likely to sustain their growth (Coad, 2007; Coad and Hözl, 2009). Furthermore, generating growth instead of profitability leads to a relatively poor performance on the medium term (Steffens et al, 2009). Business growth is thus a seriously flawed indicator of firm performance and will not be used in this study.

Concluding, firm survival is relevant for firm performance in all three phases of NTBF development and profit growth is relevant for firm performance in the start-up phase and in particular in the post start-up phase.

2.2. Independent variables

The main relation tested in this study is that between TDM and firm performance. However, there are more factors that influence firm performance. These factors also have to be taken into account in order to diminish the chances that the relation between TDM and firm performance reflects spurious correlation. TDM will be discussed first and the other factors influencing firm performance will be elaborated after that. Furthermore, three different phases in NTBF development have been discerned and the relations between some of the independent variables and firm performance may differ between these phases. The relationship of each independent variable with firm performance during each phase of NTBF development will be formulated in related hypotheses.

2.2.1. Technological Distance to Market

When a university or researcher wants to commercialize research findings, there are several ways to do so: consulting, ad-hoc advice, networking with practitioners, licensing a patent, or selling the patent. There are also several ways of further developing the patent within a NTBF. However, as argues before, the type of NTBF will depend on how the research has been funded: with or without private funding through contract-research. A firm can choose to (partially) fund research if the expected research findings are deemed important for that firm. However, firms will only do so if the research contribution is in line with the core competences and capabilities of the firm itself. The technology invested in will therefore be relatively incremental in nature. If it is *'near incremental'* then it will be further developed in-house. When a technology has a larger distance to the core capabilities of a firm, i.e. it is *'far incremental'*, the firm will most likely choose to develop the technology through a CSO.

If private companies did not fund the research, because the expected research findings are too distant from their core capabilities, the research will have been funded from public sources. If a VC is interested in the technology based on research findings, a researcher can choose to cut ties with the university and start an independent venture (IV) with the help of the VC. A VC will take the risk of funding such a more radical technology since it may lead to higher revenues, but will most likely not invest in that technology when it needs too much time and resources to become commercially viable. IVs will thus develop *'near radical'* technologies. Even more radical technologies, the *'far radical'* technologies, are therefore most likely developed with the help of an incubator, university facilities and public venture capital within a USO (Bonaccorsi and Piccaluga, 1994; Bonardo et al, 2010; d'Este and Patel, 2007; Meyer-Krahmer and Schmoch, 1998; Perkmann and Walsh, 2008; Wright et al, 2008).

It might seem odd that universities choose to develop the technologies with the largest risks of failure. This is, however, not a conscious choice as universities are less capable of selecting highly promising firms than VCs. This is caused by two factors. First, of the innovations that are available for further development and are not developed by an established firm in a CSO or by an independent researcher in an IV, are left over to be developed by a USO. Commercialization of university patents by IVs will even be stimulated by universities, since it leads to licensing revenues without any risks. So, there is a picking-order in university research commercialization, in which USOs come last.

Second, venture professionals that operate university funds do not have the best skills in terms of selection management. The innovations left for development by a USO might be too radical to be successfully commercialized, but are still selected to be developed within a USO because of the weak selection skills of these venture professionals (Lerner, 2005; Grimaldi et al, 2001).

This study contends that there is also a difference in the TDM between the different types of ventures. Patents with a low TDM will be developed by firms in-house or through a CSO, while patents with a high TDM will most likely be developed with the help of a VC within an IV or with the help of an incubator within a USO. This division of NTBFs with the corresponding TDMs is shown in figure 1. The hypothesized relationship between TDM and firm performance is the main hypothesis of this study, since it directly answers the research question. In this study it is argued that the different USO performance over time in comparison with CSOs and IVs is caused by the TDM of the founding patents, leading to the following hypotheses:

- H_{1a}: TDM has a negative influence on firm performance in the pre start-up phase.*
- H_{1b}: TDM has a positive influence on firm performance in the start-up and post start-up phases.*

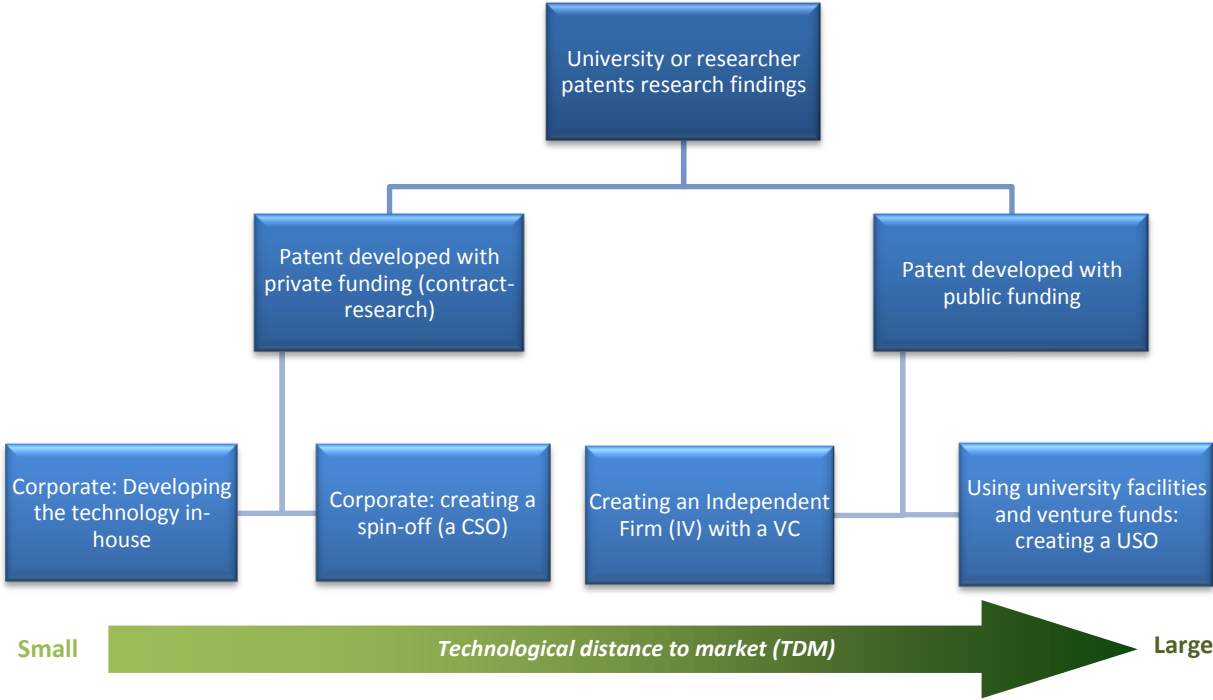


Figure 1: Schematic overview of the different NTBFs with TDM

Since different sectors and technological fields are shown to have a difference in R&D intensity and knowledge intensity in general (Eurostat, 2015; Freddi, 2009), it is likely that TDM is influenced by a difference in sectors and technological fields among firms. If TDM is indeed shown to have an influence on firm performance and if USOs are shown to have a higher TDM than other types of NTBF, this study will test if that difference in TDM is actually caused by a difference in sectors or technological fields between different types of NTBF. This will be elaborated upon in section 3.3.

2.2.2. Entrepreneurial capabilities

Several other factors influencing firm performance that need to be taken into account are part of the characteristics of the management team (Clarysse and Moray, 2004). First, there are the entrepreneurial capabilities of the management team. Management teams containing more

entrepreneurial capabilities induce a better performance of spin-offs (Bigliardi et al, 2013). This will be the case in the start-up and post start-up phases, since there is a need for commercialization and strategic management in those phases. A focus on commercialization and business development in the pre start-up phase is hazardous to a firm, because it distracts attention from the required technological development and can also cause unprofitable growth; a focus on revenues and expansion at the expense of profit. To maintain sustainable growth, firms must be patient for growth and impatient for profit (Christensen and Raynor, 2003). This leads to the following hypotheses for this factor:

H_{2a}: Entrepreneurial capabilities have a negative influence on firm performance in the pre start-up phase.

H_{2b}: Entrepreneurial capabilities have a positive influence on firm performance in the start-up and post start-up phases.

2.2.3. Technological capabilities

In the pre start-up phase, a management team with more technological expertise is required for technological development. If an innovation does not get further developed technologically, it won't reach the technological maturity required for commercialization (Teece et al, 1997; Lee et al, 2001). This will most likely lead to the death of the NTBF as a result of a lack of revenues or funding due to lagging technological progress and prospects. The technological capabilities of a start-up consist of the technological expertise available within the management team as well as access to internal and external R&D facilities (Teece et al, 1997; Zahra, 1996). As opposed to the entrepreneurial focus, a technological focus in the start-up and post start-up phases will lead to unnecessary additional development of a technology while it should be commercialized, also resulting in too little revenues and profit growth, which are both necessary to compensate the R&D investments made in the pre start-up phase (Eisenmann et al, 2012). The same applies to research facilities: too much access to such facilities can lead to stretching the development time of an innovation, which delays (and thus negatively influences) firm performance. This leads to the third set of hypotheses:

H_{3a}: Technological capabilities have a positive influence on firm performance in the pre start-up phase.

H_{3b}: Technological capabilities have a negative influence on firm performance in the start-up and post start-up phases.

2.2.4. Adaptability

The final characteristic of the management team that influences firm performance is adaptability. Adaptability of the management team is essential for survival. Without being able to change the focus of the management team from technological development to a commercialization and business development, the firm will not survive the switch between successive NTBF phases (Clarysse and Moray, 2004). Accordingly, the following hypothesis can be derived:

H₄: Management team adaptability has a positive influence on firm performance in all start-up phases.

2.2.5. Capital received

Another possible explanation of USOs performing poorer in the pre start-up phase, besides TDM or the characteristics of the management team, is that USOs have more difficulty than CSOs with

attracting external capital. However, more starting capital does not automatically lead to a better performance of USOs. USOs with more starting capital do not raise more revenues than USOs with a lower amount of starting capital (Clarysse et al, 2007). Even worse, large scale university venture capital seems to cause non-market failures which are deemed more hazardous to a firm than market failures due to capital shortage. One of these non-market failures is caused by bad motivations of university investment managers induced by their goal to maximize the total amount of funds invested and not to maximize the value created by the start-ups in their portfolio. Another failure is caused by the information asymmetry between TTOs and university investment managers, which may lead to weak valuations of patents and the creation of non-viable USOs. So, the capital received by USOs in the pre-start up phase thus may have a negative effect on firm performance since it leads to the aforementioned inefficiencies. However, attracting external capital becomes very important for NTBFs in the start-up and post start-up phases in order to be able to commercialize their product (Ortín-Ángel and Vendrell-Herrero, 2014). The hypotheses derived are formulated as:

H_{5a}: Capital received has a negative influence on firm performance in the pre start-up phase.

H_{5b}: Capital received has a positive influence on firm performance in the start-up and post start-up phases.

2.2.6. Patent value

Another factor which influences firm performance is the value of the patent a NTBF is based on. More valuable patents will generate more revenues for a NTBF and will thus increase firm performance, regardless of their TDM (Hall, 2001).

H₆: Patent value has a positive influence on firm performance in all start-up phases.

2.2.7. Firm size

The last variable influencing firm performance that is taken into account in this study is firm size. A small firm is preferred in the pre start-up phase, since a large number of employees decrease the flexibility to change. This change is required to switch from the pre start-up phase to the start-up phase, since other capabilities are required in the start-up phase than in the pre start-up phase. In the start-up and post start-up phases, a firm with more employees is more likely to have a heterogeneous management team with more diverse capabilities, which may stimulate a better performance. These heterogeneous teams also lead to the development of higher levels of group potency, cohesion, idea conflict, shared strategic cognition, and lower levels of relational conflict which are beneficial for NTBF performance (Ensley and Hmieleski, 2005). This leads to the last set of hypotheses derived in this study:

H_{7a}: Firm size has a negative influence on firm performance in the pre start-up phase.

H_{7b}: Firm size has a positive influence on firm performance in the start-up and post start-up phases.

2.3. Conceptual framework

Together, the various variables discerned and their hypothesized relations make up the conceptual framework of this study. For each phase in the development of a patent into a marketable product, process or service by a NTBF, a conceptual model is specified. The minus symbols are the hypothesized negative relationships and the plus symbols indicate the hypothesized positive relationships.

2.3.1. Pre start-up phase

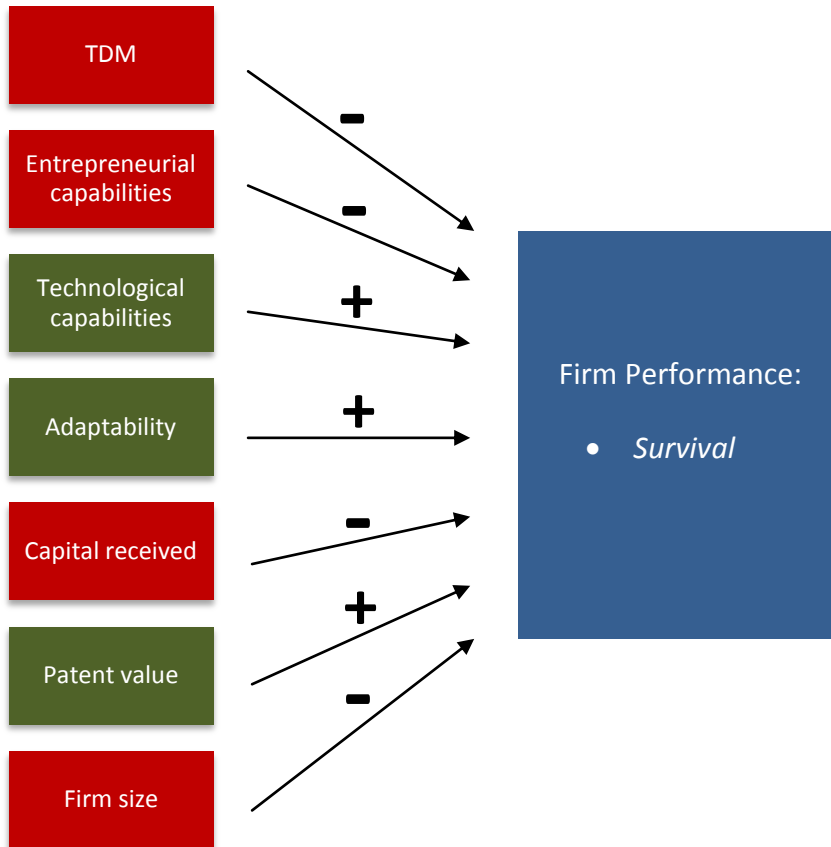


Figure 2: Schematic overview of the different indicators and relationships in the pre start-up phase

2.3.2. Start-up phase

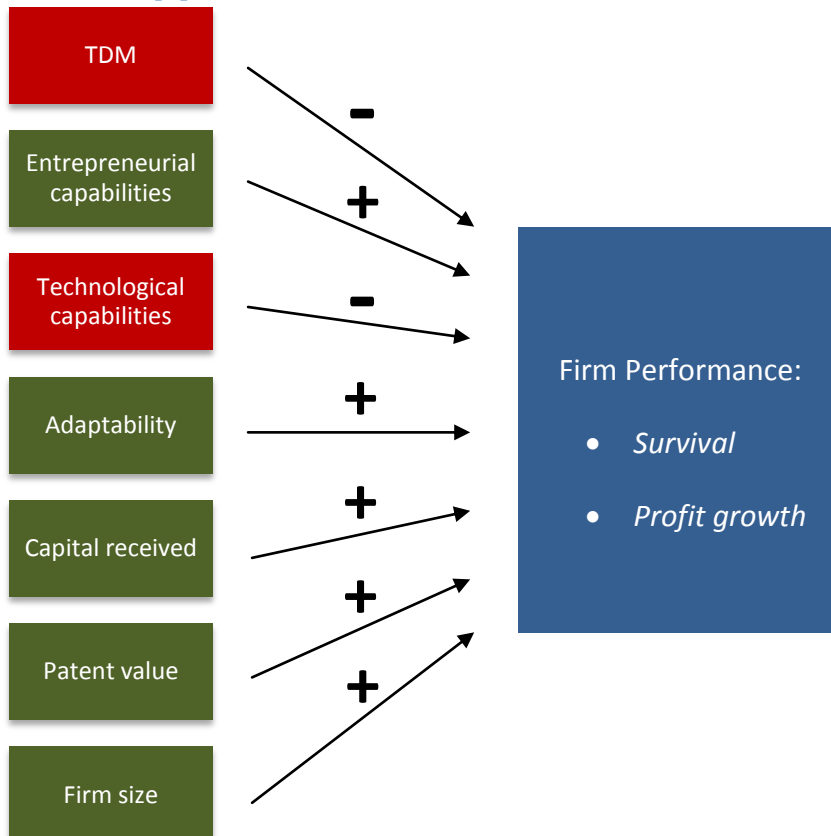


Figure 3: Schematic overview of the different indicators and relationships in the start-up phase

2.3.3. Post start-up phase

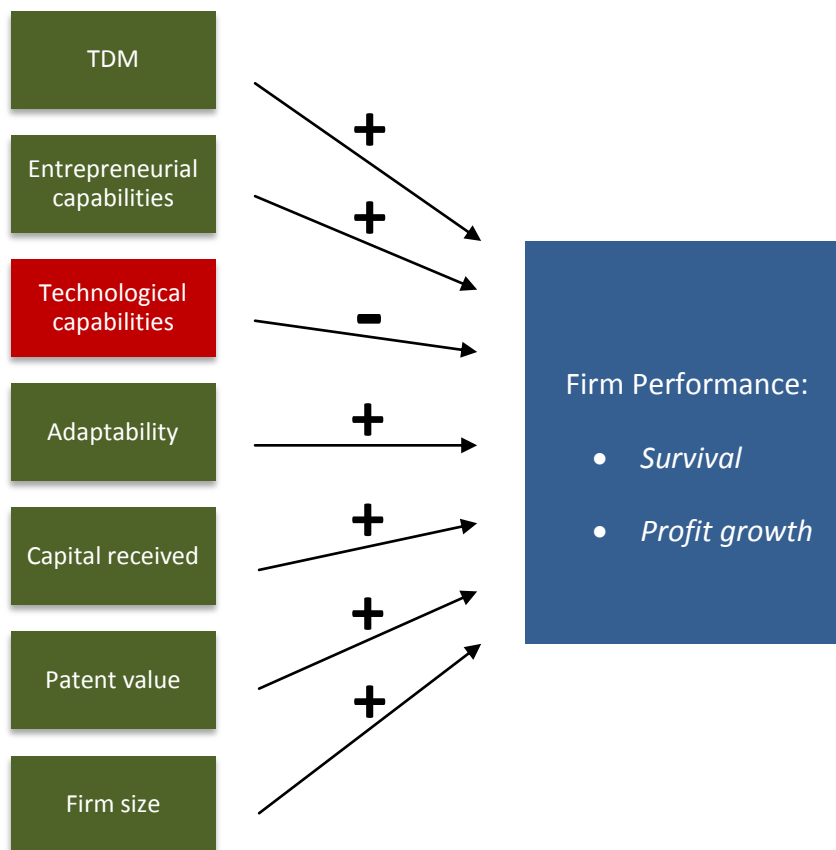


Figure 4: Schematic overview of the different indicators and relationships in the post start-up phase

The analyses conducted in this study will show if USOs indeed have a higher TDM than CSOs (figure 1) and to which extent TDM influences firm performance (figure 2). The analyses will be elaborated in the following section. With the results of these analyses, the main question posed in the introduction can be answered.

3. Methodology

This section will explain how the data has been collected, how the different variables mentioned in the theory section have been measured and which analyses have been applied in order to empirically assess the formulated hypotheses.

3.1. Data collection

3.1.1. Query Dutch universities

This study uses a sample of Dutch NTBFs based on university patents applied for since 2005. By taking all patents from that time period, every phase of NTBF development is included in the sample, without having overly outdated information. To obtain the necessary data, international patent data was retrieved from PATSTAT which have at least one of the Dutch universities as owner. PATSTAT is the database of the European Patent Office's (EPO) worldwide patent statistics (EPO, 2013). The reason for using PATSTAT is that it provides all European patents like ESPACENET, but has more analytical tools. Within PATSTAT, different databases can be consulted. The database used in this study is the Global Patent Index (GPI). This is the most comprehensive database, since it combines the DOCDB worldwide bibliographic data collection from ESPACENET with the INPADOC worldwide legal status data collection of PATSTAT itself. Furthermore, the GPI is updated every week, whereas the other databases are updated only twice per year. The version of the GPI database used was that from week 36 in 2014 (GPI 2014/36). For selecting Dutch university patents applied for since 2005, the following list of seventeen Dutch universities was used, which has been provided by the executive branch of the Dutch ministry of education, culture and science (DUO):

1. Erasmus Universiteit Rotterdam
2. Protestantse Theologische Universiteit
3. Theologische Universiteit Apeldoorn
4. Theologische Universiteit Kampen
5. Radboud Universiteit Nijmegen
6. Rijksuniversiteit Groningen
7. Technische Universiteit Delft
8. Technische Universiteit Eindhoven
9. Universiteit Leiden
10. Universiteit Maastricht
11. Universiteit Twente
12. Universiteit Utrecht
13. Universiteit van Amsterdam
14. Tilburg University
15. Universteit voor Humanistiek
16. Vrije Universiteit Amsterdam
17. Wageningen Universiteit

Since some of these universities also have an academic hospital, these hospitals are also included in the search procedures. Their patents also are also owned by universities and the related spin-offs can therefore also be considered as USOs. The Netherlands has the following academic hospitals: VU medisch centrum (VUmc), Academisch Medisch Centrum (AMC), Universitair Medisch Centrum

Groningen (UMCG), Leids Universitair Medisch Centrum (LUMC), Academisch ziekenhuis Maastricht (MUMC+), Radboud UMC, Erasmus MC and Universitair Medisch Centrum Utrecht (UMC Utrecht).

Since several institutions have different names under which they file patents (such as Utrecht University or Utrecht Holding), every ‘alias’ was searched for in the PATSTAT database, so every Dutch patent since 2005 with a university ownership background was obtained. This study has used the application date of a patent as a reference instead of the publication date for two reasons. The first reason is that inventors will not stop developing a technology until a patent has been published; the application date will therefore align better with the development date of a technology (and thus the ‘firm age’). The second reason for this is that the gap between application and publication date differs amongst patent offices. For the EPO, this gap is approximately 18 months, but for the World Intellectual Property Organization (WIPO) this is between 24 and 36 months (Van Dongen, 2015). Searching by publication date will therefore results in an age bias – patents in the WIPO will be considered younger than those in the EPO, while this is not actually the case.

The GPI lists every applicant name in their database, so all aliases have been taken from the GPI itself. The queries per university can be found in Appendix A, as well as the complete query. Only the latter has been used in order to prevent duplicated entries caused by patents that are applied for by several Dutch universities. A filter has been installed for patent families. The same technology can be patented in different patent offices, such as the EPO or the United States Patent and Trademark Office (USPTO). This means that there are several patents for the same technology. These different patents are all placed in one patent family. The filter for patent families thus filters all duplicate patents from the search. The number of patent families found per university are listed in table 1 below.

Table 1: patent families per university

Number of patent families	University
281	Delft
223	Leiden
178	Rotterdam
140	Amsterdam
125	Utrecht
99	Eindhoven
86	Twente
80	Maastricht
78	Groningen
69	Wageningen
48	Nijmegen
38	Amsterdam (VU)
1445	Total

The changes in legislation mentioned in the introduction have had implications for the ownership of these patents. A patent is owned by the employer of the researcher that discovered the technology. This means that patents developed through contract-research will be owned by both universities and corporate firms, while patents developed at USOs will be owned solely by universities. However, not

all patents owned solely by universities will be developed within USOs. Patents can also be licensed or sold to corporate firms which will develop the technology either in-house at the corporate firm, or in a CSO. Since this study installed a family filter, as previously mentioned, only the first patent of a patent family, called the priority patent, will be shown. Licensed or sold patents will still be listed as solely owned by the university in the priority patent. In other words, it is not possible to distinguish a priori between CSOs or USOs when looking at the patent information.

3.1.2. Query independent Dutch academics

The aforementioned query excludes IVs founded by researchers that have cut ties with the university from this study, since their patents are not owned by universities but by the researchers themselves. However, a study of Lissoni et al (2008) has found that, while European countries have much less academic patents regarding university-owned patents than the US, the difference is much smaller when including patents owned by academics themselves (figure 5). Much information on academic patents and NTBFs based on academic patents will thus be lost if the IVs are not included in this paper.

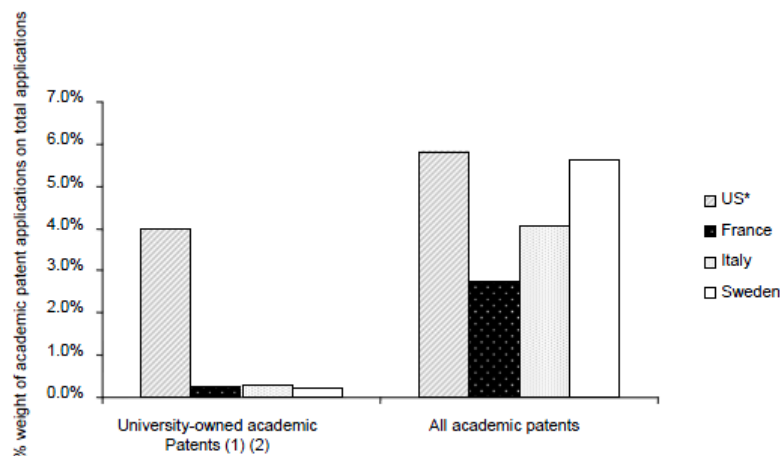


Figure 5: Weight of academic patent applications on total applications (Lissoni et al., 2008)

Because of this, an additional data collection has been performed. Baselli and Pellicciari (2007) have created an addition to the KEINS (Knowledge-based Entrepreneurship: Innovation, Networks and Systems) database used in the aforementioned study of Lissoni et al (2008). This database is described as follows: *“The KEINS database originates from the EP-INV database produced by CESPRI-Università Bocconi, which contains all EPO applications, reclassified by applicant and inventor; and from three lists of university professors of all ranks (from assistant to full professors), one for each of the above mentioned countries (PROFLISTS). Academic inventors have been identified by matching names+surnames of inventors in the EP-INV database with those in the PROFLISTS, and by checking by e-mail and phone the identity of the matches, in order to exclude homonyms”* (Lissoni, 2015). In addition to the KEINS database, Baselli and Pellicciari (2007) have used Dutch patents in the EPO database from 1977 until January 2005 and cross-checked the applicant and inventor names in the EPO database with a list of Dutch academic employees, to include the Netherlands in the KEINS database. This list of employees was based on the websites of the Dutch universities, combined with the KNAW (Royal Netherlands Academy of Arts and Sciences) website. The 890 matching pairs were then contacted to verify if the match was accurate, which resulted in a list of 600 verified names.

This Dutch addition to the KEINS database was made available to this study by professor Francesco Lissoni in order to find Dutch IVs based on academic patents. Since the patents used in the KEINS database are solely from the EPO database and only contain patents until January 2005, these patents could not be used for analysis in this study. Therefore, a new query has been executed using the names in the addition to the KEINS database in order to search for all patents in the GPI from 2005 until 2014 applied for by the named researchers in the addition. Since alterations of the aforementioned names have to be included in the query to get all of the relevant patents, a query for 1098 applicant names has been executed. This query can be found in Appendix 2. The query resulted in 5,463 patents in 3,712 patent families.

This is, however, not a comprehensive list of patents by ex-academics. The query is comprised of recent patents by ex-academics who were affiliated with a Dutch university between 1977 and January 2005. Patents of ex-academics who were affiliated with a Dutch university after January 2005 are thus not included in this database.

3.1.3. Gathering addresses

Starting with the results from the first query, the address of every inventor residing in the Netherlands has been gathered. This was done by gathering the full bibliographical data of the corresponding patent in ESPACENET, which lists the inventors addresses if the patent is published in the WIPO. If the corresponding patent isn't a WIPO patent, a WIPO patent from the patent family was searched for. If the patent family didn't contain a WIPO patent, the INPADOC family (a family filter based on legal status information) was searched for a WIPO patent with the same inventors. If that yielded no results either, a separate search in ESPACENET was performed for the inventor, to see if there are other WIPO patents published with the required inventor name. If still no WIPO patent was found, an EPO patent was searched for. EPO patents only contain the postal code. These postal codes with the corresponding inventor name were used in a query in 'De Telefoongids', an online Dutch database containing all addresses and phone numbers of Dutch residents with a phone connection. This procedure resulted in a small bias in the sample: it mostly contains addresses of inventors of worldwide (WIPO) patents and, to a lesser extent, European (EPO) patents.

Not all patents list the home addresses of inventors, however. Many addresses are those of a patent attorney, holding, or university. In the latter case, if no home address could be found by searching for other WIPO patents, the website of the university was consulted to find the office location of the inventor so that the inventor could still be reached directly. Some universities do not have a clear 'staff search' option. This results in another bias in the sample, since the addresses or office locations of employees of those universities could not be obtained.

If multiple WIPO patents were present in the database with the same inventor, the most recent was used to gather their address. This was not done if it was unclear which was the most recent patent, or when the addresses had a very large geographical distance which could indicate different inventors with the same name.

The results from the second query were then cleaned. Since these didn't exclusively contain academic patents, since some ex-academics were employee at a corporate firm, patents have been cleaned on applicant. If the applicants listed a large commercial firm, an institution which wasn't based in the Netherlands, or a knowledge institute not related to a Dutch university, the patent was removed from the database. Dutch holdings, relatively new firms, spin-offs, institutions related to a

Dutch university or company of which no information could be found online, were included in the database. The complete list of institutions cleaned and included in the database can be found in Appendix C. If the database contained an inventor already present in the database from the first query, the address from the first database was used. However, if the patent in the second database was more recent, that address was used for both databases. Afterwards, both databases were combined and cleaned on similar names and addresses. This resulted in a list of 2432 addresses in 1680 unique patents.

3.1.4. Survey and response rate

These addresses were used to send an invitation for an online survey. Each of the invitations included a list of patent numbers and names of which the addressee was listed as inventor. The full survey, which is in Dutch, can be found in Appendix D. The relevant indicators and how they were measured will be elaborated upon in section 3.2. Apart from these indicators, the survey also asked for confirmation of the patent number and the type of company: USO, CSO or IV. The survey consisted of two parts: one with questions on the patent number and general company information and one part with questions for financial information. After the first part of the survey, a choice was given to complete the second part of the survey on financial information, or to save the results and obtain a link for finishing the survey which could be sent to a CEO or CFO of the respective company.

This resulted in 44 reactions for the first part of the survey, of which 20 people also filled in the second part and thus provided financial information of the company. For 182 invitations (7.5%), the address was no longer valid or the inventor didn't work at the address obtained in the data collection anymore. 5 people invited to fill in the survey had deceased (0.2%) and 28 people indicated that their patent was not used for a spin-off (1.2%). In total, these were 215 invitations of which the invitees were unable to participate, resulting in a potential of 2217 which could. Given the 44 responses of which 20 included financial information, this resulted in a response rate of 1.98% (44/2217) for the first part of the survey, and a response rate of 0.90% (20/2217) for the complete survey.

This is a very low response rate and has serious consequences for the methods of analysis that can be applied. There is, however, a good explanation for this low response rate. Giuri et al (2007) found that about one-third of patents are not used for any kind of economic or commercial activities, but are rather used for blocking patents, or are dormant. This is, however, related to patents in general and not exclusively the case for academic patents. Van Dongen et al (2014) showed that more than 50% of Dutch university patents are dormant and still wait to be used for further development. They added that only 60% of the patents that were used in a spin-offs, were used to enter the market (to develop a product, set an industrial standard, or for another innovative application). Lawson (2013) stated that, in the UK, 48% of the academic patents were owned by universities or academics, 32% were owned by the industry and only 18% of the academic patents were used in spin-offs. Although data on the situation in the Netherlands is hard to obtain, most European countries are comparable to the UK in terms of academic patents (Vermij, 2005).

Combing the findings of Van Dongen et al (2014) and Lawson (2013), only 18% of all academic patents (and thus the first query) are spin-offs. Furthermore, only 60% of those patents were used as a basis for the spin-off and thus usable from this study. As a result, 10.8% of the inventors of the patents obtained from the first query were theoretically able to complete the survey. Since the second query contained ex-academics and were cleaned for industry firms, the best case scenario is

that all of them contained spin-offs (which is highly unlikely). A total of 251 unique (cleaned) addresses were obtained from the second query, which is 10.3% of the total database. The theoretical maximum amount of inventors that were able to participate in the survey were 10.8% of the 2181 addresses obtained from the first query, with all of the 251 addresses obtained from the second query, resulting in 487 inventors in total rounded up. This is 20% of the total amount of 2432 addresses. However, as stated above, a 7.7% of the inventors were either deceased or the addresses were invalid. Thus, 449 inventors is the theoretical maximum of inventors that could complete the survey. In light of this, the 44 response of the first part of the query is 9.8%, while the 20 response of the complete query is only 4.5%.

Low response rates have a high risk of causing non-response bias in the data. The dataset used in this study has two major biases caused by the low response rate. Firstly, as shown previously in figure 5, most academic patents are not owned by the universities themselves. However, in the sample, 60% of the response represent USOs. However, this study argues that the difference in performance between the different types of NTBF is actually caused by TDM and the control variables discerned in section 2.2., instead of there being an inherent difference in performance between types of NTBF. Thus, by including TDM and the control variables in the analyses, it becomes irrelevant what type of NTBF a case is. The results will thus most likely not be affected by this bias. Secondly, the survival rates of the firms in the dataset do not correspond with the survival rates of spin-offs found by Wennberg et al (2011). The survival rates of USOs in our dataset is 83.3% after two years, and 83.3% as well after 5 years, as opposed to the 72.6% and 53.5% respectively as given by Wennberg et al (2011). For CSOs, our dataset features survival rates of 100% after two and after five years, as opposed to 78.8% after two years and 61.6% after five years as given by Wennberg et al (2011). The method of this study uses a majority count, indicating a positive or negative majority. In this case, indicating firm survival or not. Since both the survival rates given by Wennberg et al (2011) and those observed in our dataset has a majority of firms that do survive, these unrepresentative survival rates are not likely to influence the results either. The analyses used in this study will be further elaborated upon in section 3.3.

3.2. Measurement

3.2.1. Division of NTBF phases

As stated in the introduction, in general, USOs have high death rates and a lower performance than CSOs and IVs. However, the relatively high death rates and lower performance are partially caused by the flawed comparison related to the different phases of NTBF development: CSOs do not have an observable pre start-up phase, since the technology is developed in-house by a corporate firm, which has several implications. The first is based on the survival of firms which is at stake during each switch between successive phases, because it requires a change of the management team. This selection mechanism is not observable for CSOs in the pre start-up phase. The selection related to this phase takes place in-house at the established firm that owns the patent. So, the actual CSOs do not have an observable transition and accompanying selection from the pre start-up phase to the start-up phase. The CSO would not have been created if the innovation didn't survive the in-house selection. These 'deaths' are thus not visible in the survival rate data while the deaths of the IVs and USOs caused by the switch between the pre start-up and start-up phases are. Another issue presents itself by the fact that the pre start-up phase of CSOs occurs in-house: the firm age of CSOs does not correspond with the different phases of NTBF development. Since CSOs are in the start-up phase

when created, they will be able to generate revenues at a lower firm age than their IV and USO counterparts, regardless of their TDM. The firm age of CSOs therefore cannot be compared with the firm age of IVs and USOs.

To overcome these problems, the NTBFs will not be compared based on firm age, but on patent age since application. This leads to a fair comparison, since CSOs, IVs and USOs which are in the same stage of business development should be able to generate the same revenues if they would have the same TDM. Survival rates can therefore be fairly compared between IVs, USOs and CSOs based on patent age.

In accordance with the findings of Ortín-Ángel and Vendrell-Herrero (2014), the different phases have been based on these three classes of ages. However, the effect of the different indicators on performance of a firm in the pre start-up phase (firms up to one year old), can only be measured after that phase. Characteristics of a firm which has just been founded are therefore meaningless to this analysis. The different phases are categorized as follows:

- Age category 1: These are firms which are currently still in the pre start-up phase. As stated in the previous paragraph, these firms cannot be used to measure the effect of the different indicators on firm performance. The data on these firms is only used to calculate the average scores (this will be elaborated upon in section 3.3). These are the patents applied for since 2013.
- Age category 2: This age category features companies that have passed the pre start-up phase. This age category can therefore be used to measure the effects of the different indicators in the pre start-up phase on firm performance, since the result is observable. This age category can thus be seen as measurement of the pre start-up phase, where USOs perform more poorly than CSOs and IVs, and includes patents from two to three years old. These are the patents applied for between 2011 and 2013.
- Age category 3: This category features firms that can be used to measure the effects of the different indicators on firm performance in the start-up phase, where USOs, IVs and CSOs have comparable performance, and includes patents from four to five years old. These are the patents applied for between 2009 and 2011.
- Age category 4: This category features firms that can be used to measure the effects of the different indicators on firm performance in the post start-up phase, where USOs perform better than CSOs and IVs, and includes patents older than five years. These are the patents applied for before 2009.

3.2.2. Performance indicators

The two factors indicating firm performance are survival and profit growth. Survival is measured as a dummy variable, with a value of 1 if a firm still exists and a 0 when the firm doesn't. Profit growth is measured as the yearly profits relative to the profits gained in the previous year. This will be expressed as a percentage of the profits gained in the previous year. As the low response resulted in very little data on profit growth, this indicator is unsuitable for a separate analysis. Because of this, only one variable will be used to indicate performance and to represent *profit growth* in the analysis.

This dummy variable, called ‘*success*’, has a score of 1 if the variable *survival* is 1 and *profit growth* is not negative. *Success* is assigned a score of 0 if either *survival* is 0 or *profit growth* is negative.

3.2.3. TDM indicators

The main relationship tested in this study is the one between TDM and *success*. A NTBF’s TDM is measured on two indicators: the novelty and the radicalism of the patent it is based on. In this study, novelty describes how unique the technology is, while radicalism describes the technological diversity of the patent.

3.2.3.1. Novelty

The first indicator of TDM is the novelty of a patent. This is measured using the number of backwards citations. Since backward citations are not only assigned to a patent by the applicants, but are also assigned to a patent by employees of the patent office where the patent is published, backwards citations are a good way to see if a patent builds on previous knowledge or contains something completely new. Patents which build upon many other patents can be seen as a so-called ‘small leap forward’ and thus have a low novelty. These are the patents citing many other patents. Patents with a high novelty are more disembedded in other patents and thus cite less, i.e. a ‘giant leap forward’. Novelty is thus measured by the number of backwards citations, with high numbers of citations indicating a patent of low novelty. The exact measurement is $NTY = \frac{1}{NC+1}$, where NC is the total number of citations and NTY is the Novelty. This is a normalized indicator, since all of the values lie between 0 and 1.

3.2.3.2. Radicalism

The second indicator of TDM is radicalism, measured by a patent’s diversity in technological background. The more a patent cites patents in other technological fields, the more it can be seen as radical. The technology a patent applies for is classified using the International Patent Classification (IPC). The classification is comprised of a letter indicating the section, two digits indicating the class, a letter indicating the subclass and 4 digits indicating the group (figure 5). The indicator for technological diversity is measured as an ordinal variable, valued as follows:

- If a patent cites a different subgroup (the last two digits of the group), it receives a value of 1
- If a patent cites a different main group (the first two digits of the group), it receives a value of 2
- If a patent cites a different subclass, it receives a value of 3
- If a patent cites a different class, it receives a value of 4
- If a patent cites a different section, it receives a value of 5

Contrary to the originality index by Trajtenberg et al (1997) or the radicalness index by Shane (2001), this value will be based on the technologically most distant citation and not based on the amount of citations from different groups or classes, in order to avoid contamination with the novelty indicator described above. This study argues that it is not the amount of other fields a patent cites that determines its radicalism but rather the distance between technological fields, since it has been shown that it is very difficult to combine knowledge from very different technologies (Breschi et al, 2013). A patent that cites a very different IPC class can thus be seen as very radical. As such, the most distant class citation is a good indicator for radicalism.

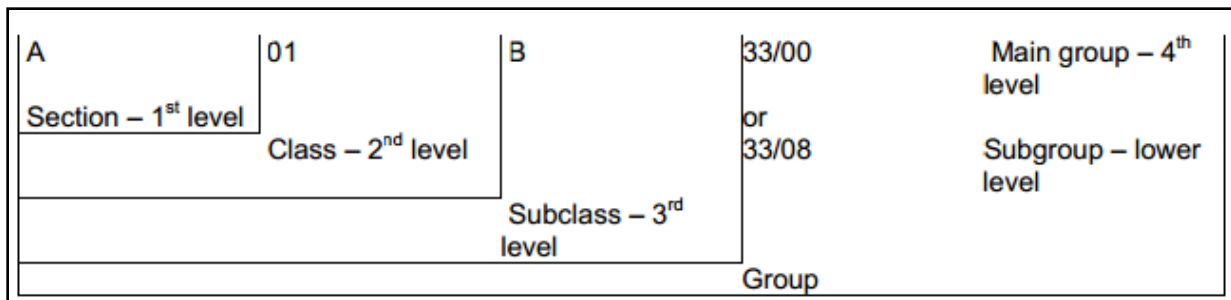


Figure 5: IPC classification symbol structure (WIPO, 2013a)

3.2.3.3. TDM

The two TDM indicators will be combined as follows: $TDM = (1 + RAD) * NTY$, where RAD is a patent's Radicalism. Thus, all values of TDM lie between 0 and 6.

3.2.4. Control variable indicators

The different independent variables that have been discussed next to TDM, are control variables. The first control variable mentioned in the theory section is *entrepreneurial capabilities*. This is measured by the percentage of employees in the last fiscal year who previously worked at another entrepreneurial firm or, even better, as an entrepreneur and thus have entrepreneurial expertise.

The second control variable is *technological capabilities*. This is measured on three indicators. The first one is the percentage of employees with a research background in the last fiscal year, measuring technological expertise. The second factor is the access to internal research facilities, measured by means of a 5-point Likert scale in the survey. The third factor is the access to external research facilities, measured on a 5-point Likert scale as well. Since there has found to be no difference in importance or effect on firm performance between internal and external facilities (Zahra, 1996) and since technological assets and expertise are both considered part of technological capabilities (Teece et al, 1997), these three indicators will be combined. The combined indicator is measured as $TC = (RDINT + RDEXT) * TE$, where TC represents the technological capabilities, RDINT the access to internal R&D facilities, RDEXT the access to external R&D facilities and TE the percentage of employees with a research background.

The third control variable is *adaptability*. Since it is very difficult to obtain quantitative data on the current adaptability of a firm, the current ability to adapt to changes in the environment will be measured by means of a 5-point Likert scale in the survey. However, firms with a high adaptability would have changed their strategic goals with each successive phase of NTBF development (Clarysse and Moray, 2004). Both these indicators, the 5-point Likert score on the current adaptability and the number of times the strategic goals of a firm have been changed in the past due to changes in the environment, are thus required to assess the adaptability of a firm. The sum of the two indicators was taken as the final indicator for adaptability, because the product of the two indicators would result in a extremely high influence of changes in the past. This is because that indicator can be 0, negating the influence of current adaptability if the product of the two indicators is used instead of the sum.

The fourth control variable, *capital received*, will be measured as the absolute amount of external capital received in the last fiscal year.

The fifth control variable is *patent value* and will be measured as the number of times a patent has been cited, since patents with many forward citations have been shown to result in a higher profitability (Hall et al, 2001). While the number of times a patent has been cited is heavily influenced by the age of the patent, this study categorizes firms by patent age. The age difference within each group is thereby minimal, negating this bias.

The last control variable to be measured is *firm size*. This will be measured as the number of employees in the last fiscal year.

3.3. Analyses

Only the 20 cases of the 44 in total that have financial information can be used for the analyses. Since these 20 cases are distributed over four different sub-samples of age categories, regressions analyses are not reliable. If there are less than 10 observations per predictor, confidence intervals will most likely not have the proper coverage, the loss of power used to identify important relations could lead to underfitting of the model to the data, regression coefficients become highly biased, the test statistics may not be valid for the model and the frequency of paradoxical associations may increase in number (Peduzzi et al, 1995). As such, determining the effects of the different variables with the age category as interaction variable is not possible. For these reasons, Moors and Faber (2007) have developed a robust exploratory method of analysis to be used for small samples. This method of analysis features a combination of average scores and majority scores, thereby nullifying the effects of outliers in the sample. This study uses an adapted version of that robust sample analysis since the method developed by Moors and Faber applies only to Likert scale measurements, while this study features scale variables.

For every variable, the average score in the entire sample has been determined, as well as the standard deviation. Then, per variable, three categories of scores have been discerned. The lowest category features all scores lower than the average minus half of the standard deviation. The highest category features all scores higher than the average plus half of the standard deviation. Everything within one standard deviation around the average score is considered the middle class. Then, every score is assigned a class indicator. These class indicator are assigned differently in three cases.

Case 1: The indicator can have a negative score. This is the case for *capital received*. Scores in the low class will be assigned a negative sign (-), those in the middle class a neutral sign (o) and those in the high class a positive sign (+).

Case 2: The indicator is dichotomous. This is the case for *success*. Since there are only two categories possible, the signs will be assigned based on the average score. Scores beneath and including the average score will be assigned a negative sign (-) and the scores above the average score will be assigned a positive sign (+)

Case 3: The indicator cannot have a negative score. This is the case for all of the other variables. With these variables, scores in the low class will be assigned a neutral-sign (o), those in the middle class a positive sign (+) and those in the high class a double positive sign (++)

This distribution of classes is shown in figure 6. The use of the standard deviation as boundaries for the classes provides the fairest division of scores, since 38.2% of the scores will be located in the

middle class and 30.9% in both the low and high class under a normal distribution. Figure 6 shows the distribution of classes in case of normally distributed scores.

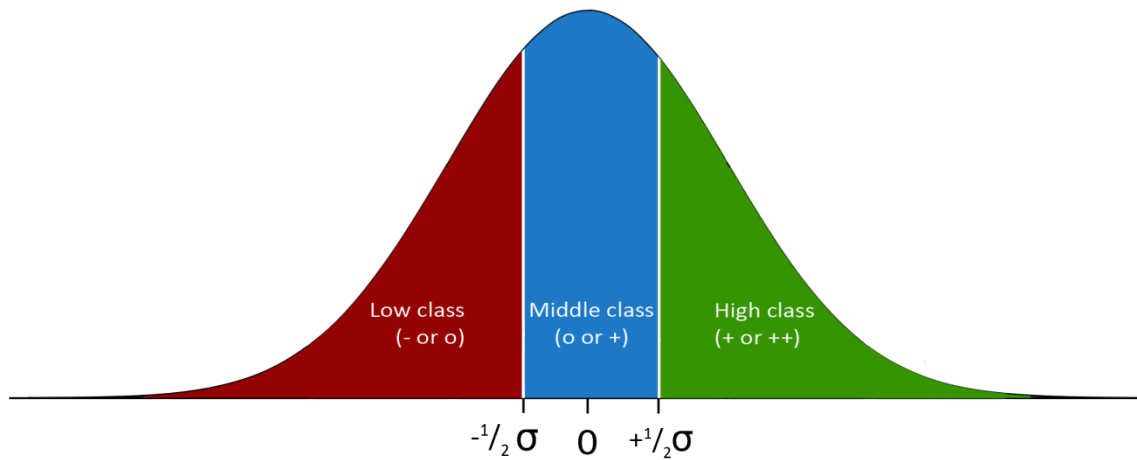


Figure 6: Class distribution in a normally distributed sample

When for each of the variables these boundaries have been determined and the classes thus defined, the number of cases in each class will be counted and the class containing the majority of the cases will be assigned to that variable in the respective age category. For example, in age category 2, *Entrepreneurial capabilities* has 3 scores in the middle class and 1 score in the low class (age category 2 has four cases). *Entrepreneurial capabilities* thus gets a + sign in age category 2. When all of the variables in an age category have been attributed a sign, the variables will be compared with each other to determine the relationship between them. If two variables were both attributed a negative sign, they have a positive relationship. Otherwise, if one variable has a positive sign and the other a negative sign, the two variables have a negative relationship. A relationship where at least one of the variables has a neutral sign, will be neutral. All of the relations possible are shown in figure 7.

	-	0	+		0	+	++		0	+	++
-	+	0	-	-	0	-	-	0	0	0	0
0	0	0	0	0	0	0	0	+	0	+	++
+	-	0	+	+	0	+	++	++	0	++	++

Figure 7: Relations between indicators derived from 27 combinations of possible classes with the concepts they represent (Moors & Faber, 2007)

While this method of analysis cannot assess the statistical significance of relations, it does show the dominant relations within the current sample. These relations are indicative for the relations present in a larger sample, and make the different hypotheses discerned in this study more plausible if the observed relations correspond with the hypotheses. If this analysis indicates that TDM positively influences NTBF performance in the later age categories, all 44 cases will be analyzed to determine if the TDM of USOs is indeed larger than of the other types of NTBFs. If the cases are distributed normally, a t-test will be used to test the difference in TDM between the different types of NTBFs. If the sample is not distributed normally, the Kruskal-Wallis Test will be used instead, since it uses rank

values instead of mean values to test the difference, thereby ignoring the distribution of the sample (McKnight and Najab, 2010).

Furthermore, if these tests show that there is a significant difference in TDM between the types of NTBF, additional analyses will be applied to assess whether this difference is caused by a difference in sectors or technological fields of the respective firms between the different types of NTBF, since different sectors and technological fields are shown to have a difference in R&D intensity and knowledge intensity in general as stated in section 2.2.1. (Eurostat, 2015; Freddi, 2009). Patents will be assigned to a specific sector and technological field according to the 'IPC8 -Technology Concordance Table' found in the WIPO statistics database (WIPO, 2013b). Patents could have been assigned several IPC classifications and some of these patents can thus be assigned several sectors or technological fields. These patents are seen as multiple cases. For example, a patent with a TDM of 0.33 and belonging to a CSO, which is assigned five IPC classifications, could be assigned to two different sectors and three different technological fields. It will be seen as two different CSOs with a TDM of 0.33 in the analysis of sectors and as three different CSOs in the analysis of technological fields. Using these data, an analysis of sectors and technological fields per type of NTBF will be performed as well as an analysis of TDM per technological field and sector. Afterwards, an expected TDM based on technological field and an expected TDM based on sector will be created per type of NTBF based on these analyses. A Kruskal-Wallis test will be used to determine if there is a difference between the expected and observed TDM.

4. Results

4.1. Robust sample analysis

As stated in the previous section, the subsample of 20 cases that provided financial information of within the sample of 44 cases has been used to determine the average scores and class boundaries for each variable. Those results are shown in table 2. As mentioned in section 3.2.1., the two cases in age category 1 are included in the calculation of the average scores and class boundaries. The scores in table 2 are thus based on 20 cases.

Table 2: Average scores and class boundaries (N=20)

	Success	TDM	EC	TC	Adaptability	Cap. Received	Patent value	Firm size
Average score	0.65	0.69	0.26	9.4	9.7	€ 306,842.11	1.70	3.70
Low class boundary	0.41	0.29	0.08	7.1	7.4	€ 41,035.93	0.59	2.37
High class boundary	0.89	1.09	0.44	11.7	12.0	€ 572,648.28	2.81	5.03

However, since age category 1 contains firms that are recently founded, they will not be included in further analyses (as mentioned in section 3.2.1.). The further analyses are thus based on 18 cases, of which four are located in age category 2, three in age category 3 and 11 in age category 4. Using the class boundaries given in table 2, all of the variables have been assigned a class indicator in age categories 2, 3 and 4. Subsequently, every variable has been compared to *success* in order to determine their relation for each of the age categories higher than 1. The results are shown in table 3. Table 4 shows the relations compared to the ones hypothesized in section 2.3. The signs in red show relations that do not match. The first result is that *success* has a positive sign in all age categories. Because of this, only capital received can have an observed negative relationship with *success*, since all other indicators cannot have a negative class indicator. The weakest relationship possible with *success* is therefore a neutral one for these indicators. Each independent variable will be elaborated upon in the following sections.

Table 3: Relations with 'success', in each age category

	Age 2 (N=4)	Age 3 (N=3)	Age 4 (N=11)
TDM	0	+	+
Entrepreneurial Capabilities	+	+	+
Technological Capabilities	+	++	+
Adaptability	+	++	+
Capital Received	0	+	0
Patent value	+	+	+
Firm size	+	++	+

Table 4: Comparison with hypothesized relations with 'success', in each age category

	Age 2		Age 3		Age 4	
	Observed	Hypothesized	Observed	Hypothesized	Observed	Hypothesized
TDM	0	0	+	0	+	+
Entrepreneurial Capabilities	+	0	+	+	+	+
Technological Capabilities	+	+	++	0	+	0
Adaptability	+	+	++	+	+	+
Capital Received	0	-	+	+	0	+
Patent value	+	+	+	+	+	+
Firm size	+	0	++	+	+	+

4.1.1. TDM

While the sample does indicate that TDM has a positive relation with success, it seems to happen earlier than hypothesized. TDM is a unique variable, in the sense that it is not dynamic; the TDM of a firm cannot be changed since it is based on the patent that a firm was established on. The analysis shows that, in this sample, firms with a high TDM did not survive the first age category (since the neutral category is the lowest category possible for TDM in this analysis). However, after age 2, mainly the firms with a relatively high TDM have survived and are successful. TDM could therefore well be the reason that USOs perform poorly in the pre start-up phase, but better in the later phases. To further explore this option, an additional analysis will be performed on the relation between TDM and *success*.

If TDM is indeed the cause of the performance differences between types of NTBF, it must have a unique relationship with *success*. This is because firms with a low TDM would survive easily, but firms with a high TDM can attain much higher profit growth when managed correctly. Since TDM is not a dynamic variable, a robust sample analysis can be performed on the entire set instead of per age. To this end, all cases have been split into two groups: one with all of the cases that have a score of 1 for success, and the other with all of the cases that have a score of 0 for success. Then, a majority count of TDM has been performed. Table 5 shows that TDM has a highly positive relation with the *success* group in this sample and only a moderate positive relation with the *no success* group. While this may seem odd, it could indicate that the hypothesis of TDM is plausible. Companies with a low TDM play it safe and survive, but will not obtain a high profit growth. On the other hand, companies with a high TDM can yield higher success, if they survive.

Table 5: TDM in the 'success' and 'no success' groups

	TDM
Success	++
No success	+

4.1.2. Entrepreneurial capabilities

Entrepreneurial capabilities have a positive relationship with *success* in all ages categories of this sample. While it was hypothesized that a firm in the pre start-up phase would have a negative influence on a firm's success, it seems that, in this sample, having employees with entrepreneurial expertise in a starting stage of a firm does not lead to a lack of focus on technological development, nor does it result in a premature focus on revenues and expansion at the expense of profit as described in section 2.2.2., which would result in unprofitable growth.

4.1.3. Technological capabilities

Technological capabilities have a positive relationship with *success* in all ages in this sample, while the hypothesis of this study was that technological capabilities only benefit a firm in the first age category. Instead, this sample features a highly positive relationship between *success* and *technological capabilities* in age category 3, indicating its importance in the start-up phase. Since table 4 shows that the average TDM in age category 3 is higher than in age category 2 and than hypothesized, this could be the cause of the increased benefits of technological capabilities. The reasoning for this is that, while it has been shown in section 4.1.1. that TDM increases success,

technological capabilities are most likely needed to be able to develop the technology further in order to become ready to enter the market, thus making technological capabilities very important to attain the benefits of a high TDM. It is also possible that the high entrepreneurial capabilities of firms overall, as shown in table 4, nullify the potential hazards of a high amount of technological capabilities; the risk of over-developing a technology for too long could be averted by people with more entrepreneurial experience. Another explanation is the transition from a one product company based on academic research to a multi-product company based on a customer driven technology base (Heirman and Clarysse, 2004). Since NTBFs are quite familiar with the customer needs after a few years, they can develop new products for their established customer base which requires technological capabilities.

4.1.4. Adaptability

Adaptability has a positive relationship with *success* in all age categories in this sample, especially in age category 3. Since there is no distinction between a positive or highly positive relationship in the hypotheses, this result corresponds with the hypothesized relationship between adaptability and success. The highly positive relationship in age category 3 could be caused by the similar highly positive relationship between firm size and success as shown in table 4, indicating larger firms in that age category. Since firm size results in a less dynamic organization causing firms to require more effort to adapt to changes in the environment, adaptability is most likely to be very important if there is a large firm size.

4.1.5. Capital received

The amount of capital received has a neutral relationship with *success* in age category 2 and 4, and a positive relationship with *success* in age category 3 in this sample. This deviates from the hypothesis in a number of ways. Firstly, it was hypothesized that having too much capital in the starting phase of the firm would lead to a neglect of developing a business model. It could also indicate a focus on attaining investments instead of creating value. This sample doesn't contain that negative relationship, but a neutral one instead. As with *technological capabilities*, this mitigation of a negative relationship in age category 2 could be caused by the observed higher entrepreneurial capabilities than hypothesized in that age category as shown in table 4, which could have resulted in a preferable firm focus because entrepreneurs could be aware of that risk and adjust the firm's strategy accordingly.

The second deviation from the hypothesis is the neutral relationship between *capital received* and *success* in the final phase of NTBF development in this sample, whereas a positive relationship was hypothesized. This may be induced by firms which have received too much capital in the pre start-up phase; it is possible that the hypothesized negative effects of receiving too much capital in the first phase of NTBF development, leading to a wrong business development focus, shows its effects only in the final phase of development. The neutral relationship would then be a combination of a negative relationship and a positive relationship. The negative relationship would be caused by firms which received too much capital in the pre start-up phase, while the positive relationship would be caused by firms receiving sufficient of capital in later phases of development, as hypothesized.

Another explanation for capital received being only important in the start-up phase, is that there is only a need for capital when starting production to enter the market. Since market entry is unwanted

in the pre start-up phase and since a NTBF should have enough capital for production in the post start-up phase, receiving capital could be important only in the start-up phase.

4.1.6. Patent value

The patent value has an overall positive effect on a firm's success in all of its development phases in this sample. This corresponds with the hypothesis.

4.1.7. Firm size

Firm size shows to have a positive relationship with *success* in all phases of NTBF development in this sample, with a highly positive relationship in age category 3. This does not correspond with the hypothesis, since *firm size* was believed to have a negative relationship with *success* in the pre start-up phase. As argued in 4.1.4., the relatively high observed adaptability of the firms in the sample as shown in table 4 could have nullified the negative effects of a large firm size in the pre start-up phase. Since *adaptability* has the same relationships with *success* as *firm size* does, it could be argued that in this sample, firm size is beneficial for a firm as long as the firm doesn't lose adaptability.

4.2. TDM per type of NTBF

Since TDM has a positive relationship with success in the later phases of NTBF development in this sample, TDM could indeed be an important explanation for the difference in performance between different types of NTBF. However, for that to be valid, the notion that USOs have a higher TDM than CSOs and IVs must be valid. As already mentioned in section 3.3., all 44 cases in the sample can be used to analyze this instead of the 20 cases used in the previous analyses, since financial information is irrelevant for this analysis. Firstly, an analysis will be done to see if the cases are normally distributed. If this is the case, a t-test can be used to test the difference in TDM between the different types of NTBFs. If the sample is not normally distributed, a Kruskal-Wallis Test will be used instead, since the latter test uses mean rank values instead of absolute mean values to test the difference (McKnight and Najab, 2010).

The box plot of the TDM in the different types of NTBFs (figure 8), shows a clear distribution of TDM. However, instead of CSOs being the type of NTBF with the smallest TDM, IVs are shown to have the smallest TDM in this sample. In this sample, external investors only seem to invest in companies that need very little time to commercialize profitably. According to the findings of this study, this could lead to a low risk factor accompanied by moderate success. USOs seem to have the highest TDM, which enforces the hypothesis that TDM explains the difference in performance between USOs on the one hand and CSOs and IVs on the other hand.

The box plot shows four outliers: two in the USO group, and one in each of the other groups. While outliers can indicate a measurement error, such as invalid information given in a survey, these cases are valid since they are derived from valid patent data, but are unique in their relatively high TDM value. As such, they will not be excluded from successive analyses.

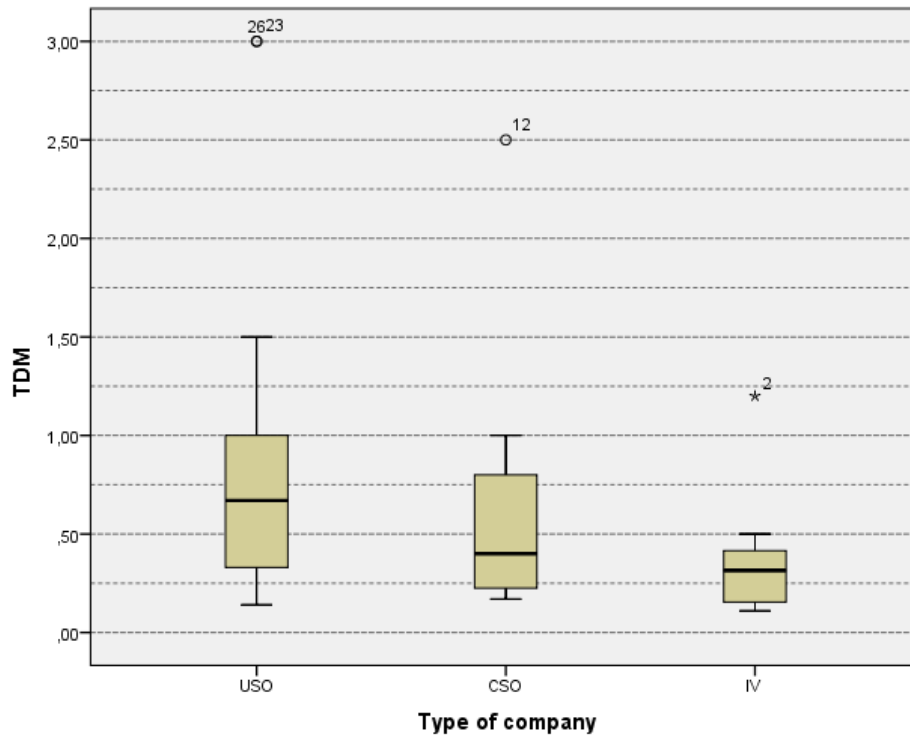


Figure 8: Box plot of the TDM per type of NTBF

The histograms of the distributions of TDM values of USOs, CSOs and IVs, respectively (figure 9), shows that the data are not normally distributed. Consequently, a Kruskal-Wallis Test has been executed (table 6). Like the Mann-Whitney U test, the Kruskal-Wallis test tests if there is a significant difference in mean rank values of different samples from the same population. However, whereas the Mann-Whitney U test can only compare two samples which would result in three different tests in order to compare the different types of NTBFs, the Kruskal-Wallis can compare several samples in one test (McKnight and Najab, 2010), thus only needing one test for the three types of NTBFs. The analysis shows that the difference in mean ranks in TDM between the three types of NTBFs has a significance of 0.082. Since this study features a very small sample, this study views all significance values below 0.1 as statistically significant. The observed difference in TDM values between different types of NTBF in this sample can thus be seen as significant, thereby making the hypothesis that TDM is the cause for the performance curve of USOs as described by Ortín-Ángel and Vendrell-Herrero (2014) more plausible.

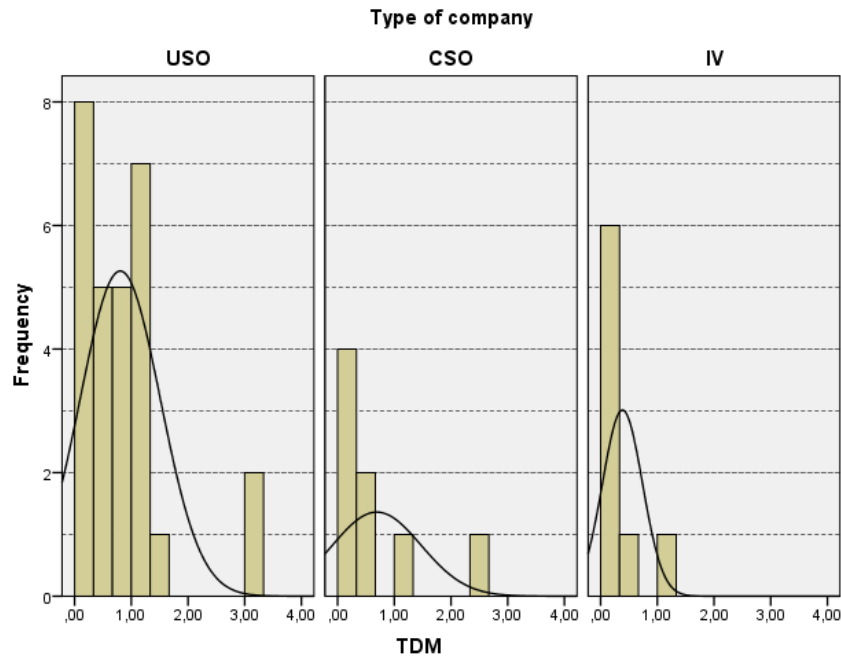


Figure 9: Histogram of the TDM per type of NTBF

Table 6: Kruskal-Wallis Test of TDM per type of NTBF

Ranks			
	Type of company	N	Mean Rank
TDM	USO	28	25.46
	CSO	8	20.25
	IV	8	14.38
	Total	44	

Test Statistics ^{a,b}	
	TDM
Chi-Square	4.997
df	2
Asymp. Sig.	.082

a. Kruskal Wallis Test

b. Grouping Variable: Type of company

4.3 Sectors and technological fields

As stated in section 3.3., a difference in TDM between types of NTBF could be caused by a difference in sectors and technological fields (Eurostat, 2015; Freddi, 2009). To test whether the observed difference in TDM between different types of NTBFs is caused by a difference in sectors and technological fields between the types of NTBFs, all 44 firms in the sample were assigned to one or more sectors or technological fields according to the 'IPC8 -Technology Concordance Table' (WIPO, 2013b). As mentioned in section 3.3., some patents were assigned several sectors or technological fields and count as several cases. The total amount of cases for the analyses of sectors is 53 and the total amount of cases for the analysis of technological fields is 71. Table 7 shows the absolute

number of sectors per type of NTBF as well as the average TDM of cases in these sectors, the latter of which is also shown in figure 10. Table 8 and figure 11 show the percentage of sectors within the types of NTBFs.

Table 7: Types of NTBF and average TDM per sector

Sectors	IVs	CSOs	USOs	TDM
Chemistry	2	4	15	0.62
Electrical engineering	0	0	5	0.54
Instruments	7	4	12	0.80
Mechanical engineering	0	0	1	0.86
Medical engineering	0	1	0	0.17
Other fields	1	1	0	0.25
Total	10	10	33	N/A

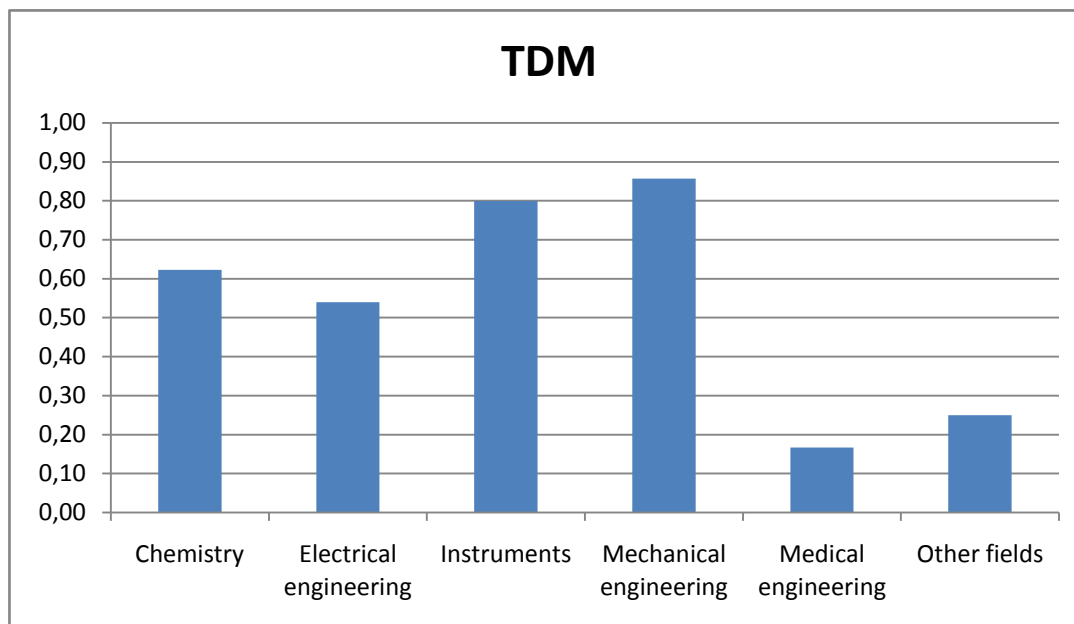


Figure 10: Average TDM per sector

Table 8: Sectors per type of NTBF

Sector	IVs	CSOs	USOs
Chemistry	20%	40%	45%
Electrical engineering	0%	0%	15%
Instruments	70%	40%	36%
Mechanical engineering	0%	0%	3%
Medical engineering	0%	10%	0%
Other fields	10%	10%	0%
Total	100%	100%	100%

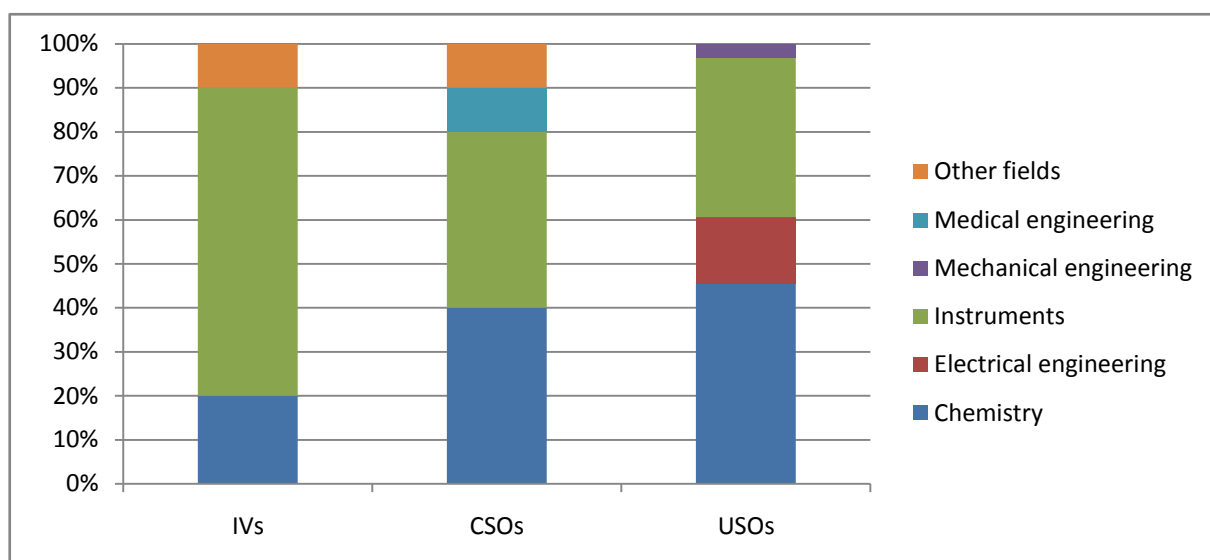


Figure 11: Relative amount of sectors per type of NTBF

The figures and tables above shows that relatively many more IVs are based in the *Instruments* sector than USOs or CSOs. This sector has the second highest TDM on average in this sample. Furthermore, in all types of NTBF, most firms are based in the *Instruments* and *Chemistry* sectors. Table 9 shows the types of NTBF, the percentage within that type of NTBF and the average TDM of the different technological fields in this sample. The average TDM of the different technological fields are shown in figure 12. No bar chart of technological fields per type of NTBF is given due to the high amount of technological fields.

Table 9: Statistics of the technological fields

Technological field	IVs	IVs %	CSOs	CSOs %	USOs	USOs %	TDM
Analysis of biological materials	3	21%	0	0%	6	13%	1.02
Basic materials chemistry	1	7%	0	0%	1	2%	0.56
Biotechnology	0	0%	1	10%	9	19%	0.73
Chemical engineering	1	7%	0	0%	2	4%	0.55
Computer technology	0	0%	0	0%	2	4%	0.27
Electrical machinery, apparatus, energy	0	0%	0	0%	3	6%	0.72
Environmental technology	0	0%	0	0%	1	2%	0.50
Food chemistry	0	0%	0	0%	2	4%	0.75
Furniture, games	1	7%	1	10%	0	0%	0.25
Macromolecular chemistry, polymers	0	0%	0	0%	1	2%	0.33
Materials, metallurgy	0	0%	0	0%	1	2%	0.67
Measurement	1	7%	0	0%	5	11%	0.73
Mechanical elements	0	0%	0	0%	1	2%	0.86
Medical technology	5	36%	3	30%	5	11%	0.46
Micro-structural and nano-technology	0	0%	0	0%	1	2%	1.00
Optics	0	0%	1	10%	0	0%	2.50
Organic fine chemistry	1	7%	0	0%	1	2%	0.56
Pharmaceuticals	1	7%	3	30%	6	13%	0.59
Transport	0	0%	1	10%	0	0%	0.17
Total	14	100%	10	100%	47	100%	N/A

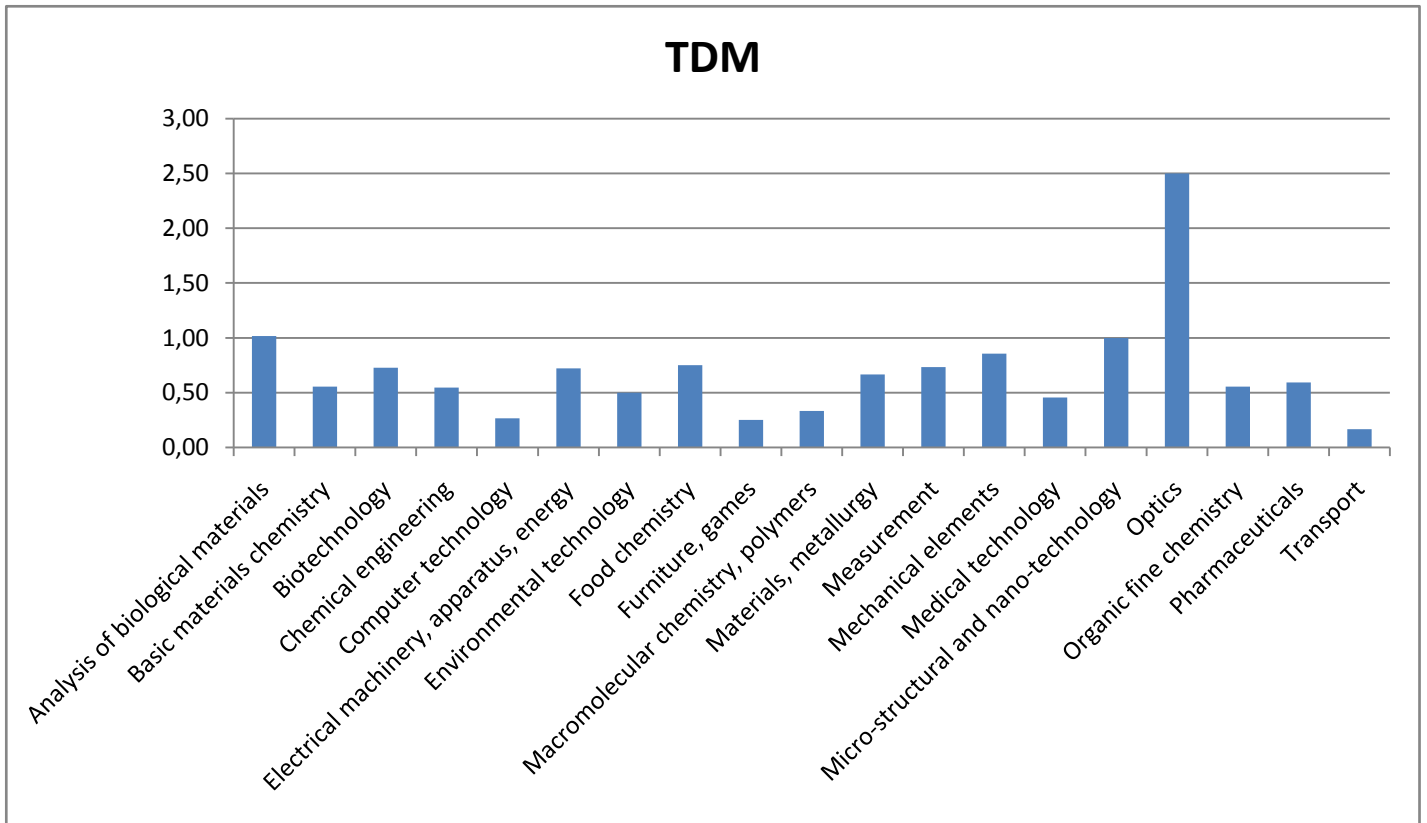


Figure 12: TDM per technological field

Table 9 and figure 12 show that Optics has the highest TDM in this sample, although that is caused by one case, much alike nano-technology. Table 8 also shows that the division of technological fields between types of NTBF is much more diverse than the observed division of sectors in this sample. Combining the data from these analyses, an expected TDM per type of NTBF was calculated based on the division of sectors and one based on the division of technological fields. Table 10 and figure 13 show these expected TDM values per type of NTBF, along with the observed TDM per type of NTBF as described in section 4.2.

Table 10: Expected and observed TDM per type of NTBF

Type of NTBF	Expected TDM based on sectors (N=53)	Expected TDM based on technological fields (N=71)	Observed TDM (N=44)
IV	0.71	0.61	0.39
CSO	0.61	0.68	0.69
USO	0.68	0.68	0.80

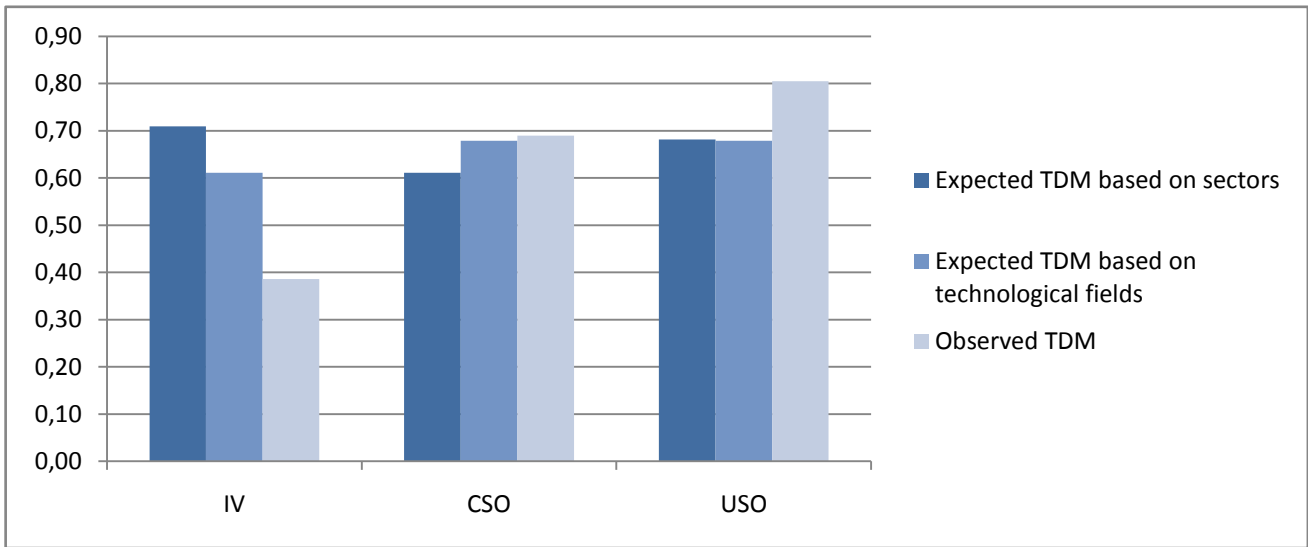


Figure 13: Expected and observed TDM per type of NTBF

Table 10 and figure 13 show quite a difference in expected and observed TDM values, especially in the case of IVs. The Kruskal-Wallis test (table 11) shows that the overall difference between the expected TDM values based on sectors, the expected TDM values based on technological fields and the observed TDM is very significant since it has a significance value of 0.000. This means that the difference in observed TDM between the different types of NTBFs is not correlated with the difference in sectors and technological fields between the different types of NTBFs.

Table 11: Kruskal-Wallis test of differences in expected and observed TDM values

Ranks			
	Group	N	Mean Rank
TDM	Sector TDM	53	114.36
	Technological field TDM	71	73.42
	Observed TDM	44	66.41
	Total	168	

Test Statistics ^{a,b}	
	TDM
Chi-Square	30.755
df	2
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. GroupingVariable: Group

5. Discussion

This section will elaborate on the findings from this study. Although the sample size is very small, the difference in TDM between USOs, CSOs and IVs was found to be statistically significant. Furthermore, the dominant relationship between *TDM* and *success* in this sample corresponds with the relationship between USOs and firm performance as found by Ortín-Ángel and Vendrell-Herrero (2014): a high TDM seems to cause lower performance in the pre start-up phase of development of a NTBF, but can lead to much higher profits than firms with a low TDM in the post start-up phase. TDM could thus very well be the cause for the difference in performance between different types of NTBF in different phases of development. This would have several implications.

5.1. Managerial implications

The first implication is that the notion that venture capitalists seem to have better selection mechanisms than university incubators and choose to disregard the technologies that seem to radical to be successfully commercialized (Lerner, 2005; Grimaldi et al, 2001), is true in this sample. However, while venture capitalists are believed to take more risks than the management of CSOs (Zahra, 1996), they seem to very risk-averse since IVs have the lowest TDM of the different types of NTBFs, even lower than CSOs. Venture capitalists thus seem to pay no attention to or are unable to see the potential high returns on investment by selecting NTBFs with a relatively high TDM. Because of this, venture capitalists are not a best practice of how to manage a NTBF successfully, since very little management is required; the companies they invest in can enter the market very swiftly with little risks. Furthermore, managing radical innovations is very different from managing incremental innovations, since they both come with their own unique challenges (Dewar and Dutton, 1986; Green et al, 1995; McDermot and O'Connor, 2002). Universities and their incubators should thus not use venture capitalists as a reference of how to manage USOs, even though IVs seem to perform better than USOs overall.

This does not mean that all USOs have a radical technology; some USOs in the sample have a very low TDM value. It is therefore necessary to structure management of a NTBF based on their TDM. Therefore, universities need to have different approaches for guiding and managing their spin-offs. Some USOs can be commercialized very swiftly, while others need a longer time to develop in order to survive their entry to the market.

This is not the only aspect that influences how a NTBF should be managed, however. The sample used by this study showed that different factors are important for a firm's performance in different phases of NTBF development. NTBFs thus need dynamic management aligned with their age in order to be to perform best.

Lastly, evaluations of NTBFs needs to incorporate their TDMs. It would be unrealistic to expect the same results within a year of development from two companies with a different TDM. Killing off or reducing support for USOs because they show no profit growth after their pre start-up phase when they have a high TDM would be a very bad decision

Universities thus have a means to increase performance by changing their management and support of their spin-offs. By adapting dynamic, individualized management based on TDM and firm age, the high death rates of USOs can be lowered while their performance can be increased. Evaluation of the spin-offs also need to be dynamic, since expected firm performance should differ with TDM.

Managing successful USOs can give universities access to more facilities and industrial know-how (Grimaldi and Von Tunzelmann, 2002), increase revenues and patent activity (Quintas and Guy, 1995; Merrill and Mazza, 2010) and attract more entrepreneurial students and faculty (Florida, 1999). A good management of USOs is thus very desirable for universities. More successful NTBFs in general could have societal benefits as well: the creation and growth of knowledge intensive firms help economical growth and knowledge creation in general (Wright et al, 2008; Grimaldi et al, 2011). Having the management of NTBFs better aligned with their TDM could thus be highly beneficial.

5.2 Theoretical implications

As mentioned in the previous section, if there is an observed influence of TDM on firm performance, evaluation criteria for NTBFs should change, causing earlier evaluation criteria to become obsolete. This calls the findings of some previous studies into question. Ensley and Hmieleski (2005) stated that IVs perform better in terms of net cash flow and revenue growth than USOs, caused by more independent and heterogeneous management teams. It is most likely true that firms with a low TDM, which most IVs are, have performed better on the short terms, but will be outperformed by firms with a high TDM on the long run, if managed correctly. Furthermore, firms with a high TDM most likely need extra technological capabilities, which implies that the management team should not be too heterogeneous in those firms in order to achieve high performance. Zahra (1996) states that IVs outperform CSOs on three-year average growth and return on equity, most likely due to the creation of a atmosphere where risk-taking is encouraged. However, this sample shows that IVs are more risk-averse than CSOs. Furthermore, three years seems to be the point where firms with higher a TDM begin to outperform firms with a lower TDM. CSOs will most likely outperform IVs after three years. Wennberg et al (2011) state that CSOs outperform USOs on survival and growth and that entrepreneurial capabilities are more valuable for performance than technological capabilities. CSOs indeed outperform USOs on growth on the short term, and a flawed management of firms with a high TDM could be the cause for the higher survival rates of CSOs in general. However, technological capabilities seem to be very important for firms with a high TDM. A comparison between the importance of technological capabilities and entrepreneurial capabilities in general is flawed: firms with a high TDM need high technological capabilities, whereas firms with a low TDM will most likely not. An overall comparison will thus be heavily influenced by the TDMs of the NTBFs in the sample.

The most important flaw in the previously mentioned studies is, however, that there doesn't seem to be an inherent difference between different types of NTBFs. A general comparison between USOs, CSOs and IVs might lead to differences caused by the overall difference in TDM, but a comparison between firms with a high TDM and firms with a low TDM would be more valid. As such, there seem to be no general advantages, disadvantages or management styles for each of the different types of NTBFs, but rather for the firms with different TDMs.

5.3. Limitations

Since the sample size of this study is very small, the findings of this study are tentative and cannot be generalized. However, since the observed relations mostly correspond with the hypothesized relations in the theoretical framework, the influence of TDM on firm performance is plausible. Since the implications are substantial if this is indeed the case, it is important to assess if the observed relations for a larger sample. However, it will be very difficult to do so. There is no way of attaining a better list of potential spin-offs based on patent data, nor is there a way of getting the email-addresses of inventors based on patent data. A solution to this would be to get a list of patents from

a university's holding, which have been either sold or licensed to companies or were further developed in an incubator. This would get information on USOs and potential CSOs based on academic patents, but it is not possible to identify IVs in this manner. However, university holdings are not very likely to share data on their patents. An alternative is to visit the university incubators to obtain a list of all of their university spin-offs, both still active and not. While this information is less sensitive, it only provides USOs. While the difference between different types of NTBFs is most likely caused by TDM, meaning that it doesn't matter if the NTBFs analyzed are solely USOs or not, it would be better if the difference in TDM between the types of NTBFs discerned in this study would also be tested on a larger scale.

The small sample posed more limitations than only the lack of generalizability. The sample size also prohibited the use of regression analyses. Therefore, this study cannot see how much TDM influences success compared to the control variables, nor multicollinearity could be tested for. It could be possible that the influences of different variables overlap, such as a large firm size increasing the importance of adaptability as argued in section 4.1.4. Lastly, regression analyses would also show the fitness of the model, showing if there are any variables missing, which could better explain the differences in success. Future research should thus shed more light on the coherence of the different independent variables, potentially missing control variables and the extent of the influence of TDM on firm performance.

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Appendix A: Search queries Dutch universities

Erasmus Universiteit Rotterdam

(APP = "univ erasmus" "univ erasmus medical center rotterdam" "univ erasmus medical ct" "univ erasmus medical ct rotter" "univ erasmus medical ct rotterdam" "rotterdam erasmus medical center" "rotterdam erasmus medical ct" "erasmus medical ct" "erasmus medical centre" "erasmus mc" "erasmus uni" "erasmus uni medisch ct" "erasmus uni medisch ct rotterd" "erasmus uni medisch ct rotterdam" "erasmus univ medical center rotterdam" "erasmus univ medical ct rotter" "erasmus univ medical ct rotterdam" "erasmus univ rotterdam" "erasmus universitair" "erasmus universitair medisch centrum" "erasmus universitair medisch centrum rotterdam" "erasmus universiteit" "erasmus universiteit medisch centrum" "erasmus universiteit medisch ct" "erasmus universiteit rotterdam" "erasmus universiteit rotterdam instituut revalidatiegeneeskunde van de faculteit geneeskunde en gezondheids wetenschappen" "erasmus universiteit rotterdam instituut revalidatiegeneeskunde van de faculteit geneeskunde en gezondheids wetenschappen" "erasmus universiteit rotterdam instituut revalidatiegeneeskunde van de faculteit geneeskunde en gezondheids wetenschappen" "erasmus universiteit rotterdam nl" "erasmus universiteit rotterdam rotterdam" "erasmus universiteit rotterdam rotterdam niederlande" "erasmus universiteit rotterdam rotterdam nl" "erasmus universiteit rotterdam te rotterdam" "erasmus universiteit te rotterdam te rotterdam" "erasmus university" "erasmus university medical center" "erasmus university medical center faculty of medicine department of cell biology and genetics" "erasmus university medical center rotterdam" "erasmus university medical center rotterdam erasm" "erasmus university medical center rotterdam erasmus mc" "erasmus university medical centre" "erasmus university medical centre rotterdam" "erasmus university medical centre rotterdam depart ment of cell biology and genetics" "erasmus university medical ct" "erasmus university rottendam medical center" "erasmus university rottendam medical ct" "erasmus university rotterdam" "erasmus university rotterdam medical center" "erasmus university rotterdam medical ct" "erasmus universteit rotterdam" "erasmus univesiteit rotterdam" "erasmus univesiteit rotterdam medicine center" "erasmus univesity rotterdam medicine center" "erasmus univesity rotterdam medicine ct" "erasmus unviersiteit" "academic hospital rotterdam" "academic hospital rotterdam ac" "academic hospital rotterdam ro" "academic hospital rotterdam rotterdam" "academisch ziekenhuis rotterdam" "academisch ziekenhuis rotterdam dijkzigt" "academisch ziekenhuis rotterdam dijkzigt rotterdam" "academisch ziekenhuis rotterdam te rotterdam") AND (APD = 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014)

Patents: 603; patent families: 178

Protestantse Theologische Universiteit

No patents found

Theologische Universiteit Apeldoorn

No patents found

Theologische Universiteit Kampen

No patents found

Radboud Universiteit Nijmegen

(APP = radboud "radboud universiteit nijmegen" "radboud university nijmegen" "radboud university nijmegen me" "radboud university nijmegen medical centre" radbouduniversiteit radbound

"radbound university nijmegen" "univ nijmegen" "univ nijmegen" "nijmegen university" "umc st radboud" "university medical centre nijmegen" "university medical centre st radboud of the university of nijmegen" "university of nijmegen" "university of nijmegen" "university of nijmegen nijmegen" "university of nijmegen nijmegen nl") AND (APD = 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014)

Patents: 139; patent families: 48

Rijksuniversiteit Groningen (Groningen Academisch Ziekenhuis)

(APP = "rijks universiteit groningen" "rijks univesiteit groningen" "rijks universiteit to groningen" "rijks universiteit to groninge" "univ groningen" "groningen science park" "groningen acad ziekenhuis" "rijksuniversiteit te gronigen" "rijksuniversiteit te groningen" "rijksuniversiteit te groningen groningen" "rijksuniversiteit te groningen groningen nl" "rijksuniversiteit te groningen te groningen" "rijksuniversiteit groningen" "rijksuniversiteit gronigen" "rijksuniversiteitte groningen" "rijksuniversiteit te groningen" "rijksunoversiteit te groningen" "rijksuniversiteit te groningen" "rijksuniv te groningen" "rijksuniverisiteit te groninge" "rijksuniverisiteit te groningen" "rijksuniversiteit groningen" "academisch ziekenhuis groningen" "academisch ziekenhuis groningen groningen" "academischziekenhuis groningen" "university of groningen" "university of groningen groningen" "university of groningen the" "universiteit van groningen" "universiteit van groningen gro" "universiteit van groningen groningen") AND (APD = 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014)

Patents: 206; patent families: 78

Technische Universiteit Delft

(APP = "technische unie delft" "technische univ delft" "technische univeristeit delft" "technische universitaet delft" "tu delft" "tu delft afdeling werktuigbouw" "tu delft afdeling werktuigbouw laboratorium voor meet en regeltechniek" "univ delft tech" "univ delft tech abb lumms glo" "univ delft tech abb lumms global inc" "delft univ of technology" "delft university" "delft university of technology" "delft university of technology faculty of chemical engineering and material science" "delft university of tevhology" "technische universiteit deflt" "technische universiteit delft" "technische universiteit delft" "technische universiteit delft delft" "technische universiteit delft delft nl" "technische universiteit delft et al" "technische universiteit delft faculteit der elektrotechniek" "technische universiteit delft faculteit technische aardwetenschappen" "technische universiteit delft null" "technische universiteit delft stichting voor de technische wetenschappen" "technische universiteit delft te delft" "technische universiteit delft te delft joseph johannes franciscus scholten te sittard en tom van der kamp te s gravenhage" "technische universiteit delft te delft p a postbus 85096 te 3508 ab utrecht" "technische universiteit delft technische universiteit delft" "technische universiteit delft the" "technische universitet delft" "technische universitet delft" "technische universiteit delft" "technische universiteit delft" "technische universteit delft" "technische universteit delft" "tech unie delft" "tech univ delft" "tech univeristeit delft" "tech universiteit deflt" "tech universiteit delft facult" "tech universiteit delft sticht" "tech universiteit delft tech u" "tech universitet delft" "tech universiteit delft" "tech university delft" "tech universteit delft" "tech universteit delft") AND (APD = 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014)

Patents: 853; patent families: 281

Technische Universiteit Eindhoven

(APP = "eindhoven university of technology" "tu eindhoven" "technische univ eindhoven"
"technische universitat eindhoven" "technische universiteit eindhoven" "technische universiteit
eindhoven" "technische universiteit eindhoven" "technische universiteit eindhoven eindhoven"
"technische universiteit eindhoven eindhoven nl" "technische universiteit eindhoven te eindhoven"
"technische university eindhoven" "univ eindhoven tech" "univ eindhoven tech nl" "tech uni
eindhoven" "tech univ eindhoven" "tech universiteit eindhoven" "tech universiteit eindhoven" "tech
universiteit eindhoven ei" "tech university eindhoven") AND (APD = 2005 2006 2007 2008 2009 2010
2011 2012 2013 2014)

Patents: 304; patent families: 99

Universiteit Leiden (AZL en LURIS)

(APP = "leiden univ" "leiden univ medical center" "leiden univ of medical center" "leiden university"
"leiden university medical center" "leiden university medical center leiden" "leiden university
medical center lumc acting on behalf of academic hospital leiden azl" "leiden university medical
center lumc acting on behalf academic hospital leiden azl" "leiden university medical center lumc
acting on behalf of academic hos pital leiden azl" "leiden university medical center lumc acting
on behalf of academic hospital leiden azl" "leiden university medical centre lumc acting on behalf of
academic hospital leiden azl" "leiden university medical centre lumc acting on behalf of the academic
hospit" "leiden university medical centre lumc acting on behalf of the academic hospital leiden"
"leiden university medical ct" "leiden university medical ct l" "leiden university medical ct lumc acting
on behalf academic hospital leiden azl" "leiden university medical ct lumc acting on behalf of
academic hos pital leiden azl" "leiden university medical ct lumc acting on behalf of academic
hospital leiden azl" "leiden university medical ct lumc acting on behalf of the academic hospital
leiden" "rijks universiteit leiden" "rijks university leiden" "rijks univ leiden" "rijksuniv leiden"
"rijksuniversiteit leiden" "rijksuniversiteit leiden" "rijksuniversiteit leiden en pr" "rijksuniversiteit
leiden en prof dr robbert adriaan schilperoort beide te leiden" "rijksuniversiteit leiden en prof dr
robbert adriaan schilperoort beiden te leiden" "rijksuniversiteit leiden leide" "rijksuniversiteit leiden
leiden" "rijksuniversiteit leiden leiden nl" "rijksuniversiteit leiden te leiden" "rijksuniversiteit leiden te
leiden en nederlandse hartstichting te den haag" "rijksuniversiteit leiden te leiden en prof dr robbert
adriaan schilperoort te oegstgeest" "rijksuniversiteit te leiden" "rijksuniversiteit te leiden de"
"rijksuniversiteit te leiden le" "rijksuniversiteit te leiden leiden" "rijksuniversiteit te leiden leiden nl"
"rijksuniversiteit te leiden nl" "rijksuniversiteit te leiden te leiden" "univ leiden" "univ leiden leiden"
"univ leiden medical ct" "leiden university res innova" "leiden university research innovation
services" "leiden university research innovation services luris" "university leiden" "universiteit leiden
leiden university" "universiteit leiden" "universiteit leiden faculteit" "universiteit leiden faculteit van
wiskunde en natuurwetenschappen" "universiteit leiden in leiden" "universiteit leiden instituut
moleculaire plantkunde" "universiteit leiden leiden" "universiteit leiden leiden uni" luris "academisch
ziekenhuis leiden a" "academisch ziekenhuis leiden acting under the name leiden university medical
center" "academisch ziekenhuis leiden h" "academisch ziekenhuis leiden h o d n lumc" "academisch
ziekenhuis leiden hodn lumc" "academisch ziekenhuis leiden l" "academisch ziekenhuis leiden leids
universitair medisch centrum" "academisch ziekenhuis leiden" "academisch ziekenhuis leiden a"
"academisch ziekenhuis leiden a u leiden uni medical ctr" "academisch ziekenhuis leiden acting under
the name leiden university medical center" "academisch ziekenhuis leiden acting under the name
leiden university medical ct" "academisch ziekenhuis leiden also acting under the name leiden
universit" "academisch ziekenhuis leiden also acting under the name leiden university" "academisch
ziekenhuis leiden also acting under the name leiden university medical center" "academisch
ziekenhuis leiden also acting under the name leiden university medical center lumc" "academisch
ziekenhuis leiden also acting under the name leiden university medical ct" "academisch ziekenhuis
leiden also acting under the name leiden university medical ct lumc" "academisch ziekenhuis leiden
h" "academisch ziekenhuis leiden h o d n leids uni medisch ct" "academisch ziekenhuis leiden h o d n

lumc" "academisch ziekenhuis leiden hodn" "academisch ziekenhuis leiden hodn leids uni medisch ct" "academisch ziekenhuis leiden hodn leids universitair medisch centrum" "academisch ziekenhuis leiden hodn lumc" "academisch ziekenhuis leiden l" "academisch ziekenhuis leiden leiden university medical center" "academisch ziekenhuis leiden leids universitair medisch centrum" "academisch ziekenhuis leiden lumc" "academisch ziekenhuis leiden rijnsburgerweg 10 te 2333 aa leiden" "academisch ziekenhuis leiden te leiden" "academisch ziekenhuis leiden" "academisch ziekenhuis leiden a u leiden uni medical ctr" "academisch ziekenhuis leiden" "university of leiden" "university of leiden leiden") AND (APD = 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014)

Patents: 766; patent families: 223

Universiteit Maastricht

(APP = "maastricht university" "univ maastricht" "universiteit maastricht" "universiteit maastricht cardio" "universiteit maastricht cardiovascular research insitute maastricht carim" "universiteit maastricht carim" "universiteit maastricht maastr" "universiteit maastricht maastricht" "academic hospital maastricht" "academisch ziekehuis maastricht" "academisch ziekenhuis maastric" "academisch ziekenhuis maastricht" "university of maastricht" "universiteit van maastricht") AND (APD = 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014)

Patents: 263; patent families: 80

Universiteit Twente

(APP = "twente university" "univ twente" "univ twente fakultaet chemisch" "univ twente inst for biomedical technology and technical medicine mira" "universiteit twente" "universiteit twente a universi" "universiteit twente a university" "universiteit twente and techno" "universiteit twente and technologiestichting stw" "universiteit twente chemische" "universiteit twente chemische technologie" "universiteit twente enschede d" "universiteit twente enschede drienerlo" "universiteit twente faculteit" "universiteit twente faculteit der technische natuurkunde" "universiteit twente faculteit toegepaste onderwijskunde to" "universiteit twente mesa res i" "universiteit twente mesa research instituut" "universiteit twente postbus 217 te 7500 ae enschede" "universiteit twente te enschede" "technische universiteit twente" "tech universiteit twente" "university of twente" "university of twente enschede nl" "university of twente institute for biomedical technology and technical medicine mira") AND (APD = 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014)

Patents: 224; patent families: 86

Universiteit Utrecht (UMC)

(APP = "utrecht univ" "utrecht university" "univ utrecht utrecht" "univ utrecht" "univ utrecht and technology fo" "univ utrecht holding b v" "univ utrecht holding b v nl et al" "univ utrecht holding bv" "univ utrecht holding bv nl" "univ utrecht holding bv nl et al" "univ utrecht nl" "univ utrecht nl et al" "univ utrecht technology foun" "umc utrecht participates bv" "umc utrecht holding b v" "umc utrecht holding bv" "umc utrecht holding bv nl" "umc utrecht holding bv nl et al" "umc utrecht participates b v" "rijksuniversiteit te utrecht" "rijksuniversiteit te utrecht te utrecht" "rijksuniversiteit te utrecht te utrecht en euro diagnostics bv te apeldoorn" "rijksuniversiteit te utrecht u" "rijksuniversiteit te utrecht utrecht nl" "rijksuniversiteit utreact" "rijksuniversiteit utrecht" "rijksuniversiteit utrecht de" "rijksuniversiteit utrecht en s" "rijksuniversiteit utrecht en stichting technische wetenschappen beide te utrecht" "rijksuniversiteit utrecht nl" "rijksuniversiteit utrecht p a" "rijksuniversiteit utrecht p a

universitair transferbureau utrecht heidelberglaan 8 te 3584 cs utrecht" "rijksuniversiteit utrecht te utrecht" "rijksuniversiteit utrecht uni" "rijksuniversiteit utrecht universitair transferbureau utrecht heidelberglaan 8 te 3584 cs utrecht" "rijksuniversiteit utrecht utre" "rijksuniversiteit utrecht utrecht" "rijksuniversiteit utrecht utrecht nl" "rijksuniv utrecht" "university medical center utrecht" "university medical center utrecht eijkman winklercentre for microbiology infectious diseases and inflammation" "academisch ziekenhuis utrecht" "academisch ziekenhuis utrecht utrecht" "academisch ziekenhuis utrecht utrecht nl" "academisch ziekenhuis utrecht" "university of utrecht" "university of utrecht and technology foundation technologiestichting stw" "university of utrecht holding bv" "university of utrecht technology foundation technologiestichting stw" "university of utrecht utrecht" "universiteit van utrecht" "universiteit van utrechth" universiteitutrecht) AND (APD = 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014)

Patents: 391; patent families: 125

Universiteit van Amsterdam

(APP = "amsterdam univ" "amc amsterdam" "academic hospital at the university of amsterdam" "academic medical center at the universiity of amsterdam" "academic medical center at the university of amsterdam" "academic medical center university of amsterdam" "academic medical centre" "academic medical ct" "academic medical ct at the uni" "academic medical ct at the universiity of amsterdam" "academic medical ct university" "academisch centrum" "academisch ct" "academisch medicsh centrum bij de universiteit van amsterdam" "academisch medicsh ct bij de universiteit van amsterdam" "academisch medisch centrum bij" "academisch medisch centrum bij de universiteit van amsterdam" "academisch medisch centru bij de universiteit van amsterdam" "academisch medisch centrum" "academisch medisch centrum amsterdam" "academisch medisch centrum amsterdam molecular therapeutics" "academisch medisch centrum bij de univ van amsterdam" "academisch medisch centrum bij de univeriteit vanamsterdam" "academisch medisch centrum bij de universiteit van" "academisch medisch centrum bij de universiteit van amsterdam" "academisch medisch centrum bij de universiteit vanamsterdam" "academisch medisch centrum bu de universiteit vanamsterdam" "academisch medisch centrum of the university van amsterdam" "academisch medisch centrum univ van amsterdam" "academisch medisch centrum universiteit van amsterdam" "academisch medisch centrum van de universiteit van amsterdam" "academisch medisch ct" "academisch medisch ct bij de u" "academisch medisch ct bij de univ van amsterdam" "academisch medisch ct bij de univeriteit van amsterdam" "academisch medisch ct bij de universiteit" "academisch medisch ct bij de universiteit van" "academisch medisch ct bij de universiteit van amsterdam" "academisch medisch ct bu de universiteit van amsterdam" "academisch medisch ct of the u" "academisch medisch ct univ van amsterdam" "academisch medisch ct universi" "academisch medisch ct universiteit van amsterdam" "academisch medisch ct van de u" "academisch medisch ct van de universiteit van amsterdam" "academisch medish centrum" "academisch medish ct" "univ amsterdam" "univ amsterdam acad ziekenhuis" "univ amstserdam" "university of amsterdam" "universiteit van amsterdam" "universiteit van amsterdam ams" "universiteit van amsterdam amsterdam" "universiteit van amsterdam faculteit der natuurwetenschappen wiskunde en" "universiteit van amsterdam faculteit der natuurwetenschappen" "universiteit van amsterdam faculteit der natuurwetenschappen wiskunde en i" "universiteit van amsterdam faculteit der natuurwetenschappen wiskunde en informatica" "universiteit van amsterdam faculteit der natuuwetenschappen wiskunde en informatica amsterdam" "universiteit van amsterdam null" "universiteit van amsterdam te amsterdam p a transferpunt amsterdam sarphatistraat 143 te 1018 gd amsterdam" "universiteit van amstserdam faculteit der natuurwetenschappen wiskunde en informaatica") AND (APD = 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014)

Patents: 414; patent families: 140

Tilburg University

No patents found

Universteit voor Humanistiek

No patents found

Vrije Universiteit Amsterdam

(APP = "vrije universiteit amsterdam" "vrije universiteit medisch centrum" "vrije universiteit medisch centrum vumc" "vrije universiteit medisch ct" "vrije universiteit van amsterd" "vrije universiteit van amsterdam" "vu medisch centrum" "vu medisch ct" vumc) AND (APD = 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014)

Patents: 81; patent families: 38

Wageningen Universiteit

(APP = "wageningen universiteit" "wageningen universiteit agrote" "wageningen universiteit agrotechnologie en voedingswetenschappen" "wageningen universiteit agrotechnologie voedingswetenschappen" "wageningen universiteit null" "wageningen universiteit pierre wind" "wageningen university" "wageningen university wagening" "wageningen university wageningen" "univ wageningen") AND (APD = 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014)

Patents: 199; patent families: 69

Complete query

(APP = "univ erasmus" "univ erasmus medical center rotterdam" "univ erasmus medical ct" "univ erasmus medical ct rotter" "univ erasmus medical ct rotterdam" "rotterdam erasmus medical center" "rotterdam erasmus medical ct" "erasmus medical ct" "erasmus medical centre" "erasmus mc" "erasmus uni" "erasmus uni medisch ct" "erasmus uni medisch ct rotterd" "erasmus uni medisch ct rotterdam" "erasmus univ medical center rotterdam" "erasmus univ medical ct rotter" "erasmus univ medical ct rotterdam" "erasmus univ rotterdam" "erasmus universitair" "erasmus universitair medisch centrum" "erasmus universitair medisch centrum rotterdam" "erasmus universiteit" "erasmus universiteit medisch centrum" "erasmus universiteit medisch ct" "erasmus universiteit rotterdam" "erasmus universiteit rotterdam instituut revalidatiegeneeskunde van de faculteit geneeskunde en gezondheids wetenschappen" "erasmus universiteit rotterdam instituut revalidatiegeneeskunde van de faculteit geneeskunde en gezondheids wetenschappen" "erasmus universiteit rotterdam instituut revalidatiegeneeskunde van de faculteit geneeskunde en gezondheids wetenschappen" "erasmus universiteit rotterdam nl" "erasmus universiteit rotterdam rotterdam" "erasmus universiteit rotterdam rotterdam niederlande" "erasmus universiteit rotterdam rotterdam nl" "erasmus universiteit rotterdam te rotterdam" "erasmus universiteit te rotterdam te rotterdam" "erasmus university" "erasmus university medical center" "erasmus university medical center faculty of medicine department of cell biology and genetics" "erasmus university medical center rotterdam" "erasmus university medical center rotterdam erasm" "erasmus university medical

center rotterdam erasmus mc" "erasmus university medical centre" "erasmus university medical centre rotterdam" "erasmus university medical centre rotterdam depart ment of cell biology and genetics" "erasmus university medical ct" "erasmus university rottendam medical center" "erasmus university rottendam medical ct" "erasmus university rotterdam" "erasmus university rotterdam medical center" "erasmus university rotterdam medical ct" "erasmus universteit rotterdam" "erasmus univesiteit rotterdam" "erasmus univesiteit rotterdam medicine center" "erasmus univesity rotterdam medicine center" "erasmus univesity rotterdam medicine ct" "erasmus unviersiteit" "academic hospital rotterdam" "academic hospital rotterdam ac" "academic hospital rotterdam ro" "academic hospital rotterdam rotterdam" "academisch ziekenhuis rotterdam" "academisch ziekenhuis rotterdam dijkzigt" "academisch ziekenhuis rotterdam dijkzigt rotterdam" "academisch ziekenhuis rotterdam te rotterdam" radboud "radboud universiteit nijmegen" "radboud university nijmegen" "radboud university nijmegen me" "radboud university nijmegen medical centre" radbouduniversiteit radbound "radbound university nijmegen" "univ nijmegen" "univ nijmegen" "nijmegen university" "umc st radboud" "university medical centre nijmegen" "university medical centre st radboud of the university of nijmegen" "university of nijmegen" "university of nijmegen" "university of nijmegen nijmegen" "university of nijmegen nijmegen nl" "rijks universiteit groningen" "rijks univesiteit groningen" "rijks universiteit to groningen" "rijks universiteit to groninge" "univ groningen" "groningen science park" "groningen acad ziekenhuis" "rijksuniversiteit te groningen" "rijksuniversiteit te groningen" "rijksuniversiteit te groningen groningen" "rijksuniversiteit te groningen groningen nl" "rijksuniversiteit te groningen te groningen" "rijksuniversiteit groningen" "rijksuniversiteit groningen" "rijksuniversiteitte groningen" "rijksuniversiteit te groningen" "rijksunoversiteit te groningen" "rijksuniversiteit te groningen" "rijksuniv te groningen" "rijksuniversiteit te groninge" "rijksuniverisiteit te groningen" "rijksuniversiteit groningen" "academisch ziekenhuis groningen" "academisch ziekenhuis groningen groningen" "academischziekenhuis groningen" "university of groningen" "university of groningen groningen" "university of groningen the" "universiteit van groningen" "universiteit van groningen gro" "universiteit van groningen groningen" "technische unie delft" "technische univ delft" "technische univeristeit delft" "technische universitaet delft" "tu delft" "tu delft afdeling werktuigbouw" "tu delft afdeling werktuigbouw laboratorium voor meet en regeltechniek" "univ delft tech" "univ delft tech abb lumms glo" "univ delft tech abb lumms global inc" "delft univ of technology" "delft university" "delft university of technology" "delft university of technology faculty of chemical engineering and material science" "delft university of tevhology" "technische universiteit deflt" "technische universiteit delft" "technische universiteit delft" "technische universiteit delft delft" "technische universiteit delft delft nl" "technische universiteit delft et al" "technische universiteit delft faculteit der elektrotechniek" "technische universiteit delft faculteit technische aardwetenschappen" "technische universiteit delft null" "technische universiteit delft stichting voor de technische wetenschappen" "technische universiteit delft te delft" "technische universiteit delft te delft joseph johannes franciscus scholten te sittard en tom van der kamp te s gravenhage" "technische universiteit delft te delft p a postbus 85096 te 3508 ab utrecht" "technische universiteit delft technische universiteit delft" "technische universiteit delft the" "technische universitiet delft" "technische universitet delft" "technische universiteit delft" "technische universiteit delft" "technische universiteit delft" "technische universteit delft" "technische univerteit delft" "tech unie delft" "tech univ delft" "tech univeristeit delft" "tech universiteit deflt" "tech universiteit delft facult" "tech universiteit delft sticht" "tech universiteit delft tech u" "tech universitiet delft" "tech universiteit delft" "tech university delft" "tech universteit delft" "tech univerteit delft" "eindhoven university of

technology" "tu eindhoven" "technische univ eindhoven" "technische universitat eindhoven"
"technische universiteit eindhoven" "technische universiteit eindhoven" "technische universiteit
eindhoven" "technische universiteit eindhoven eindhoven" "technische universiteit eindhoven
eindhoven nl" "technische universiteit eindhoven te eindhoven" "technische university eindhoven"
"univ eindhoven tech" "univ eindhoven tech nl" "tech uni eindhoven" "tech univ eindhoven" "tech
universiteit eindhoven" "tech universiteit eindhoven" "tech universiteit eindhoven ei" "tech university
eindhoven" "leiden univ" "leiden univ medical center" "leiden univ of medical center" "leiden
university" "leiden university medical center" "leiden university medical center leiden" "leiden
university medical center lumc acting on behalf of academic hospital leiden azl" "leiden university
medical center lumc acting on behalf academic hospital leiden azl" "leiden university medical center
lumc acting on behalf of academic hos pital leiden azl" "leiden university medical center lumc acting
on behalf of academic hospital leiden azl" "leiden university medical centre lumc acting on behalf of
academic hospital leiden azl" "leiden university medical centre lumc acting on behalf of the academic
hospit" "leiden university medical centre lumc acting on behalf of the academic hospital leiden"
"leiden university medical ct" "leiden university medical ct l" "leiden university medical ct lumc acting
on behalf academic hospital leiden azl" "leiden university medical ct lumc acting on behalf of
academic hos pital leiden azl" "leiden university medical ct lumc acting on behalf of academic
hospital leiden azl" "leiden university medical ct lumc acting on behalf of the academic hospital
leiden" "rijks universiteit leiden" "rijks university leiden" "rijks univ leiden" "rijksuniv leiden"
"rijksuniversiteit leiden" "rijksuniversiteit leiden" "rijksuniversiteit leiden en pr" "rijksuniversiteit
leiden en prof dr robbert adriaan schilperoort beide te leiden" "rijksuniversiteit leiden en prof dr
robbert adriaan schilperoort beiden te leiden" "rijksuniversiteit leiden leide" "rijksuniversiteit leiden
leiden" "rijksuniversiteit leiden leiden nl" "rijksuniversiteit leiden te leiden" "rijksuniversiteit leiden te
leiden en nederlandse hartstichting te den haag" "rijksuniversiteit leiden te leiden en prof dr robbert
adriaan schilperoort te oegstgeest" "rijksuniversiteit te leiden" "rijksuniversiteit te leiden de"
"rijksuniversiteit te leiden le" "rijksuniversiteit te leiden leiden" "rijksuniversiteit te leiden leiden nl"
"rijksuniversiteit te leiden nl" "rijksuniversiteit te leiden te leiden" "univ leiden" "univ leiden leiden"
"univ leiden medical ct" "leiden university res innova" "leiden university research innovation
services" "leiden university research innovation services luris" "university leiden" "universiteit leiden
leiden university" "universiteit leiden" "universiteit leiden faculteit" "universiteit leiden faculteit van
wiskunde en natuurwetenschappen" "universiteit leiden in leiden" "universiteit leiden instituut
moleculaire plantkunde" "universiteit leiden leiden" "universiteit leiden leiden uni" luris "academisch
ziekenhuis leiden a" "academisch ziekenhuis leiden acting under the name leiden university medical
center" "academisch ziekenhuis leiden h" "academisch ziekenhuis leiden h o d n lumc" "academisch
ziekenhuis leiden hodn lumc" "academisch ziekenhuis leiden l" "academisch ziekenhuis leiden leids
universitair medisch centrum" "academisch ziekenhuis leiden" "academisch ziekenhuis leiden a"
"academisch ziekenhuis leiden a u leiden uni medical ctr" "academisch ziekenhuis leiden acting under
the name leiden university medical center" "academisch ziekenhuis leiden acting under the name
leiden university medical ct" "academisch ziekenhuis leiden also acting under the name leiden
universit" "academisch ziekenhuis leiden also acting under the name leiden university" "academisch
ziekenhuis leiden also acting under the name leiden university medical center" "academisch
ziekenhuis leiden also acting under the name leiden university medical center lumc" "academisch
ziekenhuis leiden also acting under the name leiden university medical ct" "academisch ziekenhuis
leiden also acting under the name leiden university medical ct lumc" "academisch ziekenhuis leiden
h" "academisch ziekenhuis leiden h o d n leids uni medisch ct" "academisch ziekenhuis leiden h o d n

lumc" "academisch ziekenhuis leiden hodn" "academisch ziekenhuis leiden hodn leids uni medisch
ct" "academisch ziekenhuis leiden hodn leids universitair medisch centrum" "academisch ziekenhuis
leiden hodn lumc" "academisch ziekenhuis leiden hodn lumc" "academisch ziekenhuis leiden l"
"academisch ziekenhuis leiden leiden university medical center" "academisch ziekenhuis leiden leids
universitair medisch centrum" "academisch ziekenhuis leiden lumc" "academisch ziekenhuis leiden
rijnsburgerweg 10 te 2333 aa leiden" "academisch ziekenhuis leiden te leiden" "academisch ziekenhuis
leiden" "academisch ziekenhuis leiden a u leiden uni medical ctr" "academisch ziekenhuis leiden"
"university of leiden" "university of leiden leiden" "maastricht university" "univ maastricht"
"universiteit maastricht" "universiteit maastricht cardio" "universiteit maastricht cardiovascular
research institute maastricht carim" "universiteit maastricht carim" "universiteit maastricht maastr"
"universiteit maastricht maastricht" "academic hospital maastricht" "academisch ziekenhuis
maastricht" "academisch ziekenhuis maastricht" "academisch ziekenhuis maastricht" "university of
maastricht" "universiteit van maastricht" "twente university" "univ twente" "univ twente fakultet
chemisch" "univ twente inst for biomedical technology and technical medicine mira" "universiteit
twente" "universiteit twente a universi" "universiteit twente a university" "universiteit twente and
techno" "universiteit twente and technologiestichting stw" "universiteit twente chemische"
"universiteit twente chemische technologie" "universiteit twente enschede d" "universiteit twente
enschede drienerlo" "universiteit twente faculteit" "universiteit twente faculteit der technische
natuurkunde" "universiteit twente faculteit toegepaste onderwijskunde to" "universiteit twente
mesa res i" "universiteit twente mesa research instituut" "universiteit twente postbus 217 te 7500 ae
enschede" "universiteit twente te enschede" "technische universiteit twente" "tech universiteit
twente" "university of twente" "university of twente enschede nl" "university of twente institute for
biomedical technology and technical medicine mira" "utrecht univ" "utrecht university" "univ utrecht
utrecht" "univ utrecht" "univ utrecht and technology fo" "univ utrecht holding b v" "univ utrecht
holding b v nl et al" "univ utrecht holding bv" "univ utrecht holding bv nl" "univ utrecht holding bv nl
et al" "univ utrecht nl" "univ utrecht nl et al" "univ utrecht technology foun" "umc utrecht
participates bv" "umc utrecht holding b v" "umc utrecht holding bv" "umc utrecht holding bv nl"
"umc utrecht holding bv nl et al" "umc utrecht participates b v" "rijksuniversiteit te utrecht"
"rijksuniversiteit te utrecht te utrecht" "rijksuniversiteit te utrecht te utrecht en euro diagnostics bv
te apeldoorn" "rijksuniversiteit te utrecht u" "rijksuniversiteit te utrecht utrecht nl" "rijksuniversiteit
utrecht" "rijksuniversiteit utrecht" "rijksuniversiteit utrecht de" "rijksuniversiteit utrecht en s"
"rijksuniversiteit utrecht en stichting technische wetenschappen beide te utrecht" "rijksuniversiteit
utrecht nl" "rijksuniversiteit utrecht p a" "rijksuniversiteit utrecht p a universitair transferbureau
utrecht heidelberglaan 8 te 3584 cs utrecht" "rijksuniversiteit utrecht te utrecht" "rijksuniversiteit
utrecht uni" "rijksuniversiteit utrecht universitair transferbureau utrecht heidelberglaan 8 te 3584 cs
utrecht" "rijksuniversiteit utrecht utre" "rijksuniversiteit utrecht utrecht" "rijksuniversiteit utrecht
utrecht nl" "rijksuniv utrecht" "university medical center utrecht" "university medical center utrecht
eijkman winklercentre for microbiology infectious diseases and inflammation" "academisch ziekenhuis
utrecht" "academisch ziekenhuis utrecht utrecht" "academisch ziekenhuis utrecht utrecht nl"
"academisch ziekenhuis utrecht" "university of utrecht" "university of utrecht and technology
foundation technologiestichting stw" "university of utrecht holding bv" "university of utrecht
technology foundation technologiestichting stw" "university of utrecht utrecht" "universiteit van
utrecht" "universiteit van utrech" universiteit utrecht "amsterdam univ" "amc amsterdam"
"academic hospital at the university of amsterdam" "academic medical center at the universiity of
amsterdam" "academic medical center at the university of amsterdam" "academic medical center

university of amsterdam" "academic medical centre" "academic medical ct" "academic medical ct at the uni" "academic medical ct at the universiity of amsterdam" "academic medical ct university" "academisch centrum" "academisch ct" "academisch medicsh centrum bij de universiteit van amsterdam" "academisch medicsh ct bij de universiteit van amsterdam" "academisch medisch centrum bij" "academisch medisch centrum bij de universiteit van amsterdam" "academisch medisch centru bij de universiteit van amsterdam" "academisch medisch centru bij de universiteit vanamsterdam" "academisch medisch centrum" "academisch medisch centrum amsterdam" "academisch medisch centrum amsterdam molecular therapeutics" "academisch medisch centrum bij de univ van amsterdam" "academisch medisch centrum bij de univeriteit vanamsterdam" "academisch medisch centrum bij de universiteit van" "academisch medisch centrum bij de universiteit van amsterdam" "academisch medisch centrum bij de universiteit vanamsterdam" "academisch medisch centrum bu de universiteit vanamsterdam" "academisch medisch centrum of the university van amsterdam" "academisch medisch centrum univ van amsterdam" "academisch medisch centrum universiteit van amsterdam" "academisch medisch centrum van de universiteit van amsterdam" "academisch medisch ct" "academisch medisch ct bij de u" "academisch medisch ct bij de univ van amsterdam" "academisch medisch ct bij de univeriteit van amsterdam" "academisch medisch ct bij de universiteit" "academisch medisch ct bij de universiteit van" "academisch medisch ct bij de universiteit van amsterdam" "academisch medisch ct bu de universiteit van amsterdam" "academisch medisch ct of the u" "academisch medisch ct univ van amsterdam" "academisch medisch ct universi" "academisch medisch ct universiteit van amsterdam" "academisch medisch ct van de u" "academisch medisch ct van de universiteit van amsterdam" "academisch medish centrum" "academisch medish ct" "univ amsterdam" "univ amsterdam acad ziekenhuis" "univ amstserdam" "university of amsterdam" "universiteit van amsterdam" "universiteit van amsterdam ams" "universiteit van amsterdam amsterdam" "universiteit van amsterdam faculteit der natuurwetenschappen wiskunde en" "universiteit van amsterdam faculteit der natuurwetenschappen" "universiteit van amsterdam faculteit der natuurwetenschappen wiskunde en i" "universiteit van amsterdam faculteit der natuurwetenschappen wiskunde en informatica" "universiteit van amsterdam faculteit der natuuwetenschappen wiskunde en informatica amsterdam" "universiteit van amsterdam null" "universiteit van amsterdam te amsterdam p a transferpunt amsterdam sarphatistraat 143 te 1018 gd amsterdam" "universiteit van amstserdam faculteit der natuurwetenschappen wiskunde en informaatica" "vrije universiteit amsterdam" "vrije universiteit medisch centrum" "vrije universiteit medisch centrum vumc" "vrije universiteit medisch ct" "vrije universiteit van amsterd" "vrije universiteit van amsterdam" "vu medisch centrum" "vu medisch ct" vumc "wageningen universiteit" "wageningen universiteit agrote" "wageningen universiteit agrotechnologie en voedingswetenschappen" "wageningen universiteit agrotechnologie voedingswetenschappen" "wageningen universiteit null" "wageningen universiteit pierre wind" "wageningen university" "wageningen university wagening" "wageningen university wageningen" "univ wageningen") AND (APD = 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014)

Patents: 4359; patent families: 1415

Appendix B: Search queries Dutch academics

INV="APPEL PETER WILLEM" "APPEL PETER WILLIAM" "APPEL PETER WILLAM" "ARENDS ISABELLA W C E" "BAKKER MAARTEN" "BEUKERS ADRIAAN" "BISSCHOPS MARC ANTONIUS THEODORUS" "BOONE MARINUS MARIAS" "BOS FOKKO MENNO" "BOS JELTE ANNEE" "BOSCH JAN WILLEM" "BRAAT JOSEPHUS J M" "BRAAT JOSEPHUS JOHANNES MARIA" "BREEDVELD PAUL" "BROUWER GUSTAAF FRANS" "BUDKO NEIL VLADIMIROVICH" "BUIJS JOHAN ADAM" "CALIS HANS PETER ALEXANDER" "DE HAAN VICTOR OTTO" "DE BOER FRANK ROELOF" "DE BONT JAN A M" "DE HAAN SJOERD WALTER HERO" "DE JONG JEROEN ALEXANDER" "DE MOEL PETRUS JACOB" "DE RIDDER DICK NICOLAAS" "DE VRIES PAUL ALEXANDER" "DE VRIES ROB ANTON JURJEN" "DIDERICH JASPER ANDRIES" "DORENBOS PIETER" "DRENTH KAREL FREDERIK" "FERREIRA JAN ABRAHAM" "FOKKEMA JACOB TJEERD" "FRENCH PATRICK JAMES" "HANJALIC ALAN" "HANSEN I A" "HEIJNEN JOSEPH JOHANNES" "HEIJNEN JOSEF JOHANNES" "HEKMAT RAMIN" "HENDRIKS EMILE" "HERMANS AUGUSTINUS JOHANNUS" "HEUSDENS RICHARD" "HEYNDERICKX INGRID EMILIE" "HEYNDERICKX INGRID EMILLIENNE JOANNA RITA" "HEYNDERICKX INGRID EMILIE" "HOEKSTRA MATTHIAS JOHANNES" "HOEKSTRA MATTHIAS JOHANNAS" "HORDIJK ARIE CORNELIS" "HUIJSING JOHAN HENDRIK" "HUIJSING JOHAN HENDRIK" "JACOBS JOHANNES JOSEPH" "JACOBS JOHANNES JOZEF" "JAGER WOLTER FRENS" "JANBROERS STEPHAN" "JANSEN JACOBUS CORNELIS" "JANSEN FREDERIK WILLEM" "JANSEN AART JOHANNES" "JENSEN THOMAS BIRGER" "JETTEN MICHAL SILVESTER MARIA" "JONGEJAN JACOB ARIE" "KELDER ERIK M" "KELDER ERIK MARIE" "KELDER ERIK MARIA" "KEYSON DAVID VICTOR" "KLAASE PETRUS THEODORUS ANTONIUS" "KLEIN BRETELER ANTONIUS JOANNES" "KUENEN JOHANNES GIJSBRECHT" "LABORDUS MAARTEN" "LEE YEN C" "LICHTENBERG JOSEPHUS JOANNES NORBERTUS" "LUYBEN KAREL CHRISTIAAN ADRIANUS MARIA" "MAKINWA KOFI A A" "MAKINWA KOFI AFOLABI ANTHONY" "MARIJNISSEN JOHANNES CORNELIS MARIA" "MAYER CHRISTIAN" "MEESTERS GABRIEL MARINUS HENRICUS" "MEESTERS GABRIEL M H" "MEESTERS GABRIEL MARINUS HENCICUS" "METSelaar JAN WILLEM" "MISKER JAN SIMON" "MOL JAN WILLEM" "MORSHUIS PETRUS HENRICUS FRANCISCUS" "MOULIJN JACOB ADRIAAN" "MULDER WILLIAM ALEXANDER" "MULDER JAN ALBERT" "NGUYEN AHN DUNG" "OLIEMANS RENE VICTOIRE ADOLF" "OLUJIC ZARKO" "PAAP GERARDUS CHRISTOFFEL" "PETERS JOHANNES ANDREAS" "PICKEN STEPHEN JAMES" "POELMAN WILHELMUS ANTHONIUS" "PRONK JACOBUS THOMAS" "REMIS ROBERT FRANS" "ROBERS KLAAS H J" "ROBERS KLAAS HERMAN JAN" "ROBERTSON LESLEY ANNA" "SALEMINK HUUB L" "SARRO PASQUALINA MARIA" "SCHAART DENNIS ROBERT" "SCHIELE ANDRE" "SHELDON ROGER ARTHUR" "SMULDERS FRIDOLIN ELIZABERT HENRICUS MARIE" "SNIJDERS CHRISTIAAN JOHANNES" "SONNEVELD MARINA HENRIEKE" "SPOORMAKER JAN LEENDERT" "SPRONCK JOSEPHUS WILHELMUS" "STAPPERS PIETER JAN" "STOWERS MICHAEL ANTHONY" "STRAATHOF ADRIANUS JOHANNES JOZEF" "SUDMEIJER KEES JAN" "SWINKELS PETRUS L J" "SWINKELS PETRUS LEONARDUS JOHANNES" "SWINKELS PETRUS LEONARDUS J" "THEUWISSEN ALBERT JOSEPH PIERRE" "VAN DE WAERDT JAN W" "VAN DEDEM GIJS WILLEM KAREL" "VAN DEDEM GIJSBERT WILLEM KAREL" "VAN DEN BLEEK CORNELIS MARIA" "VAN DER SCHRIECK GERARD LOUIS MARIE" "VAN DER WIELEN LUCAS ANTONIUS MARIA" "VAN DIJK GERARD JOHAN" "VAN DIJK JACOBUS CORNELIS" "VAN DIJK JOHANNIS CORNELIS" "VAN DIJK MATTHEUS BERNARDUS" "VAN DIJKEN JAN PIETER" "VAN DONGEN KOEN WILLEM ANTON" "VAN DOORN ANTON JAN" "VAN EIJK CAREL WILHELM EDUARD" "VAN LOON JEAN PAUL" "VAN LOOSDRECHT MARINUS CORNELIS MARIA" "VAN OUDHEUSDEN BASTIAAN WILLEM" "VAN VLIET LUCAS JOZEF" "VASSILIADIS STAMATIS" "VEER FREDERIK ALAIN" "VERBEEK PIETER

WILHELMUS" "VERKOOIJEN ADRIANUS HUBERTUS MARIA" "VOLLERS KAREL JAN" "WANG JUN"
"WARTENBERGH LEONARDUS HENDRIKUS" "WIERINGA PETER ALBERT" "WIERINGA PETER EDDY"
"WITKAMP GEERT JAN" "WITTE JOHAN FREDERIK" "WOLFFENBUTTEL REINOUD FELIX" "AARTS
RONALDUS MARIA" "ACKET GERARD ADRIAAN" "ALDEA EUGEN" "BAILLY CHRISTIAN MARIA EMILE"
"BAILLY CHRISTIAN MARIA EMILLE" "BALTUS PETRUS GERARDUS MARIA" "BALTUS PETRUS G M"
"BALTUS PETER GERARDUS MARIA" "BASTIAANSEN CEES" "BEGEMANN SIMON HENDRIK ANTON"
"BEGEMANN SIMON H A" "BENTE ERWIN ANTONIUS JOSEPHUS MARIA" "BERGMANS JOHANNES
WILHELMUS MARIA" "BERGMANS JOHANNES W M" "BONGERS ALBERTUS J" "BOS MARIA JOHANNA"
"BRIER PETER" "BRUEKERS ALPHONS A M L" "BRUEKERS ALPHONS ANTONIUS MARIA LAMBERTUS"
"BRUIN SOLKE" "CHADWICK JOHN CLEMENT" "COEHOORN REINDER" "COHEN AMNON MORDECHAI"
"COHEN A M" "COLLIER RENE PIERRE GASTON" "COLLIER RENE P G" "DE BOER SIEBE JAN" "DE
BRUIJN FRANK ALBERT" "DE GRAAF JAN LEENDERT JOHANNES" "DE GRAAF JAN ANTONIUS" "DE
HAAN ANDRE" "DE HAAN ANDRE BANIER" "DE JONG HERMAN LAMBERTUS" "DE VRIES JAN SYBREN"
"DE VRIES JAN WILLEM" "DE VRIES JAN" "DE WIT GERT" "DE WITH PETER H N" "DE WITH PETER
HENDRIK NELIS" "DIJKHUIS GEERT CORNELIS" "DIJKHUIS GEERT C" "DORREN HARM J S" "DORREN
HARMEN JOSEPH SEBASTIAAN" "DUARTE JORGE L" "EGGEN JOSEPHUS HUBERTUS" "FREDERIK PETER
MICHIEL" "GERMAN ANTON LEENDERT" "GERRITSEN FRANS ANDREAS" "GIJSMAN PIETER" "HAM
MICHIEL" "HASKER JAN" "HEIJMAN EDWIN" "HENDRIX MACHIEL ANTONIUS MARTINUS" "HENDRIX
MACHIEL A M" "HUISMAN WILHELMUS JACOBUS JOHANNES" "JANSEN JOHANNES WILHELMUS"
"JANSEN JAN WILLEM" "JANSSEN RENE ALBERT JOHAN" "JANSSEN PETER J" "JANSSEN PETER
JOHANNES MICHIEL" "JANSSEN PETER JOHANNES GERTRUDIS MARIA" "JANSSEN PETER" "JANSSEN
PETER J M" "JANSSEN PETER HENDRIKUS" "JANSSENS PETER CORNELIS" "KHAN NISAR AHMED"
"KHOE GIOK DJAN" "KINGMA HERMAN" "KOK JAN" "KOK JAN BART" "KOOIJMANS ANTONIUS
GERARDUS PETRUS JOHANNES" "KOOLE LEO H" "KONEN ANTONIUS MARCELLUS JOZEF" "KORSTEN
HENDRIKUS HUBERTUS MARIA" "KRAMER GERT JAN" "LEYSER DIRK" "LINDHOUT THEO" "LOMMERTS
BERT JAN" "LOOS JOACHIM" "MAAS JOSEPH W J" "MARTENS JEAN BERNARD OSKAR SUZANNA"
"MARTENS JEAN BERNARD OSKAR SUZANNE" "MEIJER EMMO MARINUS" "MEINDERS ERWIN R"
"MULDER WILLEM" "MULDER WILLEM STADO" "NICOLAY KLAAS" "NOLTE ROELAND JOHANNES
MARIA" "NUIJ PIETER WALTHERUS JOZEF MARIA" "OFFRINGA LODEWIJK JACOB JAN" "PAULUSSE JOS
M J" "PRINS MENNO W J" "PRINS MENNO WILLEM JOSE" "QUINN PATRICK JOHN" "RAMAEKERS
FRANS C S" "RASTOGI SANJAY" "REESINK KOEN DANIJL" "REUTELINGSPERGER CHRIS PETER MARIA"
"RITZERFELD JOHANNES HENRICUS FRANCISCUS" "RONGEN PETER M J" "RONGEN PETER MARIA
JOHANNES" "RUTGERS WIJNAND REIJER" "SCHOUTEN MATHEUS JACOBUS WILHELMUS" "SCHUTTE
BERT" "SMEETS RENE PETER PAUL" "SMIT MEINT KOERT" "SMITS JOS F M" "SMULDERS PETRUS
FRANCISCUS MARIA" "SOMMEN PETRUS CHRISTIANUS WILHELMUS" "STEENNIS EVERT FREDERIK"
"STEINBUCH MAARTEN" "TER HAAR ROMENY BAREND MARIUS" "TJALKENS TJALLING JAN" "UDDING
JAN HENDERIKUS" "VAN ASSELEN OTTO LEONARDUS JOHANNES" "PERIK EVELIEN MARIA" "VAN DEN
BOSCH PAULUS P J" "VAN DEN BROEK PETER" "VAN DEN HOVEN ELISE A W H" "VAN DER LINDEN
BEREND JACOB" "VAN DER MEER JAN" "VAN DER MEULEN JAN" "VAN DER TOL JOHANNES J G M"
"VAN DER TOL JOHANNES JACOBUS GERARDUS MARIA" "VAN DER TOL JOHANNES JACOBUS
GERRADUS MARIA" "VAN DER WOUDE JAAP H A" "VAN DEURSEN ALEXANDER PETRUS JOHANNES"
"VAN DIJK JAN" "VAN DRUTEN ROELL MARIE" "VAN DUIN MARTIN" "VAN HEESCH EGBERTUS
JOHANNES MARIA" "VAN HORCK FRANCISCUS BERNARDUS MARIE" "VAN OVERVELD C W A M" "VAN
OVERVELD CORNELIS WILHELMUS ANTONIUS MARIE" "VAN OVERVELD CORNELIS W A M" "VAN
OVERVELD CORNELIUS W A M" "VAN OVERVELD CORNELIS W A M" "VAN ROERMUND ARTHUR

HERMANUS M" "VAN ROERMUND ARTHUR HERMANUS MARIA" "VAN SANTEN RUTGER ANTHONY PROFESSOR" "VAN SANTEN RUTGER ANTHONY" "VAN TILBORG HENK C A" "VAN ZOLINGEN RONALD JOHAN CHRISTIAAN" "VEENHUIZEN BRAM" "VEKEMANS JEF A J M" "VERHEIJ JAN A" "VERMEER CEES" "VISSER HUBREGT JANNIS" "VOGT DIETER" "VOGTEN LEONARDUS LAMBERTUS MARIA" "VROEMEN BAS GERARD" "WESTERTERP KLAAS ROELOF" "WESTRA JAN DANIEL" "WESTRA JAN R" "WESTRA JAN ROELOF" "WILLEMS FRANCISCUS MARIA JOANNES" "WILLEMS FRANCISCUS MARIA JOHANNES" "WOLTER JOACHIM HERMANN" "WOUTERS PETRUS ARNOLDUS ANTONIUS FRANCISCA" "ANDRINGA TJEERD CATHARINUS" "BAKKER WINSTON WILLEM" "BAKKER JAN" "BIBER KNUT PETER HEINRICH" "BLOM PAULUS WILHELMUS MARIA" "BLOM PAULUS W M" "BLOM EVERT" "BODDEKE ERIK HENDRIKUS WILHELMUS GERARDUS MARIA" "BODDEKE ERIK H W G M" "BOESTEN MICHAEL WILHELMUS MARIA" "BOLHUIS GERAD KLAAS" "BROEKHUIS ANTONIUS AUGUSTINUS" "BRON SIERD" "BUSSCHER HENK J" "BUSSCHER HENDRIK JAN" "CHEN CHANG WEN" "DAEMEN CATHARINA ARNOLDINE HUBERTINA HENRICA" "DE GROOT RIEMER ALBERTS" "DE GROOT ROBERT AART" "VISSER HENDRIKUS WILHELMUS" "DE JONG KRIJN PIETER" "DE JONG KRIJN PEITER" "DE JONG KRIJN PETER" "DE LEIJ LOU FRANCISCUS MARIA HUBERTUS" "DE MUL FRITS FRANS MARIA" "DE VRIES JOHANNES GERARDUS" "DEGENER JOHN EDWARD" "DEN BOER JAN ARIE" "DEN BOER JACOB ANNE" "DEN BOER JOHAN ANTONIE" "DEN HARTOG HUIBERT WILLEM" "DIJKSTRA BAUKE WIEPKE" "DIJKSTRA BAUKE W UNIVERSITY OF GRONINGEN" "DIJKSTRA BAUKE" "DIJKSTRA KLAAS SJOERD" "DIJKSTRA KLAAS" "ENGBERTS JAN BERNARD FREDERICK NICOLAAS" "ENGBERTS JAN BERNARD FREDERIK NICOLAAS" "FERINGA BERNARD LUCAS" "FERINGA B L" "FERINGA BEN L" "FRAAIJE MARCO WILHELMUS" "FRIJLINK HENDERIK WILLEM" "FRIJLINK HENDERIK W" "FRIJLINK HENDRIK WILLEM" "GERBENS FRANS" "GRIJPM A DIRK WYBE" "HAISMA HIDDE JACOB" "HAISMA HIDDE J" "HANSEN THEO ADRIAAN" "HARMSSEN GERRIT JAN" "HEERES HERO JAN" "HENNING ROBERT HENK" "HINRICHS WOUTER LEONARDUS JOSEPH" "HOF ALBERT J" "HUMMELEN JAN CORNELIS" "JANSEN TOM CORNELIS" "JANSEN RITSERT C" "JANSSEN DICK BAREND" "JANSSEN DIRK BAREND" "JANSSEN LEON PETER BERNARD MARIE" "KIEL JAN ANDRIES KORNELIS WILLEM" "KRASNIKOV VICTOR VALIRIVICH" "KUIPERS OSCAR PAUL" "LINSKENS MAARTEN HERMAN KAREL" "MEIJER DIRK KLAAS FOKKE" "MINNAARD ADRIAAN JACOBUS" "NIJMAN JOHAN MARTIN" "QUAX WILHELMUS JOHANNES" "ROBILLARD GEORGE THOMAS" "ROELFES JOHANNES GERHARDUS" "ROKS ANTONIUS JACOBUS MARINUS" "ROKS ANTON J M" "SCHOEMAKER REGINA GERTRUIDA" "SCHOUTEN AREND JAN" "SCHOUTEN JOHANNES PETRUS" "SCHUDDE EBE PIETER" "SCHUTTE HARM KORNELIS" "SCHUURS THEO AUKE" "SHARMA PREM KUMAR" "SIEVAL ALEXANDER BERNARDUS" "SMIT ARENDT JAN" "SMIT ANDRIES JAN" "STAMHUIS EIZE JACOB" "TERPSTRA PETER" "TERPSTRA PETER JOHAN" "TIMMERMANS ROB" "VAN DER MEER WILHELMUS JACOBUS" "VAN DEN BERG ARIE PIETER" "VAN DER KLEI IDA JOHANNA" "VAN DER MEULEN PIETER SIERD" "VAN DER MEULEN PIETER" "VAN DER VEEN MONIQUE H" "VAN DER WAL JAN WILLEM" "VAN DIJL JAN MAARTEN" "VAN ESCH JOHANNES HENRICUS" "VAN GILST WIEKERT HENDRIKUS" "VAN GILST WIEK H" "VAN HAASTERT PETRUS JOHANNES MARIA" "VAN HIJUM SACHA ADRIANUS FOKKE TACO" "VAN HOOGMOED CHRISTIANUS GERHARDUS" "VAN WEES BART JAN" "VERKADE HENDRIK JAN" "VERKERKE GIJSBERTUS JACOB" "WALLAART THORVALD EELCO" "WELLING GJALT WIETZE" "WIKSTROM HAKAN VILHELM" "WILKINSON MICHAEL HENDRIK FRANCIS" "WILSCHUT JAN C" "WILSCHUT JAN CHRISTIAAN" "WOLFFENBUTTEL BRUCE H R" "ABRAHAMS JAN PIETER" "ALIA" "BACKENDORF CLAUDE MARIA PIERRE" "BAKKER ERWIN PAUL MARIA" "BEIJERSBERGEN VAN HENEGOUWEN GERARD M J" "BERTINA ROGIER MARIA" "BIESSEN ERICUS ANNA LEONARDUS" "BIESSEN ERIK ANNA LEONARDUS" "BLOEMBERG GUIDO VINCENT" "BOUWSTRA JOHANNES AALTJE" "BOUWSTRA JOHANNA AALTJE"

“BREDENBEEK PETRUS J” “BREDENBEEK PETRUS JOHANNES” “JANSEN AUGUSTINUS M” “JANSEN AUGUSTINUS MARIA” “COHEN ADAM FREDERIK” “DE BOER ALBERTUS G” “DE BOER FRANK” “DE JONG HENDRIK JOHANNES” “DE JONG HENDRIK JOHANNUS” “DE VRIES RENE RUDOLF PIETER” “DEN DUNNEN JOHAN THEODORUS” “DEN DUNNEN JOHANNES THEODORUS” “DRIJFHOUT JAN W” “DRIJFHOUT JAN WOUTER” “FALKENBURG JOHAN H F” “FALKENBURG JOHAN HERMAN FREDERIK” “FERRARI MICHEL DOMINIQUE” “FIBBE WILLEM E” “GOULMY ELSA AFRA JULIA MARIA” “GOULMY ELS A J M” “HASNAIN GHULAM” “HEEMSKERK MARIA HUBERTA MARGARETHA” “HIEMSTRA PIETER SICCO” “HOEBEN ROBERT CORNELIS” “HOEBEN ROBERT C” “HOOYKAAS PAUL JAN JACOB” “HOOYKAAS PAUL J J” “IJZERMAN ADRIAAN PIETER” “IJZERMAN ADRIAAN P” “JOCHEMSEN AART GERRIT” “JUNGINGER HANS E” “JUNGINGER HANS EUGEN” “KIJNE JAN WILLEM” “KOERTEN HENDRICK KLAAS” “KOSTERS WALTER CORNELIS GERARD” “KRAAL BAREND” “KUIL MAXIM EMILE” “LUGTENBERG EGBERTUS J J” “LUGTENBERG EGBERTUS JOHANNES JOSEPHUS” “LUGTENBURG JOHAN” “MATYSIK JORG” “MEIJER SJOERD” “MELIEF CORNELIS JOSEPH MARIA” “MELIEF CORNELUS J M” “MELIEF CORNELIUS JOHANNES MARIA” “MELIEF CORNELIS J M” “MELIEF CORNELIS JOHANNES MARIA” “MELIEF CORNELIS JOHANNA MARIA” “MEMELINK JOHAN” “MIDDELDORP JAAP MICHEL” “MIDDELDORP J M” “MULDER GERARDUS JOHANNES” “MULDER GERHARDUS JOHANNIS” “NOTEBORN MATHIEU HUBERTUS MARIA” “OVERHAND MARK” “OVERKLEEF HERMAN STEVEN” “PAPAPOULOS SOKRATES E” “PAUWELS ERNEST K J” “PAUWELS ERNEST KAREL JACOB” “PETERS FRANS JEANNETTE MARIA LEONARDUS” “PETERS FRANS JEANNETTE MARIA” “PETERS FRANS JEANETTE MARIA” “PETERS FRANS JEANETTE MARIA LEONARDUS” “PETERS DOROTHEA JOHANNA MARIA” “PLAISIER JASPER RIKKERT” “RAAP ANTON KLAAS” “REITSMA PIETER HENDRIK” “ROEP BART OTTO” “ROOS RAYMUNDUS ALBERTUS CHRISTIANUS” “ROZING PETRUS MARIA” “ROZING PERRUS M” “SIEGAL GREGG DAVID” “SNIJDER ERIC JOHN” “SPAAN WILHELMUS JOSEPHUS MARIA” “SPAAN WILHELMUS J M” “SPAINK HERMAN PIETER” “SPAINK HERMAN PETER” “TANKE HENDRIKUS JOHANNES” “TOES REINALDUS EVERARDUS MARIA” “TOES RENE EVERARDUS MARIA” “VAN DEN BERG ARIE WILLEM” “VAN BOECKEL CONSTANT ADRIAAN ANTON” “VAN BOECKEL CONSTANT” “VAN DEN BERG PAULUS CORNELIS MARIA” “VAN DEN BERG ROBERT JOHANN” “VAN DEN HONDEL CORNELIS A M J J” “VAN DEN HONDEL CEES A M J J” “VAN DEN HONDEL CORNELIS ANTONIUS M J J” “VAN DEUTEKOM JUDITH CHRISTINA THEODORA” “VAN DIJK MARCUS A” “VAN DIJK MENNO ANTON” “VAN OMMEN GARRIT JAN BOUDEWIJN” “VAN SPENGEN WILLEM MERLIJN” “VAN WEZEL GILLES PHILIPPUS” “VAN ZONNEVELD ANTON JAN” “VISSER LUIRINK GESINA” “WASSENAAR ALFRED LEONARD MARIA” “WIERTZ EMMANUEL J H J” “WILLEMS JOHANNES MARIA” “ZHANG YING HUI” “BAR FREDERICUS WILHELMUS HENDRICUS MARIA” “BOON PETRUS JOHANNES” “DAEMEN MATTHIAS JOSEPH ALPHONS PIETER” “DE JONG PETER MATHENS” “DE JONG PETER” “DEUTZ NICOLAAS E P” “GRIFFIOEN ARJAN W” “HAENEN GUIDO R M M” “HAENEN GUIDO REMBERTUS MICHEL MARIE” “MURIS PETER GERARDUS” “MURRE JACOB MARINUS JAN” “OTTENHEIJM HENRICUS CARL JOSEPH” “OTTENHEIJM H C J” “OTTENHEIJM HENRICUS CARL JOZEPH” “PINTO YIGAL M” “PINTO YIGAL MARTIN” “RAMAEKERS FRANCISCUS CHARLES SERVATIUS” “SARIS WILHELMUS HERMANUS MARINUS” “SARIS WILHELMUS HERMANUS MARIA” “SMEETS JOSEPH LEON ROBERT MARIE” “STRUJCKER BOUDIER HARRY A J” “VAN DER VIJGH WILLEM JAN FREDERIK” “VAN LOON LUCAS JOHANNUS CORNELUS” “VERMEULEN ANTHONIUS HENDRICUS MARIA” “ADEMA GOSSE JAN” “ADEMA GOSSE J” “DE GROOT WILLIBRORDUS THEODORUS” “DE GROOT P F M” “DE JONG SYLVIA JOSEFINE” “DE JONG SYLVIA JOHANNA” “DECHERING KOEN JACOB” “DERKSEN JOHANNES THEODORUS PETRUS” “DESAIN PETRUS WILHELMUS MARIA” “GIELEN MATHIEU JACOBUS GERARDUS” “GROTENHUIS JOSEF ANTON” “GROTENHUIS J A” “HARREN FRANCISCUS JOHANNES

MARIA" "HENDRIKS JAN" "HENDRIKS JAN JAQUES MARIE" "HENDRIKS JAN J M" "HENDRIKS ANTONIUS JR" "HENDRIKS ANTONIUS JOHANNES" "JANSEN JOHANNES ANTHONIUS" "JANSEN JOHANNES ARNOLDUS" "JANSEN JOHANNES A" "JANSSEN JACQUES J" "KILIAAN AMANDA JOHANNE" "MARTENS GERARDUS JULIANUS MARIA" "NILLESEN MAARTJE MARJOLEIN" "PARKER DAVID HUBERT" "PASCH M C" "POP GHEORGHE AUREL MARIE" "SCHALKEN JACOBUS ANTONIUS" "SCHERMER JOHANNES JACOBUS" "SMITS THEODORUS JOHANNES MARIA" "TER MEULEN JOHANNES JOSEPH" "TORENSMA RUURD" "VAN DIJK ANTONIUS JOHANNES MARIA" "VAN DIJK ANTONIUS J M" "VAN ENCKEVORT WILHELMUS JOHANNES PETRUS" "VAN ERP ALPHONSUS A M" "VAN HEST JAN CORNELIS MARIA" "VAN LEEUWEN FRANK" "VAN MUIJEN GOOSEN N P" "VERDONSCHOT NICOLAAS JACOBUS JOSEPH" "VETH RENE PIETER HENDRICK" "WULLEMS GEORGE JOSEPH" "WULLEMS GEORGE J" "BAKKER WOUDEBERG IRMA A J M" "DE JONG BERNARDUS WILHELMUS" "DE JONG JAN CORNELIUS" "DE JONG J C" "DE KONING HENDRIK JOHANNES" "DE MAN ROBERT A" "DE WIT JAN BAUKE" "DORSSERS LAMBERTUS CHRISTIAAN JOHANNES" "DROP STENWERT LEONARD SEBASTIAN" "ENGEL DIRK COENRAAD" "FOUCHIER RONALDUS ADRIANUS MARIA" "GROOTEGOED JOHAN ANTON" "GROSVELD FRANKLIN GERARDUS" "GROSVELD FRANKLIN GERADUS" "HOUTSMULLER ADRIAAN BAREND" "JANSEN PETER PAUL" "KRENNING ERIC P" "KRENNING ERIC PAUL" "KUSTERS JOHANNES G" "KUSTERS JOHANNES GERARDUS" "LAMAN JON DANIEL" "LAMBERTS STEVEN W J" "NIESTERS HUBERT G M" "PHILIPSEN JACOBUS N J" "PHILIPSEN JACOBUS NICOLAAS JOZES" "POLS HUIBERT ADRIAAN PIETER" "PUPPELS GERWIN J" "RADEMAKER HENDRIK JAN" "REUSER ARNOLD J J" "RIJKEN DINGEMAN CORNELIS" "SCHAAP GERARD R MED" "SCHENK EUGENE ANTOINE MARIE" "SCHOLTE BOB JOHAN" "SIXMA TITIA KAREN" "STEEGERS THEUNISSEN REGINE PATRICIA MARIA" "STERENBORG HENRIKUS JOSEPHUS CORNELIS MARIA" "THEMMEN AXEL PETER NICO" "UITTERLINDEN ANDREAS GERARDUS" "UITTERLINDEN ANDRE GERARDUS" "VAN BAALEN CAREL A" "VAN BEMMEL JAN C" "VAN DEN BERG HENDRIK JAN" "VAN DEN BERG HENDRIKUS JACOBUS" "VAN DEN HOOGEN BERNADETTA GERARDA" "VAN DER SPEK PETRUS JOHANNES" "VAN DER STEEN ANTONIUS FRANCISCUS WILHELMUS" "VAN DIJK LUKAS CAROLUS" "VAN DIJK JACOB P" "VAN DONGEN JACOBUS JOHANNUS MARIA" "VAN DONGEN JACOBUS JOHANNES MARIA" "VAN LEEUWEN JOHANNES PETRUS THOMAS MARIA" "VAN TOL GERT JAN" "VINK CORNELIS" "VISSER THEOFILUS JOHANNES" "VISSER THEOFILUS J" "VOS HENDRIK JAN" "WESTERHOF HENK" "ANNEMA ANNE JOHAN" "BERGVELD PIET" "BERKHOFF ARTHUR PERRY" "BONNEMA GERRIT MAARTEN" "BROENINK JAN W" "BROUWERS JOZEF JOHANNES HUBERTUS" "CHEN CHUN YU" "CHEN QI" "DE BOER MEINT" "DE JONG NICO" "DEKKER RONALD" "DORST LEENDERT" "EGER ARTHUR OTTO" "FIGDOR CARL G" "FIGDOR CARL GUSTAV" "GLANDRUP MAURICE HENK JAN" "GODLIEB WILLEM FREDERIK" "GREVE JAN" "GROENLAND JOHANNES PETRUS JACOBUS" "HAARTSEN JACOBUS CORNELIS" "HEESINK ALBERTUS BERNARDUS MARIA" "HEIJENK GEERT" "HEKMAN EDSKO EVERT GEERT" "HIRS GILLES GERARDUS" "HOLSHEIMER JAN" "HUETING RAYMOND J E" "IMHOF ARNOUT" "JACOBS JAN ARNOLDUS MARIA HYACINTUS" "JACOBS JAN" "JANSEN PETER GERARDUS" "KARAGIANNIS GEORGIOS" "KATOEN JOOST PIETER" "KEIZER KLAAS" "KELLY PAUL JOSEPH" "KLUMPERINK ERIC ANTONIUS MARIA" "KOOYMAN ROB PETER HERMAN" "KROL THIJS" "KROON MARK" "LAANSTRA GEERT JAN" "LAMBECK PAUL VINCENT" "LAMMERINK THEO S J" "LEFERINK FRANCISCUS BERNARDUS JOHANNES" "LI XIAO B" "MALHOTRA RICHA" "MARTIN DIDIER DIEUDONNE ELISABETH" "MARTINEZ JOSE ANTONIO JADRAQUE" "MARTINEZ JOSE ANTONIO" "MEIJER ROBERT RENE" "MEIJER ROBERT JAN" "MEIJER ROBERT JOHAN" "MEINDERSMA GEERT WYTZE" "MULDER JAN HARM" "MULDER JAN" "MULDER JAN PIETER" "NIEUWENHUIS LAMBERTUS JOHANNES MARIA" "NIJSSE GERARD JOHANNES PIETER" "NYMEIJER DOROTHEA CATHARINA" "OFFERHAUS HERMAN LEONARD" "OLTHUIS WOUTER"

"POPMA THEO JOHAN AUGUST" "POST ALBERT" "RACZ IMRE GYULA" "REINHOUDT DAVID
NICOLAAS" "ROGALLA HORST" "SANDERS ANTONIUS JOHANNES BERNARDUS" "SCHIPPER DIRK JAN"
"SCHLAUTMANN STEFAN" "SCHUURMANS FRANK JEROEN PIETER" "SIJBESMA HYLKE PIETER" "SMIT
GERARD CLEMENT" "SNELLINK RUEL BIANCA HENRIETTE MARIA" "SOEMERS HERMANUS MATHIAS
JOANNES RENE" "SOEMERS HERMANUS M J R" "SOEMERS HERMANUS MATHIAS JOANNUS REN"
"SPRENKELS AD" "STEENBERGEN WIENDEL" "STOFFER REMCO" "TALMA AUKE GERARDUS" "TEN
KATE HERMAN HENDRIK JOHAN" "TEN KATE HERMAN HENDRIK" "VAN DEN BERG ALBERT" "VAN DER
MEER WALTERUS GIJSBERTUS JOSEPH" "VAN DER SLOT PETER JOHANNES MARIA" "VAN DER TANG
JOHAN D" "VAN DER VOORT MASCHA CECILE" "VAN DER WIEL WILLEM GERRIT" "VAN DIJK
JOHANNES ABRAHAM" "VAN DIJK JOHANNES HENRICUS" "VAN DIJK JOHANNES EDWINUS" "VAN
HALTEREN AART TIJMEN" "VAN TUIJL ADRIANUS JOHANNES MARIA" "VAN TUIJL ADRIANUS J M"
"VELDHUIS RAYMOND NICOLAAS JOHAN" "VELLEKOOP MARINUS HENDRICUS" "VERSTEEG GEERT
FREDERIK" "VISSER HENDRIK AREND" "VISSER PETER" "WESSELINK JOHAN JACOB HENDRIK"
"WIEGERINK REMCO" "WOLTERS ROBERTUS ADRIANUS MARIA" "WOLTERS ROBERTUS A M"
"WOLTERS ROBERTUS ADRIANOS MARIA" "XING YI ZI" "ZWART GUIDO GERARDUS MARIA" "ZWART
HENDRIK JAN" "ADAN ROGER ANTONIUS HENDRICUS" "BAKKER CHRISTIANUS JOHANNES
GERARDUS" "BAKKER PETRUS FRANCISCUS ANTONIUS" "BEEKMAN FREDERIK JOHANNES"
"BIERHUIZEN MARTI F A" "BLOEM ANDRIES CHRISTIAAN" "BLOKSMA MARIE ANNA" "BOELENS JAAP
JAN" "BOLT JACOB HENDRIK" "BONTEN MARCUS J M" "BOS J L" "BOUCHER CHARLES ACHIM
BERNARD" "BRUCE MATTHEW" "BURBACH JOHANNES PETER HENRI" "BURGER KOERT NICO JAN"
"CLEVERS JOHANNES CAROLUS" "CROMMELIN DAAN J A" "CROMMELIN DANIEL JAN ANNE" "DE
BOER FRANCISCUS SIJTSE" "DE BOER HENRIETTE CHRISTINE" "DE BOER JAN H" "DE GROOT RAOUL J"
"DE JONG GEERT JAN" "DE JONG SIBO WYTSE" "DE KLEIJN DOMINICUS PASCHALIS VICTOR" "DEKKER
GERRIT HENDRIK" "DIJKHUIS JOB IR" "EGBERINK HERMANUS FRANCISCUS" "FLUIT ADRIAAN
CAMILLE" "GEBBINK MARTIJN FRANS BEN GERARD" "GISPEN WILLEM HENDRIK" "GROBBEE
DIEDERICK EGBERTUS" "GRUNDEMAN PAUL FREDERIK" "GRUNDEMAN PAUL F" "HENNINK
WILHELMUS EVERARDUS" "HENNINK WILHELMUS EVERHARDUS" "HENNINK WILHELMUS E"
"HOEPELMAN ILJA MOHANDAS" "HOUWEN RODERICK H J" "KONINGS MAURITS KAREL"
"KRANENBURG ONNO WOUTER" "KRANEVELD ALETTA DESIRE" "KRANEVELD ALETTA DESIREE"
"LENTING PETRUS JOHANNES" "LIPS CORNELIS JOSEPHUS MARIA" "LISKAMP ROB MATTHIAS
JOSEPH" "MARX JOHANNES JOSEPHUS MARIA" "MEIJER GEERT JAN" "MOLL FRANS L" "MOLL
FRANCISCUS LAURENS" "MOLL FRANCISCUS LAURENS" "MOOI FREDERIK ROBERT" "MULLER
WALRAVEN HENRY" "NIJKAMP FRANCISCUS PETRUS" "OPHOFF ROEL ANDRE" "PEETERS ANTONIUS
JOHAN MARIA" "PIETERSE JAN KAREL" "PLASTERK RONALD HANS ANTON" "PLASTERK RONALD H A"
"PRINS HENDRIK JOHAN" "RAAIJMAKERS JOHANNES ANTONIUS MARIA" "REDEGELD FRANCISCUS
ANTONIUS MARIA" "RIJKERS DIRK THOMAS SIGURD" "SCHROPP RUDOLF E I" "SCHROPP RUDOLF
EMMANUEL ISIDORE" "SCHUILING ROELOF DIRK" "SCHUURMAN ARNOLD HERMAN" "SMEEKENS
JOSEPHUS CHRISTIANUS MARIA" "SMIDT MARTEN PIET" "STEEGHS LIANA JULIANA JOSEPHINE
MARGRET" "STEEGHS LIANA JULIANA JOSEPHINE MARGRIET" "STEENBERGH PAUL HERMAN"
"STROUS GERARDUS JACOBUS ANTONIUS MARIA" "TILANUS MARCEL G J" "TOMMASSEN JOHANNES
PETRUS MARIA" "TREFFERS WILLEM FRITS" "TULLEKEN C A F" "VAN ALPHEN ALOYSIUS JOANNES
WILHELMUS" "VAN ASBECK BERNT SWEDER" "VAN DE LEST CHRISTIAAN HENDRIKUS ADRIAAN" "VAN
DE WINKEL J G J" "VAN DE WINKEL JAN G J" "VAN DEN BERG JOHANNES PETRUS" "VAN DER KOLK
JOHANNES HUBERTUS" "VAN DER VLIET PIETER CHARLES" "VAN KESSEL CORNELIS PETRUS MARIA"
"VAN KESSEL CORNELUS PETRUS MARIA" "VAN LEENGOED LEONARDUS ANDRIANUS MARIA

GOVARDUS" "VAN LEENGOED LEONARDUS ADRIANUS MARIA GOVARDUS" "VAN NOSTRUM CORNELIS FRANCISCUS" "VAN NOSTRUM CORNELUS FRANCISCUS" "VAN OOSTRUM RONALD WILLIAM" "VAN STRIJP JOHANNES ANTONIUS GERARDUS" "VERDAASDONK RUDOLF MARIUS" "VERDAASDONK R M" "VERHOEVEN JAN WILLEM" "VERHOEVEN JAN W" "VERRIPS CORNELIS THEODORUS" "VERRIPS CORNELIS T" "VINCKEN KOENRAAD LUCAS" "VLIEGENTHART JOHANNES FREDERIK G" "VLIEGENTHART JOHANNES F G" "VOEST EMILE EUGENE" "WAUBEN MARCA HENRIETTE MICHAELA" "WAUBEN MARCA H M" "WAUBEN MARCA H MICHAELA" "WAUBEN MARCA HENRIETTE M" "WAUBEN MARCA HENRI[TTE MICHAELA" "WEISBEEK PETRUS JACOBUS" "WILLEMS ROBERTUS J L" "WITTKAMPF FREDERIK H M" "WITTKAMPF FREDERICK H M" "WOSTEN HERMAN ABEL BERNARD" "AALBERSE ROB C" "AALBERSE ROBERTUS CAROLUS" "AARDEN LUCIEN ADRIANUS" "AARDEN LUCIEN A" "ADRIAANS PIETER WILLEM" "AERTS JOHANNES MARIA FRANCISCUS GERARDUS" "BAKKER HENDRIK JAN" "BAKKER HENDRIK JANUS" "BANK RUUD ANTONIUS" "BELD MARCELLINUS GUALBERTUS HUBERTUS MARIA" "BERDEN JOHANNES ANTONIUS" "BOERMEESTER MARJA A" "BOS J D" "BOS JOANNES DOSITHEUS" "BOSMA PITER JABIK" "BRAKENHOFF GODEFRIDUS JACOBUS" "BRAKENHOFF GODEFRIEDUS JACOBUS" "BRUCK EKKEHARD HUBERTUS" "BUSCHOW KURT HEINZ JURGEN" "CARON HUBERTUS NICOLAAS" "CHAMULEAU ROBERT ANTOINE FRANCOIS MARIE" "DAS ATZE TAEDA" "DE SMET HELEEN JOHANNA AUGUSTA" "DIERGAARDE PAUL JOHAN" "DOUWES ADOLPHE MARIE" "FEILZER ALBERT JOSEPH" "GROEN DEODORUS JACOBUS" "GROOT JACQUES ALPHONS" "HARING MICHEL ALBERTUS" "HOFSTRAAT JOHANNES W" "HOFSTRAAT JOHANNES WILLEM" "JANSEN MARCEL ADRIAAN" "JANSSEN JOHANNES GIJSBERTUS MARIA" "JASPERS JORIS EMANUEL NICOLAAS" "KAMER PAUL C J" "KAMER PAULUS CLEMENS JOZEF" "KASTELEIN JOHN J P" "KASTELEIN JOHANNES JACOBUS PIETER" "KLEVERLAAN CORNELIS JOHANNES" "KLIS FRANCISCUS MARIA" "KOK WILHELMUS THEODORUS" "KOOMEN GERRIT JAN" "KRUSE CHRIS G" "KRUSE CORNELIS GERRIT" "KRUSE C G" "KRUSE CORNELIS G" "LANGEDIJK MATTHEUS F" "MANDJES MICHAEL ROBERTUS HENDRIKUS" "MARIS MARIEN GEORGE" "MEIJER ROELF JAN" "MEIJER ELSE JOHANNA" "MULDER ERIK CORNELIS" "MULDER ERIC CORNELIS" "MUR LUCAS ROELOF" "NOORDAM LAMBERTUS DOMINICUS" "OTTE ARIE PIETER" "OUDE ELFERINK RONALD PETRUS JOHANNES" "PAULUSMA COENRAAD CORNELIS" "REEKERS JAN ALBERTUS" "SCHOEMAKER HANS EGBERT" "SCHOENMAKER ARIE CORNELIS" "SCHOENMAKERS PETRUS JOHANNES" "SCHOUTEN J A" "SCHOUTEN JOHANNES ADRIANUS" "SCHOUTEN JAN A" "SMELT JOHANNES PETRUS PAULUS MARIA" "SMITS MARIA THERESIA" "TAK PAUL PETER" "TAKKEN FRANCISCUS LAMBERTUS WILHELMUS" "TEIXEIRA DE MATTOS MAARTEN JOOST" "VAN DER KUYL ANTOINETTE CORNELIA" "VAN DER REIJDEN WILLY ALEXANDER" "VAN DER STELT PAUL FRANS" "VAN DER ZEL JOSEPH MARIA" "VAN DER ZEL JOZEF MARIA" "VAN DIJK CORNELIS DIONYSIUS" "VAN GEMERT MARTINUS JOHANNES COENRAAD" "VAN LEEUWEN WILHELMUS ANTONIUS" "VAN LEEUWEN WILLEM AART" "VAN LEEUWEN PETRUS W N M" "VAN LEEUWEN PETRUS WILHELMUS N M" "VAN LEEUWEN PETRUS WILHELMUS NICOLAAS MARIA" "VAN LIER RENE ANTONIUS WILHELMUS" "VAN TUNEN ADRIANUS JOHANNES" "VAN TUNEN ARJEN JOHANNES" "VEERMAN ENGELMUNDUS CORNELIS IGNATIUS" "VERAART ANTONIUS JOZEF" "VERMEULEN JACOBUS CORNELIS" "VERMEULEN JACOB CORNELIS" "WESTERHOFF HANS VICTOR" "ZAAT SEBASTIANUS ANTONIUS JOHANNES" "ZAAT SEBASTIANUS A J" "AARNOUDSE CORLIEN A" "APPELMELK BERNARD JAN" "BERENDSE HENK WOUTERUS" "BRAKENHOFF RUDOLF HENRIKUS" "DAM BERNARD" "DE BOER JACOB" "DE BOER ANNE H" "DE BOER ANNE HAAIJE" "DE VRIES JOHANNES JEICHINUS" "DE VRIES JOCHEM JACOBUS" "DEKKER JAN HENDRIK" "DEKKER JAN GERRIT" "DEKKER JAN" "DIAMANT MICHAELA" "DIJKSTRA JAN" "DIJKSTRA JAN ALBERT" "DIJKSTRA JAN WILLEM" "DIJKSTRA CHRISTINE DIEDERIKE" "GERRITSEN WILLEM

RONALD" "GRIESSEN RONALD PIERRE" "GROOTENHUIS PETER DIEDERIK JAN" "HEETHAAR ROBERT MARTIN" "HOGERVORST WIM" "HOGERVORST WIM T" "IRTH HUBERTUS" "JANSEN MICHEL GODEFRIDUS" "KNOL DIRK" "KRAAL GEORG" "KRAB KLAAS" "KREIS ROBERT WALTER" "MEIJER CHRISTOPHORUS JOANNES LAMBERTUS MARIA" "PETERS PETER CORNELIS" "PETERS PETER JOSEPHUS HUBERTUS" "PETERS PETER" "PETERS PETER JACOBUS MARIA" "PETERS PETER JURGEN" "POLMAN CHRIS HUBERT" "ROOS WOUTER" "SANDERS JAN WILLEM" "SMIT AUGUST BENJAMIN" "SMIT JAN C UNILEVER RESEARCH VLAARDINGEN" "SMIT JAN WILLEM" "SMIT JAN WICHERT" "SNIJDERS PETRUS JOSEPHUS FERDINANDUS" "SNOEP JACKY LEENDERT" "TE RIELE HENRICUS PETRUS JOSEPH" "TEUNISSEN CHARLOTTE" "VAN DEN BERG JAN LAURENS" "VAN DEN BERG JAN KEIMPE" "VAN DEN BERG JAN" "VAN DEN BERG TIMO KARS" "VAN DIE IRMA MARIANNE" "VAN KOOYK YVETTE" "VAN LEEUWEN PAULUS ALUISIUS MARIE" "VAN LEEUWEN PAULUS ALOISIUS MARIE" "VAN LEEUWEN PAUL A M" "VERMEULEN N P E" "VISSER JEROEN MARIE" "VOS JAN CHRISTIAAN" "WUISMAN PAULUS IGNATIUS JOZEF MARIA" "AARTS MARK GERARDUS MARIA" "BACHEM CHRISTIAN" "BELDMAN GERRIT" "BINDELS JACOB GEERT" "BINO RAOUL JOHN" "BOOM REMKO" "BUISMAN CEES JAN NICO" "DE BOER JAN" "DE BOER JAN REINDER" "DE BOER JAN R" "DE VOS WILLEM MEINDERT" "DE VRIES SAPE CORNELIS" "DE WAARD MAARTEN A" "DE WIT PETER JOZEF GERARD MARIE" "DE WIT PIERRE J G M" "EGGINK GERRIT" "FRANSSEN HENK" "GOLDBACH ROBERT WILLEN" "GOLDBACH ROBERT WILLEM" "GOMMERS FREDERIK JAN" "GROENEN MARTINUS ANTONIUS MATHILDA" "GROENEN MARTIEN A M" "HARBINSON JEREMY" "HOEK ANNETTE CATHERINA" "HOFSTEE JAN HENK EELSE" "JACOBSEN EVERT" "JANSEN JOHANN JOSEF" "JANSEN JOHANNES JACOBUS" "JANSEN HANS WILFRUDUS MARIA" "JANSEN HANS" "JANSSEN MARCEL LODEWIJK PETRUS MARIA" "JANSSEN ALBERT JOZEF HENDRIK" "JANSSEN SANDER JOHAN LEON MARIE" "JOOSTEN MATTHIEU HENRI ANTOON JOZEF" "KOORNNEEF MAARTEN" "LOVENSTEIN HARRIE MAURICE" "NOUT MARTINUS JOHANNES ROBERTUS" "POST JAN H" "RINZEMA ARJEN" "SAAKES MICHEL" "SANDERS JOHAN PIETER MARINUS" "SCHAAP PETER JOHANNES" "SCOTT ELINOR" "SIBBEL WAGEMAKERS CORNELIA ANTONIA MARIA" "SMIDT HAUKE" "SMIT GERRIT" "SMIT GERRIT JOHANNES" "SMIT GERRIT ALBERTUS" "SMITS MARINUS ADRIANUS" "STIEKEMA WILLEM JOHANNES" "SUDHOLTER ERNST JAN ROBERT" "TERLOUW ARIE" "VAN ARENDONK JOHANNUS ANTONIUS MARIA" "VAN BEEK TERIS ANDRE" "VAN BERKEL WILHELMUS JOHANNES H" "VAN DE VONDERVOORT PETER JOZEF I" "VAN DER BURG WILLEM JACOB" "VAN DER GOOT ATZE JAN" "VAN DER KROL ALEXANDER RONALD" "VAN DER KROL ALEXANDER R" "VAN DER VOSSEN EDWIN ANDRIES GERARD" "VAN KAN JOHANNES ARNOLDUS LAURENTIUS" "VAN KOOTEN OLAF" "VAN RIJN CORNELIS JOHANNES MARIA" "VINCKEN JEAN PAUL" "VISSER RICHARD GERARDUS FRANCISUS" "VISSER RICHARD GERARDUS FRANCISCUS" "VISSER RICHARD" "VISSER RICHARD G F" "VISSER GERBEN M" "VISSER G M" "VISSER GERBEN MACHIEL" "VLAK JUSTINUS MARIA" "VOS JAN" "VOSSEN JACOBUS HUBERTUS" "WEIJERS CAREL A G M" "WICHERS HARRY J" "WIJFFELS RENE HUBERTUS" AND (APD = 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014)

Appendix C: Institutions cleaned from and included in the database from the second query

Included	Cleaned	Aliases
3FORCE B V	COOPERATIE AVEBE	
AAK PATENT B V	KONINKL PHILIPS ELECTRONICS NV	
AGROTECHNOLOGY AND FOOD INNOVA	KONINKL PHILIPS NV	
AGVENTURE B V	PHILIPS INTELLECTUAL PROPERTY	
ANGTEQ BV	PHILIPS CORP	
APPLIED NANOSYSTEMS BV	KONINL PHILIPS ELECTRONICS NV	
AQTIS IP BV	MAXIM INTEGRATED PRODUCTS	
BEESTERZWAAG BEHEER B V	NL ORGANISATIE VAN WETENSCHAPP	NWO
BENDER ANALYTICAL HOLDING B V	DURECT CORP	
BESTEWIL HOLDING B V KONINGSPLEIN 1	MSD OSS B V NETHERLANDS	
BIOECON INT HOLDING NV	STICHTING TECH WETENSCHAPP	STW
BIOTEMPT BV	AKZO NOBEL NV	
BOUNZ BV	AKZO NOBEL CHEMICALS INT BV	
BTG BIOMASS TECHNOLOGY GROUP B V	FORNIX BIOSCIENCES N V	SnowWorld
C5 YEAST COMPANY B V	AKZO NOBEL COATINGS INT BV	
CALLOCK B V	LIANDON B V	
CAVADIS B V	BASF AG	
CELLAGENICS B V	BASF SE	
CHROMAGENICS BV	FRIESLAND BRANDS BV	FrieslandCampina
CLEA TECHNOLOGIES B V	KWEEK EN RESEARCHBED AGRICO BV	
COALESSENSE B V	TNO	
COOLL SUSTAINABLE ENERGY SOLUTIONS B V	SCHAPPELIJK ONDERZOEK TNO NL O	
CROSSBETA BIOSCIENCES BV	PURAC BIOCHEM BV	Corbion
CYTO BARR B V	STICHTING TOP INST FOOD AND NU	TI Food and Nutrition
DADTCO DEV B V	STICHTING TECHNOLOGISCH TOP IN	TTI Green Genetics
DIAGNOPTICS HOLDING B V	CRV HOLDING B V	
DRIVETRAIN INNOVATIONS B V	DSM IP ASSETS BV	
DTI ADVANCED TECHNOLOGIES B V	NXP BV	
DTI GROUP BV	SANQUIN BLOEDVOORZIENING	
EMOTIONAL BRAIN BV	NETHERLANDS ORGANISATION FOR SCIENT RES ADVANCED CHEMICAL TECHNOLOGIES FOR SUSTAINABILITY	NWO (ACTS)
ENATEC MICRO COGEN B V	DE RUITER SEEDS R & D BV	
ENCAPSON V O F	UNIV HONG KONG SCIENCE & TECHN	
EUROTRON B V	GN RESOUND AS	Great Nordic
FEYECON DEV & IMPLEMENTATION	INST PIG GENETICS B V	Topigs Norsvin
FLUXXION B V	US HEALTH	
FONDEL FINANCE B V	GLOBUS EI B V	
GENEXIS B V	BAYER CROPSCIENCE GMBH	
GILBERT TECHNOLOGIES B V	BAYER HEALTHCARE LLC	

GROW BEHEER B V	BAYER MATERIALSCIENCE AG	
HEMOLOGIC B V	ORGANON NV	MSD
INNOLUCE B V	STICHTING PUBLIC PRIVATE PARTNERSHIP INST FOR SUSTAINABLE PROCESS TECHNOLOGY	ISPT
INTERNA TECHNOLOGIES BV	CYCLOMEDIA TECHNOLOGY B V	
ISA PHARMACEUTICALS B V	SYNGENTA MOGEN BV	
JADE BEHEER B V	BIOCLEAR B V	
KLIP CONSULTANCY B V	KEYGENE NV	
KOOYMANS BEHEER B V	STAAT DER NEDERLANDEN VERT DOO	De Staat der Nederlanden, vertaald door de minister van VWS
LANTHIOPEP B V	MAGNETO SPECIAL ANODES B V	
MAGIC BOILER IP B V	NOVOFLOW GMBH	
MARTIL INSTR B V	VIATAR LLC	
MEDIMATE HOLDING B V	GENMAB AS	
MEDSPRAY XMEMS BV	MEDAREX INC	Bristol-Myers Squibb
MILABS B V	XENDO HOLDING B V	
MUBIO PRODUCTS BV	ELEPHANT DENTAL BV	
MUNISENSE B V	ASML NETHERLANDS BV	
MYCOBICS B V	FEI CO	
NANOMI B V	CORUS TECHNOLOGY BV	Tata Steel
NEEDLE HOLDING B V U	MOVARES NEDERLAND B V	
NEWTRICIOUS B V	GEMEENTE AMSTERDAM WATERLEIDIN	
NL INST NEUROWETENSCHAPPEN	SHELL INT RESEARCH	
NVI NL VACCININST	UNILEVER NV	
OCTOPLUS SCIENCES BV	UNILEVER PLC	
OCTOPLUS TECHNOLOGIES B V	UNILEVER HINDUSTAN	
OCTROLIX BV	CONOPCO INC DBA UNILEVER	
OPTIMOS APTO B V	SAMSUNG LCD NL R & D CT BV	
ORATIO B V	SAMSUNG ELECTRONICS CO LTD	
PHOTANOL BV	ADVANCED CHEM TECH	ACTS
PLANT RES INT BV	VERTEX PHARMA	
PRAKTIJKONDERZOEK PLANT & OMGE	STICHTING IMEC NEDERLAND	
PROSENSA HOLDING BV	MAERSK CONTAINER IND AS	
PROSENSA TECHNOLOGIES BV	COOPERATIE CEHAVE LANDBOUWBEL	
RECHARGE B V	CAMPINA NEDERLAND HOLDING BV	
RIVER DIAGNOSTICS B.V	VALIO LTD	
ROMICO HOLD A V V	SCHAPPEN STICHTING TECHNOLOGIS	Geen idee
SCHAPPELIJK ONDERZOEK EN PATIE	INTERVET INT BV	MSD Animal Health (onderdeel van Merck)
SELF SCREEN B V	UCB PHARMA GMBH	
SENZAI B V	NUTRICIA NV	
SMITDESIGN BV	KONINK NL AKADEMIE VAN WETENS	KNAW
SOUND INTELLIGENCE B V	FUJIFILM MFG EUROPE BV	
STICHTING DIENST LANDBOUWKUNDI	FUJI PHOTO FILM BV	
STICHTING GRONINGEN CT FOR DRU	PALM INC	

STICHTING SKELETAL TISSUE ENGI	ST JUDE CHILDRENS RES HOSPITAL	
STICHTING WETSUS CT OF EXCELLE	HEWLETT PACKARD DEVELOPMENT CO	
STYREX C V	TECHNOLOGIESTICHTING STW	
TO BBB HOLDING B V	STATOIL PETROLEUM AS	
TSC SOLAR B V	ARNOLD JAEGER HOLDING GMBH	
VALLETTA HEALTH B V	STICHTING DUTCH POLYMER INST	DPI
VIRONOVATIVE BV	HELIANTHOS BV	NUON
VITAK BV	FLEXSYS HOLDING B V	Joint venture van Solutia Inc. and Akzo Nobel Chemicals International B.V. (maar ook subsidiary van Eastman Chemical Company)
ZERNIKE BUSINESS SUPPORT B V	JOHNSON MATTHEY PLC	
ZONDHEID B V ID LELYSTAD INST	CENTRE NAT RECH SCIENT	Centre national de la recherche scientifique (CNRS)
	TOTAL RAFFINAGE MARKETING	
	DOW GLOBAL TECHNOLOGIES LLC	
	DUTCH POLYMER INST	
	HUBRECHT LAB	Onderdeel van KNAW
	ABLYNX NV	
	ONO PHARMACEUTICAL CO	
	CO2 SOLUTIONS INC	
	SARA LEE DE NV	
	SOLVAY PHARM BV	
	ALLIGATOR BIOSCIENCE AB PUBL	
	STICHTING HET NL KANKER I	NKI
	CIBA SC HOLDING AG	
	ERICSSON TELEFON AB L M	
	SONY ERICSSON MOBILE COMM AB	
	SONY MOBILE COMM AB	
	SONY CORP	
	SDU IDENTIFICATION BV	
	INTERVENTIONAL & SURGICAL INNO	Interventional and Surgical Innovations, LL
	SAGEM IDENTIFICATION BV	SDU Identification BV
	PEPTX INC	
	GRACENOTE INC	SDU Identification BV
	MORPHO B V	
	STICHTING VOOR DE TECH WETENSCHAPPEN	STW
	BROADCOM CORP	
	SANOFI AVENTIS	
	PAPER CONVERTING MACHINE CO	
	ANCORA PHARMACEUTICALS INC	
	TRUSTESS OF THE UNIVERSITY OF	
	LATEXFALT BV	
	D S M IP ASSETS B V	
	ONCOMETHYLOME SCIENCES SA	

	NANOPASS TECHNOLOGIES LTD	
	ALERIS SWITZERLAND GMBH	
	ALBEMARLE EUROPE SPRL	
	ALBEMARLE NETHERLANDS BV	
	FRUTAROM SWITZERLAND LTD	
	SIEMENS AG	
	ABB LUMMUS GLOBAL INC	
	MICROBIA PREC ENGINEERING INC	
	TATE & LYLE INGREDIENTS	
	ALPHARMA APS	
	GREYSTONE MEDICAL GROUP INC	
	MEYN FOOD PROC TECHNOLOGY BV	
	BIOSYNTHEMA INC	
	STICHTING ENERGIE	ECN
	LANXESS ELASTOMERS BV	
	REAL ENTPR SOLUTIONS DEV B V	
	ANTHURA B V	
	ML LAB PLC	
	BRIDGELUX INC	
	LUPIN LTD	
	GLO AB	
	ALCATEL LUCENT	
	CRUCELL HOLLAND BV	
	SAINT GOBAIN CRISTAUX ET DETEC	
	NATTOPHARMA ASA	
	LUCENT TECHNOLOGIES INC	
	AGERE SYSTEMS INC	
	WINCLOVE BIO IND B V	
	MELBOURNE HEALTH	
	BOSTON SCIENT NEUROMODULATION	
	MITSUBISHI CHEMICAL EUROP GMBH	
	PROTAGEN AG	
	DRAKA COMTEQ BV	
	BERKIN BV	Bronkhorst High-tech
	TOTAL SA	
	MEIJER ST JABIK B V GEB	
	BAUSCH & LOMB	
	MICROSOFT CORP	
	ST ANNA KINDERKREBSFORSCHUNG	
	TEIJIN ARAMID BV	
	AMAKEM NV	
	DEVGEN NV	
	TRELLEBORG VELP B V	

	HUNTSMAN INT LLC	
	BOSCH GMBH ROBERT	
	UNIV NAT CHIAO TUNG	
	NATION CHIAO TUNG UNIVERSITY	
	R3DSTAR BIOMEDICAL CORP	
	NAT APPLIED RES LABORATORIES	
	HIMAX TECH LTD	
	PENSIERO MEDICAL ELECTRONICS CORP	
	QUANTA COMP INC	
	UNIV NAT CENTRAL	
	ROCHE MOLECULAR SYSTEMS INC	
	IND TECH RES INST	
	FOXCONN COMM TECHNOLOGY CORP	
	WISTRON CORP	
	GOOGLE INC	
	X FLOW BV	Spin-off van Uni Twente, maar erg oud (1984)
	OTB GROUP BV	
	ERIKSSON CAPITAL AB	
	PROVIMI HOLDING B V	
	OTB SOLAR BV	
	VERIDEX LLC	
	RENAULT TRUCKS	
	VOLVO LASTVAGNAR AB	
	QUEST INT	
	IMMUNIVEST CORP	
	AIXTRON AG	
	HEALTHSPAN SOLUTIONS LLC	
	ISO GROEP MACHB B V	
	NOVARTIS AG	
	S T V GESTION S L	
	BROCKEVILLE CORP N V	
	ZOBELE ESPANA SA	
	ZOBELE HOLDING SPA	
	UNI JAUME I DE CASTELLO	
	UNI POLITECNICA DE VALENCIA	
	AAP BIOMATERIALS GMBH	
	PROBELTE S A	
	BANK OF AMERICA	
	UNIV ARIZONA	
	OPW FLUID TRANSFER GROUP EUROP	
	EVONIK OXENO GMBH	
	UNIV STRATHCLYDE	
	XSTALBIO LTD	

	DAIMLER CHRYSLER AG	
	DAIMLER AG	
	NOKIA CORP	
	INTEL MOBILE COMM GMBH	
	OCE TECH BV	
	DORMA GMBH & CO KG	
	UNIV DUISBURG ESSEN	
	BORGWARNER BERU SYSTEMS GMBH	
	FEV MOTORENTECH GMBH	
	LANDIS & GYR AG	
	CHIMIE INORGANIQUE ET ORGANIQU	
	SYNOPSIS INC	
	THALES NEDERLAND BV	
	BLACKBERRY LTD	
	RESEARCH IN MOTION LTD	BlackBerry
	RESEARCH IN MOTION CORP	BlackBerry
	RES IN MOTION LIMITED	BlackBerry
	RESEARCH IN MOTION	BlackBerry
	MAUSER WERKE GMBH	
	EXXONMOBIL UPSTREAM RES CO	
	BRUNSWICK NEW TECHNOLOGIES ASI	
	VERIZON PATENT & LICENSING INC	
	THALES SA	
	UCHREZHDENIE ROSSYSKOI AKADEMII NAUK INST MOLEKULYARNOI BIOLOG IM V A ENGELGARDTA RAN IMB RAN	
	US NAVY	
	ALIA TECHNIK GMBH	
	ALIA HOLDING	
	ALIA AB	
	ALIA KK	
	IBM	
	UNIV SHEFFIELD	
	JUNIPER NETWORKS INC	
	REPSOL YPF SA	
	UNIV LELAND STANFORD JUNIOR	
	SOLVAY PHARMACEUTICALS B.V	
	EXXON CHEMICAL LIMITED	
	EXXON CHEMICAL PATENTS INC	
	SKF AB	
	EIDGENOSSISCHE TECHNISCHE HOCHSCHULE	

Appendix D: Survey

Wat is het patentnummer waarop het bedrijf is gebaseerd (zie de bijlage van uw uitnodiging)?

Wat voor type bedrijf betreft het?

Wat is de naam van het bedrijf?

In welk jaar is het bedrijf opgericht?

Zijn de bedrijfsactiviteiten inmiddels gestaakt?

- Zo ja, zie 'Optie 1'
- Zo nee, zie 'Optie 2'

Optie 1

In welk jaar zijn de bedrijfsactiviteiten gestaakt?

Wat was het laatste afgeronde financiële jaar?

De volgende vragen gaan over de financiën en werknemers van het bedrijf. Mocht u niet in staat zijn de volgende vragen te beantwoorden, omdat u bijvoorbeeld niet (meer) actief betrokken bent bij het desbetreffende bedrijf, dan willen wij u verzoeken deze enquête in te laten vullen door de CEO van het desbetreffende bedrijf.

Wilt u doorgaan met het invullen van de enquête? Als u op 'nee' klikt, krijgt u een link om deze enquête te bewerken; gelieve deze door te sturen naar de CEO van het desbetreffende bedrijf.
U zult naar het scherm 'formulier verzenden' gaan als u op 'nee' klikt

Wat was de omzet van het laatst afgeronde financiële jaar?

Wat was de netto winst van het laatst afgeronde financiële jaar?

Wat was de omzet van het voorgaande financiële jaar?

Wat was de netto winst van het voorgaande financiële jaar?

Hoeveel werknemers telde het bedrijf aan het eind van het laatst afgeronde financiële jaar?

Hoeveel werknemers hiervan hadden een technische of wetenschappelijke achtergrond?

Hoeveel werknemers hadden een achtergrond als ondernemer of hadden al eerder gewerkt bij een nieuw gestart bedrijf?

In hoeverre had het bedrijf beschikking over eigen onderzoeksfaciliteiten?

In hoeverre had het bedrijf toegang tot externe onderzoeksfaciliteiten?

Hoe vaak zijn de strategische doelen van het bedrijf gewijzigd sinds de oprichting van het bedrijf?

In welke mate was het bedrijf in staat zich aan te passen aan veranderingen in de omgeving?

Hoeveel externe financiering heeft het bedrijf in het laatst afgeronde financiële jaar ontvangen?

Optie 2

De volgende vragen gaan over de financiën en werknemers van het bedrijf. Mocht u niet in staat zijn de volgende vragen te beantwoorden, omdat u bijvoorbeeld niet (meer) actief betrokken bent bij het desbetreffende bedrijf, dan willen wij u verzoeken deze enquête in te laten vullen door de CEO van het desbetreffende bedrijf.

Wilt u doorgaan met het invullen van de enquête? Als u op 'nee' klikt, krijgt u een link om deze enquête te bewerken; gelieve deze door te sturen naar de CEO van het desbetreffende bedrijf.

U zult naar het scherm 'formulier verzenden' gaan als u op 'nee' klikt

Wat was de omzet in 2013?

Wat was de netto winst in 2013?

Wat was de omzet in 2012?

Wat was de netto winst in 2012?

Hoeveel werknemers telde het bedrijf eind 2013?

Hoeveel werknemers hiervan hadden een technische of wetenschappelijke achtergrond?

Hoeveel werknemers hadden een achtergrond als ondernemer of hadden al eerder gewerkt bij een nieuw gestart bedrijf?

In hoeverre had het bedrijf eind 2013 beschikking over eigen onderzoeksfaciliteiten?

In hoeverre had het bedrijf eind 2013 toegang tot externe onderzoeksfaciliteiten?

Hoe vaak zijn de strategische doelen van het bedrijf gewijzigd sinds de oprichting van het bedrijf tot eind 2013?

In welke mate was het bedrijf eind 2013 in staat zich aan te passen aan veranderingen in de omgeving?

Hoeveel externe financiering heeft het bedrijf in 2013 ontvangen?