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How generic and specific regulations differ in their effectiveness regarding renewable energy technology development by SMEs

- A study applied to the Dutch Solar and Bio-energy sector -

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ABSTRACT

The aim of this study is to examine the effectiveness of generic and specific regulations with regard to renewable energy technology development by small- and medium enterprises (SMEs) in the Netherlands. The Netherlands Enterprise Agency (NEA) is responsible for these programs. Generic policies focus on the economy as a whole, such as the provision of funds for basic research and development (R&D). Specific policies focus on specific areas, like renewable energy technologies. Within these specific policies the NEA furthermore combines the provision of funds with an active involvement during the development of the project. This study was applied to the Dutch bioenergy- and solar industry.

Using the insights from the resource-based view (RBV), the main hypotheses of this study emphasized a positive influence of the participation in a specific program on the performance of SMEs and a positive influence of the participation in a generic program on the performance of SMEs. The performance of SMEs was indicated by the successful phase transition towards a subsequent phase within the innovation process.

Based on data from questionnaires, the main results of this study show that there is a negative influence of participation in a specific program and the successful phase transition of an SME.

The results imply for policymakers that they should improve their programs by changing the selection processes. Based on the results they should at least focus on young firms active in the development phases of technology, based on private equity and suffering from too limited external financing, and situated in limited consortia with no commercialization partners.

Keywords: *specific policy, generic policy, Small- and Medium Enterprises (SMEs), renewable energy technology development, effectiveness*

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1. INTRODUCTION

The most prevalent problem the world faces today is climate change (Dean, 2014). In the mitigation of climate change renewable energy plays a significant role (IPCC, 2011). It is therefore important to stimulate developments in the area of renewable energy technology (Del Rio & Bleda, 2012). Because the benefits of these technologies accrue to the whole society, instead of solely to the technology users, the market on its own presents only little incentive to develop these technologies (Popp et al., 2009). Consequently, public authorities aim to stimulate technical progress and accelerate technological learning processes via a variety of (environmental) policy instruments (Menanteau et al., 2003; Fischer & Newell, 2008). They thereby create entrepreneurial opportunities for small- and medium enterprises[1] (SMEs) that play a vital role in economic growth (Pasanen, 2003; Storey, 2003).

In the Netherlands the '*Netherlands Enterprise Agency'* (NEA), commissioned by the Ministry of Economic Affairs, implements generic and specific policy instruments to support the development of renewable energy technologies (RVO, 2014). Generic policies focus on the economy as a whole, such as the provision of funds for basic research and development (R&D) (Popp et al., 2009). Specific policies focus on specific areas, like renewable energy technologies (Popp et al., 2009). Within these specific policies the NEA furthermore combines the provision of funds with an active involvement during the development of the project. The NEA thereby takes on a role comparable to a venture capitalist, rather than focusing solely on providing subsidies as is the case with the general policies (Kunze, 1990; Jeng & Wells, 2000).

Generic and specific policies have different influences on SME technology development (Vollebergh, 2007). Taxpayers, policy-makers, businesses and society all have an interest in the effectiveness of policy instruments (Storey, 2003; Storey, 2008). To analyse the effectiveness of policies, one should look at the performance of SMEs (Lerner, 1996). According to the Resource-Based View (RBV) the performance of a firm is dependent on its (unique) resources, capabilities and competences (Hansen & Wernerfelt, 1989; Barney, 1997; Newbert, 2007). Teece et al. (1997) describe the exploitation of a firm's resources as the dynamic capabilities of a firm. The dynamic capabilities of the firm are defined as "the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments" (p.516). This implies that changes in the business environment induced by generic and specific governmental policies, also influence the performance of SMEs (Covin & Covin, 1990; Chandler & Hanks, 1994).

Many studies have investigated the effectiveness of policies (e.g. Bürer & Wüstenhagen, 2009; Menz & Vachon, 2006). González et al. (2005) studied the effectiveness of a general policy, namely of subsidies for R&D-based firms. The authors showed that only for a few firms government subsidies were decisive to engage in R&D activities. Furthermore, the study by Beason et al. (1996) showed that government subsidies resulted in low growth of many firms, and in a decline of their returns to scale. Lerner (1996) analysed the long-term influence of the SBIR program of the US government on firm sales and employment. This author showed that only in the areas with considerable venture capital involvement, government regulation has a positive influence. Nevertheless, Vollebergh (2007) argues that literature has shown that environmental policy has a clear impact on the invention, innovation and diffusion of sustainable technologies (Vollebergh, 2007). Economists in particular believe that environmental policy is essential for firms to engage in the development and adoption of new (more) environmental friendly technologies (Vollebergh, 2007).

Storey (2008) argues that various policies appear never to be evaluated, and even if they are, the evaluation is often based solely on rather primitive criteria. Furthermore, Rigby & Ramlogan (2013) showed in their study that a comparison of the effectiveness of generic and specific policies is completely lacking in the literature. Therefore, the following research question is formulated focused on the development of renewable energy technologies by SMEs in the Netherlands:

[1] SMEs are defined as businesses with less than 250 employees (RVO, 2014).

"How do generic and specific regulations differ in their effectiveness regarding renewable energy technology development by SMEs?"

In order to answer this question, this study will analyse SMEs in the field of renewable energy technology that participated in Dutch governmental programs focusing on the development and implementation of renewable energy technologies. The focus will be on two policy agendas: the *Energie Onderzoek Agenda* (EOS) (2005-2010) and the *Innovatie Agenda Energie* (IAE) (2008-2012). In order to be able to compare specific and generic programs a third group of SMEs has been selected that participated in the general WBSO regulation in place since 2005. The time scope of this study is 2005 – 2012, thereby incorporating the full duration of both specific policy agenda programs. The answer to the research question is quite relevant for policy makers, because it can help them to improve their strategies of supporting SMEs active in the field of renewable energy technology. In society, SMEs play an important role in economic and sustainable developments (Holt et al., 2001; Pasanen, 2003). Having more SMEs developing renewable energy technologies is therefore important.

This study is structured as follows. Section 2 will shortly explain the different phases an SME goes through during its development of a technology. Throughout these phases the SMEs do not have any revenues yet, which is why the performance of SMEs will be represented by their (un)successful transition trough successive development phases. Subsequently, the challenges the SMEs encounter during their development of a technology will be analysed. To address these challenges SMEs can decide to participate in the NEA programs. Consequently the role of the NEA programs in these incentives will also be explained. The hypothesized effects of these incentives and the NEA programs on the (un)successful transition of SMEs to the next phase of technology development will be empirically assessed. Section 3 describes the method of data collection and data analysis applied. Section 4 presents the results of this study, thereby either confirming or rejecting the hypothesis. In the end, section 5 and 6 present the conclusion and discussion, respectively.

2. THEORETICAL FRAMEWORK

2.1 PHASE TRANSITIONS

Within the economic literature, SMEs are seen as the engine of economic growth and employment (Radas & Božić, 2009). One of the most significant ways in which SMEs can accomplish growth is via innovations (Radas & Božić, 2009). SMEs go through different phases before they reach the moment at which their innovation can be introduced and implemented in the market (Utterback, 1971). A distinction can be made between the following key phases: idea generation, research, development and implementation (Tushman, 1977). The idea generation phase is the phase in which a design or proposal will be developed (Tushman, 1977). The end of this phase should result in a technical proposal or design concept (Utterback, 1971). After the development of a technical proposal, the firm can enter the next phase, namely the research phase. During this phase the SMEs create and search for the new knowledge they need for the development of the technology (Hall, 2002). The main outcome of this phase is therefore knowledge of how SMEs can make the technology work (Hall, 2002). The subsequent phase is the development phase. During this phase the firm develops its technology into a marketable product or process, i.e. an innovation, which is thus the end result of this phase (Tidd & Bessant, 2007). The implementation phase is concerned with the introduction of the innovation in the market (Utterback, 1971). After the implementation phase the firm should focus on further business development.

In order to measure the effectiveness of the policy regulations, this study will look at the performance of SMEs as the dependent variable. In general the performance of SMEs can be measured by growth and profit (Pasanen, 2003). However, because the SMEs studied are in the phases before servicing the market, growth and profit are not suitable indicators. Therefore, the performance of SMEs is indicated by their (un)successful transition to a subsequent phase.

2.2 SME CHALLENGES

Given their small sizes, SMEs will encounter different challenges during these phases (Hessels & Parker, 2013). Previous studies in the field of organizational economics have shown that smaller and younger firms have a lower chance of survival than bigger and older firms (Pasanen, 2003). This has been explained by the 'liability of newness' and the 'liability of smallness' (Stinchcombe, 1965; Cefis & Marsili, 2005; Pasanen, 2003; Lohrke et al., 2010; Nagy & Lohrke, 2010). Both liabilities can be related to the resource-based view (RBV).

According to the RBV the performance of a firm is dependent on its (unique) resources, capabilities and competences (Hansen & Wernerfelt, 1989; Barney, 1997; Newbert, 2006). Furthermore, unique resources help firm with gaining a comparative advantage (Wernerfelt, 1984; Mahoney, 1992). Firm resources are defined as "all assets, capabilities, organizational processes, firm attributes, information, and knowledge etc. controlled by a firm that enable the firm to conceive and implement strategies that improve its efficiency and effectiveness" (Barney, 1991, p.101). The liability of newness and the liability of smallness refer to the problems new small firms encounter with acquiring the resources necessary for engaging in innovation and creating a comparative advantage (Freeman et al., 1983; Kaufmann & Tödtling, 2002; Wiklund et al., 2010). The necessary resources of an SME can be categorized in human, organizational, physical, financial, technological and social capital (Brush et al., 2001).

Human capital is related to the embodied knowledge and skills in employees (Audretsch & Keilbach, 2004). One can think of the "training, experience, judgement, intelligence, relationships, and insight of individual managers and workers in a firm" (Barney, 1991, p. 101). A distinction can be made between three different types of human capital (Florin & Schultze, 2000). The first type is firm-specific human capital, which refers to the knowledge and skills of individuals that is only of value within the firm (Dakhli & de Clercq, 2004). The second type is industry-specific human capital. Industry-specific human capital is related to experience derived from the industry (Dakhli & de Clercq, 2004). The general managerial and entrepreneurial experience of individuals, which can be applied both in firms and the industry, is called individual-specific human capital and is the third type of human capital (Pennings et al., 1998). According to Martín-de-Castro et al. (2006), human capital essentially refers to the knowledge people possess, and their ability to create new knowledge.

Human capital has been argued to be critical for the success of entrepreneurial firms (Pfeffer, 1994; Florin et al., 2003). SMEs face, however, significant human resource challenges (Cardon & Stevens, 2004). They have more difficulties with recruiting employees and have less human resources than larger organisations (Cardon & Stevens, 2004). These human resource constraints have a negative influence on the performance of SMEs (Klaas et al., 2010). As performance is defined as the successful phase transition, this translates into the following hypothesis:

H1: *Human capital has a positive influence on the successful phase transition of an SME.*

Related to human capital is organizational capital. This is defined as: "the combination of explicit and implicit, formal and informal knowledge, which in an effective and efficient way structure and develop the activities of the firm. It includes culture – implicit and informal knowledge; structure – explicit and formal knowledge; and organizational learning – implicit and explicit, formal and informal renewal of knowledge processes" (Martín-de-Castro et al., 2006, p. 328). The main dimensions of organizational capital discussed are: culture, structure and organizational learning. Culture is defined as values, beliefs etc. that determine the way in which a firm performs it business. Structure is defined as the means and processes (via routines) that determine the formal organization of the firm. Organizational learning refers to the capability to acquire new knowledge and competences in order to be able to adapt to a changing environment. Due to the liability of newness, SMEs face especially organizational learning challenges. These challenges can be attributed to a lack of routines that enable the control of day-to-day activities (Nelson & Winter, 1982). A lack of organizational capital can lead to inefficient and unnecessary activities (Baum, 1996). The presence of

organizational capital has thus influence on the activities in a firm, and therefore the successful transitions to the next phase. Accordingly, the following hypothesis can be formulated:

H2: *Organizational capital has a positive influence on the successful phase transition of an SME.*

Physical capital refers to the presence of tangible objects within a firm (Audretsch & Keilbach, 2004). It includes the firm's facilities and equipment necessary for the production of a product or process (Brush et al., 2001). These facilities can play an important role during the different phases of the innovation process. However, SMEs often have to deal with a shortage of physical capital, as they need financial capital to get access to physical capital (Hussain et al., 2006). This lack of physical capital has a negative influence on the successful phase transition of SMEs, or in other words:

H3: *Physical capital has a positive influence on the successful phase transition of an SME.*

Financial capital refers to the amount of funding available to the firm. It is important for creating a buffer against random shocks and, as already mentioned, it helps in pursuing more capital-intensive strategies (Cooper et al., 1994). In each of the different phases, an SME can encounter different challenges. In order to solve these challenges, financial capital plays an important role. An SME can acquire the necessary financial capital via, for example, bank loans, family and friends and equity capital (Orser et al., 2006). However, because of the liability of newness and smallness, a firm may face difficulties with acquiring such funds. The resulting lack of funding has a negative influence on the performance of SMEs and thus on the successful phase transition. In other words:

H4: *Financial capital has a positive influence on the successful phase transition of an SME.*

A firm's technological capital is defined as the "combination of knowledge directly linked to the development of the activities and functions of the technical system of the organization, responsible for obtaining products and services" (Martín-de-Castro et al., 2006, p.328). It can be divided into a firm's technological capabilities (van Haverbeke et al., 2002) and its technological assets. Due to the liability of smallness and newness, SMEs often have a shortage of technological capital. This shortage has a negative influence on the successful phase transition of an SME. So:

H5: *Technological capital has a positive influence on the successful phase transition of an SME.*

The RBV presumes that firms do not possess all necessary resources themselves (Dhanaraj & Beamish, 2003). They must acquire additional resources by entering partnerships (Das & Teng, 2000). However, in order to do so the SME must have social capital. Social capital comprises the relations individuals have with others and the social networks that arise from them (Audretsch & Keilbach, 2004). In these relations reciprocity and trustworthiness are important aspects that must be established (Audretsch & Keilbach, 2004). SMEs first need to establish legitimacy before they can attract suitable partners. According to the liability of newness this is a challenge for the firms. Especially in the first phases of the innovation process, SME thus often have a shortage of the necessary social capital. This shortage has a negative influence on the possibility to proceed to a subsequent phase. In other words:

H6: *Social capital has a positive influence on the successful phase transition of an SME.*

As already mentioned in the beginning of this section, (new) small firms often encounter difficulties with acquiring the resources necessary for engaging in innovation and creating a comparative advantage. Therefore, the NEA offers support to the SMEs.

2.3 POLICY REGULATIONS

The NEA implemented generic as well as specific policy agenda's. The specific regulations of the NEA are aimed at inducing SMEs to collaborate with other partners. In order to participate in the projects belonging to the specific policy agenda's, SMEs must form a consortium. In this way, SMEs

can gain access to unique resources of or via its partners. Additionally the NEA acts as a venture capitalist during these programs. They do not only provide funding, but also take on an advisory role in the area of strategic management and networking within the consortium. As (new) SMEs are often lacking the right managerial skills and have little external relations, this advisory role can be a valuable asset for SMEs. In the period 2005-2012 the NEA implemented two agenda's in which specific programs were developed. The first agenda was the *Energie Onderzoek Subsidie* (EOS) program (2005-2010). The second policy agenda was the *Innovatie Agenda Energie* (IAE) (2008-2012). There are different programs within both agenda's that focus on different phases of the innovation development by SMEs. These programs included the ability to do feasibility projects, research and development projects, and fundamental and industrial research.

If SMEs do not have the necessary financial and social capital themselves, this can be a reason to participate in the NEA programs. Additionally, as mentioned before, the NEA is actively involved in the projects. Financial capital and social capital are important in the different phases of the innovation process. Participation in the NEA programs will have a positive influence on the successful phase transition of the SMEs:

H7: *Participation in one of the specific programs of the NEA has a positive influence on successful phase transition.*

SMEs can also try to participate in the general R&D stimulation program (WBSO) of the NEA. This program is focused on subsidizing R&D by individual firms via tax reductions. Firms can use this regulation to lower their financial costs when participating in an R&D project. The WBSO thus offers additional financial resources to the firm. The WBSO can also be seen as an incentive for firms engaged in R&D activities. Based on the fact that financial capital plays an important role in the phase transition processes of SMEs, one can expect that there is a positive effect of participation in the WBSO on successful phase transition:

H8*: Participation in the WBSO has a positive influence on successful phase transition.*

However, one may ask what would be more effective for an SME; participation in either the specific program, or in the generic program? Because the specific program offers more support to SMEs, one would expect specific programs to be more effective. In other words:

H9*: Participation in the specific programs of the NEA has a more positive influence on successful phase transition than participation in the WBSO.*

For firms it is possible to participate in specific programs as well as general programs (WBSO). Therefore, one can differentiate between four different groups of (non)participating SMEs. The first group solely participates in one of the specific programs, and not in the WBSO. The second group only participates in the WBSO and not in a specific program. Then there is a third group that participates in both types of programs. Finally there is a group of SMEs that do not participate in either program types. An overview of this division is presented in table 1. This will be further elaborated in section 3.2.

TABLE 1: GROUP DIVISION INTO FOUR CATEGORIES.

Participation		**General program**	
		No	*Yes*
Specific Program	*No*	None	WBSO
	Yes	EOS / IAE	WBSO + EOS/IAE

2.4 CONCEPTUAL MODEL

The hypotheses presented before can be summarized in the conceptual model shown in figure 1. As already mentioned, all hypothesized relations between the independent variables and SME performance (dependent variable) are derived to be positive in nature.

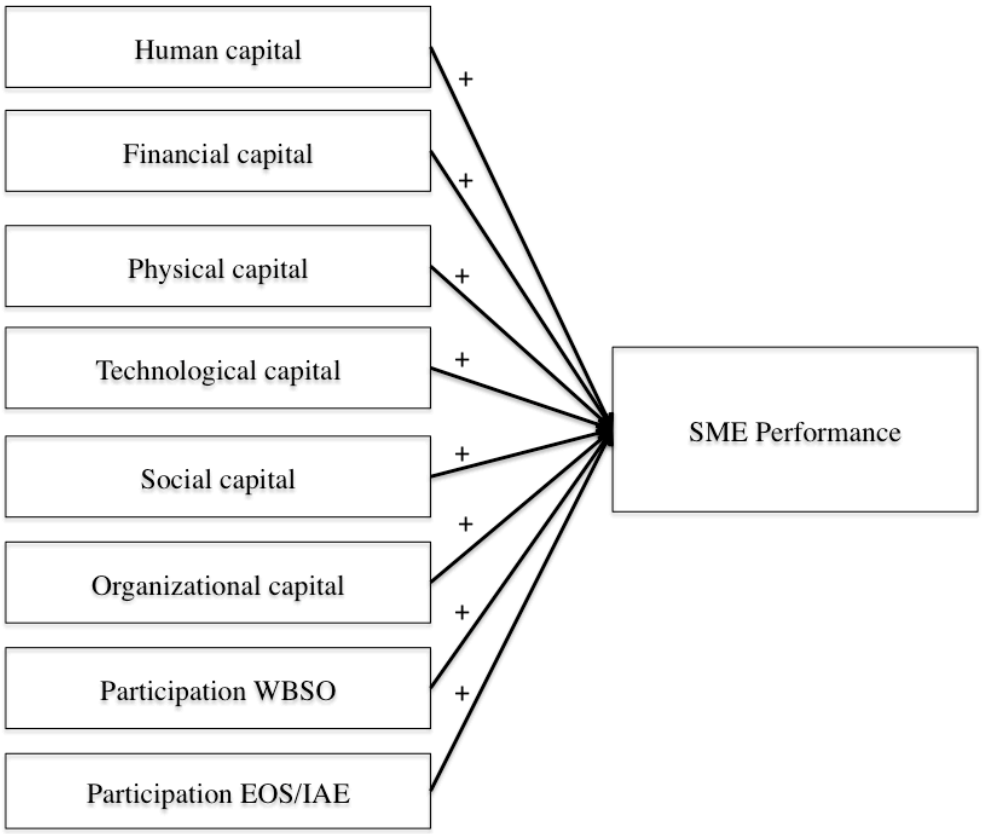

FIGURE 1: CONCEPTUAL MODEL

2.5 CONTROL VARIABLES

This study takes three control variables into account, namely firm age, firm size and type of industry. The age of the venture can have either a positive or a negative influence on performance. On the one hand, age is related to the accumulation of experience over time, and thereby has a positive effect on performance (Glancey, 1998). On the other hand, a negative relation between age and performance is also possible, as older firms can get stuck in routines that lead to inefficient processes (Glancey, 1998). The second control variable that will be controlled for is the size of the SMEs. Larger firms could 'derive greater synergy effects from human and financial capital resources' (Wu et al., 2006, p. 497). This will have a positive influence on firm performance. Industry effects should also be taken into account, as the performance of SMEs may differ between industries.

3. METHOD

3.1 RESEARCH DESIGN

The aim of this research was to examine the influence of two specific types of governmental support programs on the performance of SMEs in the area of renewable energy technology. The function of this research is therefore explanatory, because this study tries to assess empirically the effect of the independent variables (as shown in the conceptual model) on SME performance. This study has a cross-sectional design by analysing SMEs in the areas of Bio-energy and solar energy that participated

in EOS and/or IAE and/or WBSO for one moment of observation in time. Many SMEs working on these types of renewable energy technologies applied for support from the NEA programs. These SMEs have been invited to participate in a survey in order to collect data on the dependent (section 3.3.1) and the independent variables (section 3.3.2). The study is thus quantitative in nature. Before the invitations were sent, interviews with a small number of SMEs were held to investigate the completeness of the questionnaires. These interviews were conducted with four companies (two from the database of the NEA and two firms from the database of the Dutch Chamber of Commerce).

The information obtained from the interviews was analysed using an open coding procedure. This means disentangling the information and attaching codes to them. These codes can range from one code per sentence to one code per paragraph (Burnard, 1991). The open coding procedure is appropriate in this study, as it allows for a clear analysis of the data thereby enabling the researcher to uncover important details of the interviews and check their presence in the questionnaires. Furthermore, after each interview the interviewee was asked whether there were some ambiguities or important things missing in the questions. Based on the interviews, no important topics appeared to be missing or unclear in the questionnaire.

3.2 DATA COLLECTION

To answer the research question, this study uses questionnaires sent to four different groups of SMEs that were described in the theory section. The questionnaire of this study has a focus on the project in which each actor last participated, because these are the projects that suffer the least from memory decay[2]. The questionnaire is presented in appendix I.

The selection of the groups of SMEs is based on data from the NEA and the Dutch Chamber of Commerce. The NEA has two databases that provide an overview of all the projects that have been part of the specific programs of EOS and IAE, which were focused on stimulating two types of renewable energy technologies: Solar energy and Bio-energy. These projects are documented between 2005 and 2012. For each project, an overview is obtained of its technical characteristics, the start and end year of the project, and all parties involved in the project.

Besides data from the NEA, data was also gathered at the Dutch Chamber of Commerce. The database of the Dutch Chamber of Commerce offers an overview of all (Dutch) firms active in various fields of renewable energy. Based on keywords one can find the firms active in a certain field which are contained in the Dutch Chamber of Commerce database. The selected sample thus exists of SMEs participating only in the WBSO or in the specific programs or a combination of both or in none of the programs. The amount of firms participating in the WBSO program can be checked with the WBSO database of the Ministry of Economic Affairs. This database contains all SMEs that have applied for the WBSO program, and thus for tax reduction on their R&D activities. However, because of tax secrecy the NEA cannot give the names of the firms participating in the WBSO. Therefore, the number of actors that made use of the WBSO was identified based on the questionnaires.

A total of 250 firms, selected from both databases, received an invitation to fill in the online questionnaire. About 80 per cent of these firms were derived from the database of the NEA. The remaining 20 per cent was selected via keywords from the Dutch Chamber of Commerce database. The questionnaire was returned by 35 respondents and thus resulted in a response rate of only 14 per cent. Of the 35 respondents about 75 per cent represented firms obtained from the database of the NEA, and 25 per cent represented firms not in this database.

[2] For the SMEs that only participated in the WBSO and the SMEs that have not participated in the NEA programs and not in the WBSO, the focus of this study is on their last R&D project within the period 2005-2012.

3.3 MEASUREMENT

3.3.1. DEPENDENT VARIABLE

The dependent variable of this study is firm performance. This variable is measured on the (un)successful phase transition of a firm. As already mentioned the key phases an SME goes through are: idea formulation, research, development and implementation. For each phase its content and indicator are presented in table 2.

TABLE 2: OPERATIONALIZATION DEPENDENT VARIABLE[3].

Phases	**Content**	**Indicator: Transition to**
Idea formulation	Developed a technical proposal or design concept.	Research? Yes / No *(Q.1, Q.6 and Q.35)*
Research	Acquired knowledge on how to make the technology.	Development? Yes / No *(Q.1, Q.6 and Q.35)*
Development	Developed the technology.	Implementation? Yes / No *(Q.1, Q.6 and Q.35)*
Implementation	Introduced the product to the market.	Business Development? Yes / No *(Q.1, Q.6 and Q.35)*

3.3.2. INDEPENDENT VARIABLES

This study makes use of eight independent variables. The first variable is human capital. As already mentioned, one can make a distinction between three types of human capital: firm-specific, industry-specific, and individual- specific. Both firm-specific and industry-specific human capital is indicated by experience (Hinz & Jungbauer-Gans, 1999; Dakhli & de Clercq, 2004). Firm-specific human capital, is operationalized by the presence of job-trainings (Blundell et al., 1999). These trainings are designed to help employees with the development of skills that are useful for their job. Industry experience is measured by the percentage of employees that already has experience in another firm and/or in the same industry (Dimov & Shepherd, 2005). Furthermore, the percentage of employees that already has experience in entrepreneurial organizations is measured (Dimov & Shepherd, 2005). Individual-specific knowledge is measured using the following two indicators: average level of education and the percentage of employees that followed vocational training (Hinz & Jungbauer-Gans, 1999; Dakhli & de Clercq, 2004). The average level of education is calculated as a compound figure for all employees of each SME (see table 3).

The second variable is organizational capital. As already mentioned there are three different dimensions, namely culture, structure and organizational learning. However, each of these dimensions is intangible making them difficult to measure. Culture is defined by the shared values and beliefs that determine how the firm performs its business (Deshpane & Webster, 1989). According to the model by Cameron & Quinn (1999) one can categorize organisational culture into four different types. The first type of culture is adhocracy. This type highlights flexibility and change and has an external focus (Naranjo-Valencia et al., 2011). Key values belonging to this type of culture are creativity, entrepreneurship and risk-taking (Naranjo-Valencia et al., 2011). Clan culture is largely similar to adhocracy culture, but it has its focus on the internal organization. This is characterized by teamwork, involvement of employees and company commitment to the employees. The third type of culture is market culture (Naranjo-Valencia et al., 2011). This type is externally oriented but is also focussed on control. Essential elements of this type of culture are productivity and competitiveness. The last type of culture is hierarchy culture. This type is also control oriented but has its focus on the internal organization (Naranjo-Valencia et al., 2011). Important values belonging to this culture are efficiency,

[3] After each indicator the related question numbers from the questionnaire are presented.

coordination and close compliance to rules and regulations. Organizational culture can be seen as 'collectively shared interpretive schemes' (Ravasi & Schultz, 2006). The strength of organizational culture can be measured by the presence of a shared organizational culture among employees (Sørensen, 2002). This has been measured by the presence of a shared vision on the project on a scale of 1-5.

The second dimension is organizational structure. The means and processes that determine the formal organization of the firm form its organizational structure. One can distinguish three main types of organization: the functional organization, the project organisation, and the matrix organization (Lester, 2014). The functional organization consists of functional departments, each with their own manager and one or more directors. The employees are thus organized based on their function. The project organization is a structure in which a project team is located in one area, with all functions for the project present in the same team. Within a matrix organization employees with the same function are located at the same department, however, these employees are assigned to different project teams. An overview of these different structures is presented in figure 2. These three types are used as an indicator of organizational structure.

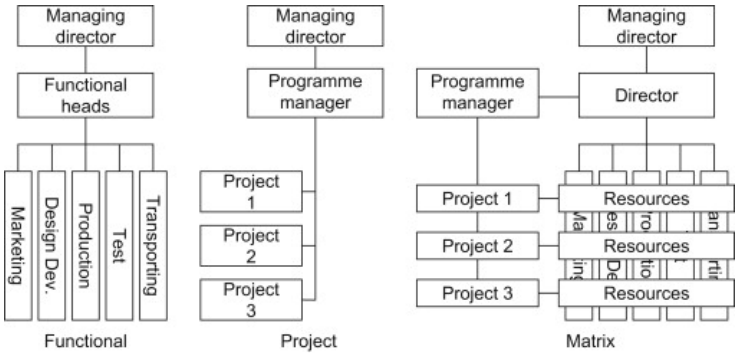

FIGURE 2: ORGANIZATIONAL STRUCTURE (LESTER, 2014, P. 43).

Organizational learning is the capability to acquire new knowledge and competences in order to be able to adapt to a changing environment (Martín-de-Castro et al., 2006). The organizational learning process can be divided into four key phases (Perez Lopez et al., 2005; Jimenez-Jimenez & Sanz-Valle, 2011): knowledge acquisition, knowledge distribution, knowledge interpretation and organizational memory (storing knowledge for future use). Based on the study by Jimenez-Jimenez & Sanz-Valle (2011) these phases are operationalized as shown in table 3.

The third independent variable is physical capital. Physical capital exists of the physical objects of a firm that are necessary for the production of a product or process (Brush et al., 2001). This will be measured by the presence of firm (R&D) facilities and firm equipment (including the firm's physical technologies) (see table 3).

The fourth independent variable is the financial capital of the SME. Financial capital can exist of own equity, funds from family & friends, venture capital, bank loans, and a remaining category with other types of funding. In order to measure financial capital, we analysed the available budget of the firms for their project and on how these firms were funded (see table 3).

The fifth independent variable is technological capital. As already mentioned one can divide such capital in a firm's technological capabilities and technological assets. Technological capabilities are based on investments in R&D (Zhou & Wu, 2010). Therefore, one can indicate the technological capabilities by the R&D intensity of the firm, represented as the percentage of R&D investments relative to sales (Zhou & Wu, 2010). However, as this sample includes SMEs that are not yet in the implementation phase and R&D activities can be outsourced, technological capability will be indicated by number of R&D employees within the firm (see table 3). The technological assets are the

"specific technologies in which the organization can claim competence" (Adler & Shenhar, 1990, p. 27). This is measured as the number of patents owned by a firm (Lee et al., 2001) (see table 3).

The sixth independent variable is social capital. This is displayed by a firm's social network. An indicator of a firm's social network is the number of external partners of the firm. Additionally one can also indicate the quality of these relations based on three attributes of a relation. These attributes are: access to useful information for the firm, access to useful resources and the possibility to acquire and exploit knowledge (Acquaah, 2007) (see table 3).

The last two independent variables are EOS/IAE and the WBSO. This was indicated by whether or not the firm participates in either of these programs (see table 3).

TABLE 3: OPERATIONALIZATION INDEPENDENT VARIABLES[4].

Independent Variable	Dimension	Indicator	Measurement
Human capital	Firm-specific human capital	Current individual job training programs *(Q.10)*	Likert scale from 1 to 5 (strongly present – not present)
		Other work-related training courses (seminars, conferences, demonstrations) *(Q.11)*	Likert scale from 1 to 5 (Very often attended – never attended)
	Industry-specific human capital	Prior experience in the industry. *(Q.12)*	...% of total number of employees with experience in the same industry but in an different firm.
		Prior experience in entrepreneurial organizations. *(Q.12)*	...% of total number of employees with experience entrepreneurial organizations
	Individual-specific human capital	Average level of education *(Q.13)*:	
		• No education	...% of total number of Employees
		• Vocational training	...% of total number of Employees
		• Secondary vocational education (MBO)	...% of total number of Employees
		• Higher education (HBO)	...% of total number of Employees
		• Academic level	...% of total number of Employees
		• PhD and higher	…% of total number of Employees
Organizational capital	Culture	Type of organisational culture[5] *(Q.32)*	a) Adhocracy culture b) Clan culture c) Market culture

[4] After each indicator the related question number(s) from the questionnaire is (are) presented.
[5] The type of organisational culture was measured via questions on whether the SME has an internal or external (towards the environment) focus, and whether it is control oriented or focuses on flexibility in its organizational structure (Naranjo-Valencia et al., 2011).

		Degree of shared culture among the workforce/employees (*Q.32)*	d) Hierarchy culture Likert scale from 1 to 5 (Strongly shared – not shared)
	Structure	Type of formal organization *(Q.29 – Q.31)*	a) Functional structure b) Project structure c) Matrix structure d) Other
	Organizational learning	**Knowledge Acquisitions** *(Q. 33)*	
		• There is a consolidated and resourceful R&D policy *(Q. 33)*	Likert scale from 1 to 5 (totally agree – totally not agree)
		• Experiments with new ideas and approaches on work performance	Likert scale from 1 to 5 (always – never)
		Knowledge distribution *(Q. 33)*	
		• There are formal mechanisms to guarantee sharing of best practices between employees in different fields	Likert scale from 1 to 5 (totally agree – totally not agree)
		• There is formal collaboration and knowledge sharing between different teams	Likert scale from 1 to 5 (totally agree – totally not agree)
		• There is informal collaboration and knowledge sharing between different teams	Likert scale from 1 to 5 (totally agree – totally not agree)
		• Employees suggestions are evaluated within the organization	Likert scale from 1 to 5 (totally agree – totally not agree)
		Knowledge interpretation *(Q. 33)*	
		• Knowledge and experience are shared between employees	Likert scale from 1 to 5 (totally agree – totally not agree)
		• Teamwork is common in the SME	Likert scale from 1 to 5 (totally agree – totally not agree)
		Organized memory *(Q. 33)*	
		• The firms can via its database find an expert on a concrete issue at any time	Likert scale from 1 to 5 (totally agree – totally not agree)
		• Databases are kept up-to-date	Likert scale from 1 to 5 (totally agree – totally not agree)

Physical capital	Physical objects of the firm for producing a product or process	Presence of firm (R&D) facilities and equipment *(Q.18)*	Likert scale from 1 to 5 (more than enough – not present)
Financial capital	Types of financial capital	Equity capital *(Q.15)* Friends & Family *(Q.15)* Venture Capital *(Q.15)* Bank loans *(Q.15)* Other *(Q.15)* Budget for (NEA)-project *(Q.16)*	% of financial capital % of financial capital % of financial capital % of financial capital % of financial capital a) € 0 - € 100,000 b) € 100,000 - €1000,000 c) €1000,000 or more
Technological capital	A firm's technological capabilities and assets.	Amount of patents granted to firm *(Q.25)* Amount of patents as basis for the project *(Q.26 – Q.27)*	… Patents … Patents
Social capital	Social network Quality of relationship	External partners based on number of R&D collaborations *(Q. 20 – Q.21)* Access to useful information for the firm *(Q.23)* Access to useful resources *(Q.23)* Possibility to acquire and exploit knowledge *(Q.23)*	….. external partners through collaborations Likert scale from 1 to 5 (totally agree – totally not agree) Likert scale from 1 to 5 (totally agree – totally not agree) Likert scale from 1 to 5 (totally agree – totally not agree)
WBSO	-	Participation in the WBSO *(Q.9)*	Yes / No
EOS/IAE	-	Participation in EOS/IAE *(Q.4)*	Yes / No

3.3.3. CONTROL VARIABLES

The three control variables of this study represent firm age, size and type of industry. In table 4 an overview is presented of the different control variables and their indicators.

TABLE 4: OPERATIONALIZATION CONTROL VARIABLES.[6]

Variable	**Indicator**
Age	2014 - Foundation year *(Q.i)*
Size	Number of employees *(Q.v)*
Type of industry	a) Solar energy *(Q.iv)* b) Bio-energy *(Q.iv)*

[6] After each indicator the related question number from the questionnaire is presented.

3.4 METHOD OF ANALYSIS

The questionnaire used in this study contains questions concerning the indicators shown in the table 3 and table 4. The data obtained from the questionnaires is analysed by means of SPSS (see appendix II for an overview of the relation between the types of resources, questionnaire and related variable numbers in SPSS). First of all, the measurement of independent concepts on multiple indicators is analysed by means of factor analyses. Factor analysis is applied to identify unobserved factors, which represent concepts that are measured on two or more highly correlated variables (Field, 2005). The problem with the data obtained is however that most indicators of the concepts specified are measured as ordinal variables, whereas factor analysis assumes that these indicators are normally distributed variables measured on interval or ratio scales. Accordingly, the application of factor analysis to data measured on ordinal scales is not correct because of violation of assumptions. Furthermore, the analysis of the hypothesized effects of the various concepts, which are measured on either factor scores or a single observed indicator, on the binary dependent variable indicating the successful phase transition of the last project carried out by means of logistic regression analysis is bound to failure. This happens because of the list-wise deletion of cases with one or more missing values for the specified independent concepts from the logistic regression analysis. This would reduce the set of cases analysed from 35 in the sample to 17 with non-missing values. This reduction of the number of cases analysed casts serious doubts about the validity of the results to be obtained. In order to circumvent these problems with factor analysis of ordinal variables and logistic regression analysis of only 17 out of 35 observed cases, another route of data analyses has been chosen.

The data analyses performed in this study are based on the Pearson correlations of a pair of unobserved normally distributed constructs underlying each pair observed ordinal variables. These correlations are called polychoric correlations (Olssen, 1979). These polychoric correlations are estimated by fitting the bivariate normal distribution of both unobserved normally distributed constructs as close as possible, i.e. with maximum likelihood, to the bivariate discrete distribution of the observed ordinal variables concerned during an iterative mathematical search process for the most optimal value of the Pearson correlation between these constructs. Binary variables are also treated as ordinal variables but with two consecutive categories instead of multiple consecutive categories. For the method applied this makes no difference. Furthermore, this method excludes cases with missing values only on a pairwise basis and not on a list-wise basis, thereby making optimal use of the information contained in the sample of 35 cases analysed. The estimated polychoric correlations of all pairs of observed ordinal variables are used as input for the factor and regression analyses performed in this study (see appendix III).

The first analyses performed are exploratory factor analyses called principal component analyses in order to test whether or not the indicators selected to represent one concept indeed load on one factor with an eigenvalue > 1.000, a Kaiser-Meyer-Olkin test-value > 0.50 and a significant Bartlett's test-value of sphericity ($p<0.10$) (Field, 2005). After that, the factors representing concepts to be measured on multiple observed indicators and the concepts to be measured on one observed variable and the dependent variables are specified in one confirmatory factor analysis model. This model allows for the simultaneous estimation of all factor loadings of individual concepts on their specified sets of indicators as well as the correlations between all factors specified by means of the maximum likelihood method. The estimated Pearson correlations between all factors are used as input for linear regression analyses in order to estimate the hypothesized effects of the various independent concepts and control variables on the dependent variable and test them for their significance (see appendix IV for an overview of the relation between the types of resources, questionnaire, related variable numbers in SPSS and ETA number and name and see appendix V for the estimated Pearson correlations).

In total, three regression analyses have been conducted. First, a linear regression analysis has been performed in order to estimate the effects of only the control variables on the dependent variable. Next, a linear regression was performed including all independent concepts and control variables. The results show a model in which certain variables are excluded (see result section). This exclusion of particular independent concepts and control variables from the model is based on their tolerances.

Tolerance is a statistical measure of the multicollinearity of the independent variables (Field, 2005). This measure combines the chance of each independent variable of not being a linear combination of other independent variables in the model with the chance of that variable to explain extra unexplained variance of the dependent variable additionally to that already explained by the other independent variables specified. In case the tolerance is below 0.01, the variable will be excluded from the model (Field, 2005). Then the independent variable does not contribute anything significantly to the explained variance of the dependent variable. After that, the same analysis is done with only the variables that were included in the model before but excluding the two most important independent variables: participation in specific and generic regulations. This analysis is done in order to check the influence of those regulation variables within the model and their contribution to the explained variance of the dependent variable. The results of this analysis are shown in the result section.

3.5 The Validity and Reliability

The quality of this study can be assessed on four different criteria (Yin, 2003). These types of criteria are construct validity, internal validity, external validity and reliability.

Construct validity is concerned with whether the study uses the adequate measures for the concepts they represent (Yin, 2003; Bryman, 2008). The operationalization of this research is based on many other studies. Therefore, one can assume that the indicators are valid indicators of the concepts they stand for.

Internal validity is concerned with the correspondence of the causal relations specified between variables and the results obtained, as opposed to spurious relations (Yin, 2003). This study will use eight explanatory variables that are expected to have a causal effect on the dependent variable. The internal validity of this study will be high, because other researchers have also tested and confirmed the expected relationships between the independent and dependent variables in this study. Out of these eight variables, two variables are concerned with participation in the programs of the NEA.

External validity is concerned with the possibility to generalize the results of this study (Bryman, 2008). The study is based on programs and SMEs in the Netherlands. Furthermore, the study takes two different sectors into account. A generalization of the results to other sectors and countries is therefore not possible. Furthermore, due to the possibility of selective responses to the survey the results only hold for the 35 SMEs investigated in this study.

The reliability of this study is concerned with the stability of the measurements (Yin, 2003). In case the procedures applied in this study will be repeated, then the same results should be generated provided that the context has not changed. The methods of this study are presented in detail, enabling the repetition of this study in exactly the same way.

4. Results

Table 5 shows the results of the factor analyses. As shown in that table, there are twelve different factors identified. For each of these factors the following three conditions hold: (1) the eigenvalue is >1, (2) the Kaiser-Meyer-Olkin (KMO) value is > 0.50, (3) the Bartlett's test of sphericity is significant ($p < 0.1$*, $p < 0.05$**, $p < 0.01$***). Each of the twelve factors presented in table 5 also proved to represent one of the theoretically derived concepts.

The first column of the table represents the indicators included in the factor analyses. In the second column the concepts are shown. In the third column the eigenvalues of the concepts (based on the principal component analysis) are presented. The fourth column represents the factor loadings of each concept on the indicators and their significance ($p < 0.1$*, $p < 0.05$**, $p < 0.01$***) based on the maximum likelihood estimation of the confirmatory factor analysis model by means of LISREL-8 (Jöreskog and Sörbom, 1993). The final column presents the Cronbach's alpha of the measurement of

each concept on its indicators. The value of Cronbach's alpha represents the coherence of the variables indicating the factor (Boermans & Kattenberg, 2011). Traditionally speaking, if the reliability coefficient (Cronbach's alpha) is lower than 0.5 it is seen as unreliable. Values between 0.5 and 0.7 are modest, and higher than 0.7 are acceptable (Boermans & Kattenberg, 2011).

TABLE 5: RESULTS FATCOR ANALYSES (N=35)[7].

$p < 0.1$*, $p < 0.05$**, $p < 0.01$***

Variables (and variable number)	**Factor (and ETA number)**	**Eigenvalue (principal component analysis in SPSS)**	**Factor loadings (Maximum Likelihood Estimates)**	**Cronbach's alpha**
- Participation in work related trainings that were relevant for the project *(V8)* - Participation in seminars, conferences and other work related meetings that were relevant for the project *(V9)*	Employee training *(ETA3)*	1.487***	0.715*** 0.682***	0.655
- Experience with a similar project within the same company *(V10)* - Experience with a different project in the same company *(V11)*	Internal experience *(ETA4)*	1.358**	0.588*** 1.017***	0.527
- Experience within another firm in the same branch *(V12)* - Experience within another firms outside the firm's branch *(V13)*	External experience *(ETA5)*	1.460***	0.798*** 0.801***	0.630
- Vocational training *(V15)* - Secondary vocational education *(V16)* - Higher education *(V17)*	Employees with a low education *(ETA6)*	1.780***	0.787*** 0.493*** 0.568***	0.646
- Funding from friends & family *(V22)* - Venture capital *(V23)* - Bank loans *(V24)*	Debt capital *(ETA10)*	2.263***	0.615*** 0.785*** 0.997***	0.834
- Possibility to commercialize via external partners *(V34)* - Useful information via collaborations *(V35)* - Useful resources via collaborations *(V36)* - Possibility to acquire and exploit knowledge via the alliances *(V37)*	Usefulness of external partners *(ETA16)*	2.376***	0.505*** 0.941*** 0.824*** 0.668***	0.740
- Patents from the company as basis for the project *(V40)* - Patents from external partners as basis for the project *(V41)*	(Internal & External) patents for the project *(ETA 18)*	1.347**	0.665*** 0.523***	0.515

[7] See appendix IV.

- Responsibility of the project *(V43)* - Team formation of the project *(V44)*	Organization of the project *(ETA19)*	1.531***	0.684*** 0.777***	0.694
- Contact between employees within different projects *(V45)* - Employee participation in more than one project at the same time *(V46)*	Teamwork *(ETA20)*	1.400**	0.750*** 0.534***	0.571
- Strong involvement of employees in the organization of the project *(V49)* - Shared vision on the execution of the project *(V50)* - Suggestions by employees are evaluated within the organization *(V56)*	Employee involvement *(ETA23)*	2.232***	0.878*** 0.817*** 0.780***	0.827
- There is a consolidated and resourceful research and development policy *(V51)* - Experiments are done with new ideas and approaches on work performance *(V52)*	Knowledge acquisition *(ETA24)*	1.514***	0.775*** 0.663***	0.679
- Employees' contact through an informal way *(V53)* - Employees' contact through an informal way *(V54)* - The organization and execution of the project was dependent on teamwork *(V55)*	Knowledge diffusion *(ETA25)*	1.661**	0.490*** 0.371*** 0.771***	0.594

After these factor analyses, regression analyses have been performed. First a linear regression was performed for the effects of the control variables on the dependent variable. This resulted in the model shown in table 6. The estimated model shows that none of the control variables is significant and that the R-squared value is only 0.080; this implies that only 8% of the variance of the dependent variable is explained by the control variables. The F-value represents the fit of the model on the data and is only 0.650 and thereby not significant. Concluding, in this model the control variables do not affect the dependent variable.

TABLE 6: REGRESSION ANALYSIS OF CONTROL VARIABLES (N=35)[8].

$p < 0.1$*, $p < 0.05$**, $p < 0.01$***

Type of variable	Variables (and ETA number)	Model
Control variable	Firm age *(ETA27)* Type of industry *(ETA28)* Firm size *(ETA29)* Year of the project *(ETA30)*	-0.274 -0.085 -0.058 0.021
Model fit indicator	R-squared F-value	0.080 0.650

a. Dependent Variable: Successful phase transition

[8] With regard to the ETA numbers, see appendix IV.

Next a linear regression analysis has been performed using all independent concepts and control variables in one model. Table 7 shows the results of this regression analysis. During this regression analysis certain variables were excluded from the model based on their tolerances as explained in Section 3.4. These variables are: *Internal and external experience of employees, Low education of employees, Available budget for the project, Physical capital, Research partners, Amount of patents of the firm, Amount of external and internal patents, Organization of the project, Teamwork, Importance of formal procedures, Involvement of employees, Knowledge acquisition, Use of database, Type of Industry and Participation in a generic program.* This implies that hypothesis H3, H5 and H8 are not confirmed and that hypothesis, H1 and H4 are partially not confirmed.

As shown in table 7 the resulting model has an R–squared value of 0.712. This means that 71.2% of the variance of the dependent variable is explained by the independent variables included in the regression model. The F-value of the model is 3.216 and is significant. Thus, the model fits to the data.

TABLE 7: FIRST REGRESSION ANALYSIS (N=35)[9].

$p < 0.1$*, $p < 0.05$**, $p < 0.01$***

Type of variable	Variables (and ETA number)	Model
Control variables	Firm age *(ETA27)*	-0.889***
	Firm size *(ETA29)*	0.601**
Independent variables	Amount of employees within the project *(ETA2)*	-0.015
	Employee training *(ETA3)*	0.093
	Employees with an academic education *(ETA7)*	-0.345*
	Employees with a PhD *(ETA8)*	0.244
	Private equity *(ETA 9)*	-0.751***
	Debt capital *(ETA10)*	0.690**
	Number of external partners *(ETA13)*	-0.661**
	Commercialisation partners *(ETA15)*	-0.694***
	Usefulness of external partners *(ETA16)*	0.322
	Rate of adjustment (*ETA21)*	-0.194
	Knowledge diffusion *(ETA25)*	0.119
	Year of project *(ETA30)*	0.018
	Participation in specific program (*ETA32)*	-0.857***
Model fit indicator	R-squared	0.712
	F-value	3.126**

a. Dependent Variable: Successful phase transition

Subsequently, the two main independent regulatory variables: participation in the specific programs and participation in the generic program, have been removed from the model, which has then been estimated again in order to assess how much the other independent variables explain of the variance of the dependent variable. This resulted in the following table:

[9] With regard to the ETA numbers, see appendix IV.

TABLE 8: SECOND REGRESSION ANALYSIS WITHOUT TWO INDEPENDENT REGULATORY VARIABLES (N=35)[10].

p < 0.1*, *p* < 0.05**, *p* < 0.01***

Type of variable	Variables	Model
Control variables	Firm age *(ETA27)*	-0.429
	Firm size *(ETA29)*	0.319
Independent variables	Amount of employees within the project *(ETA2)*	-0.200
	Employee training *(ETA3)*	0.384*
	Employees with an academic education *(ETA7)*	-0.350
	Employees with a PhD *(ETA8)*	-0.129
	Private equity *(ETA 9)*	-0.583**
	Debt capital *(ETA10)*	0.801**
	Number of external partners *(ETA13)*	-0.513*
	Commercialisation partners *(ETA15)*	-0.558**
	Usefulness of external partners *(ETA16)*	0.411
	Rate of adjustment (*ETA21)*	-0.291
	Knowledge diffusion *(ETA25)*	0.342
	Year of project *(ETA30)*	-0.054
Model fit indicator	R-squared	0.558
	F-value	1.803

a. Dependent Variable: Successful phase transition

As shown in table 8, the R-squared value of the model without both independent regulatory variables is 0.558. This means that only 55.8% of the outcome is explained by these independent variables instead of the 71.2% mentioned before. Furthermore, the F-value of this model is not significant.

As follows, we return to table 7. We can now summarize these results by accepting or rejecting the following hypotheses. Hypothesis 1 was concerned with the human capital of the firms: "*Human capital has a positive influence on the successful phase transition of an SME"*. One can derive from the model above that most of the variables related to the human capital of a firm are not included. This means that the unique contribution of these variables to the model has a chance lower than the tolerance. One variable however has been included in the model, namely 'academic education of the employees'. This variable shows a negative influence (-0.345*, *p=0.068*). Thus if the firm has more academics involved in their project, they will be less likely to reach a successful phase transition. This can be explained as follows. In this study, a distinction was made between four different phases: idea formulation, research, development and implementation. The first two phases, idea formulation and research, are scientific phases. The last two phases, development and implementation, are phases that are more focused on engineering. As shown in table 9, 74,3% of the firms is situated in the last two phases. Thus these firms are more focused on engineering than on the scientific part. During the engineering phases there is a need for technicians with a vocational training for the technical implementation instead of employees with an academic education. In this case having academics working on the engineering part can slow down the processes in the firm, leading to lower efficiency and possibly result in the unsuccessful phase transition.

[10] With regard to the ETA numbers, see appendix IV.

TABLE 9: THE NUMBER OF FIRMS PER PHASE.

		Frequency	Percent	Valid Percent	Cumulative Percent
Phase	Phase: Idea	3	8.6	8.6	8.6
	Phase: Research	6	17.1	17.1	25.7
	Phase: Development	16	45.7	45.7	71.4
	Phase: Implementation	10	28.6	28.6	100.0
	Total	35	100.0	100.0	

The second hypothesis "*Organizational capital has a positive influence on the successful phase transition of an SME"* cannot be confirmed as no significant influence has been found of the variables that represent the organizational capital on the dependent variable.

The results indicate that hypothesis four "*Financial capital has a positive influence on the successful phase transition of an SME"* can partly be accepted and partly be rejected. Table 7 shows that there is a negative influence of private equity on successful phase transition (-0.751***, p=0.001). On the contrary there is a positive influence between the debt capital and the successful phase transition of a firm (0.690**, p=0.014). This can be explained as follows. If a firm is dependent on private equity (i.e. the firm has to generate its own money), it is possible that the firm cannot generate enough money in order to be able to reach reasonable progress. If a firm is able to generate debt capital (in large amounts), they will probably be more likely to generate enough money to make any progress. One would thus expect more successful phase transitions if a firm is also based on debt capital. Table 10 however shows that there are more successful phase transitions for firms that are based solely on private equity (9 successful phase transitions out of 13) than based on both private equity and debt (6 successful phase transitions out of 17). This thus implies that this argument is not correct. Therefore, two other possible explanations can be given. First of all, it is possible that firms that are dependent on debt capital are selected beforehand on their potential to become successful. Thus, debt capital is only provided to those firms that already have more potential on successful performance. This explains the positive relation of debt capital on successful phase transition. Another possible explanation could be the risk behaviour of firms. One would expect the SMEs using personal equity for a project to be rationally more careful and less willing to take risks, which is sometimes necessary for the successful execution of a project. Or they take too little risks to become successful. Due to moral hazard problems, there is a possibility that firms that use debt capital are more willing to take the necessary risks, as they will bear less of the consequences if something goes wrong.

TABLE 10: THE NUMBER OF FIRMS WITH DEBT CAPITAL AND PRIVATE EQUITY AND SUCCESSFUL PHASE TRANSITION[11].

Private Equity *(ETA9)*			**Successful phase transition** *(ETA1)*		**Total**
			No	Yes	
Not present	**Debt**	Not present	1	3	4
		Present	0	0	0
	Total		1	3	4
Present	**Debt**	Not present	4	9	13
		Present	11	6	17
	Total		15	15	30
Total	**Debt**	Not present	5	12	17
		Present	11	6	17
	Total		16	18	34

The sixth hypothesis was as follows: "*Social capital has a positive influence on the successful phase transition of an SME".* This hypothesis can be rejected based on the results shown in table 7. External partners and in particular those specialized in commercialisation have a negative influence on successful phase transition (-0.661**, p= 0.012 and -0.694***, p=0.002, respectively). First of all, the fact that external partners have a negative influence can be caused by a difference in motives for participating in a project thus perhaps stirs the project another way. Furthermore, the external partners can also have no actual interest in the successful transition of a project but more in the knowledge they want to gain and alliances they want to establish during the project. As more external partners implicate more interests and activities that have to be coordinated, another possibility is that conflicts occur between the partners, which delay the project. Secondly the commercialisation nature of external partners has a negative effect on successful phase transition, because these firms will be more focused on bringing the product on the market and making profit. Commercially oriented partners also have less knowledge of and interests in the R&D phases and thereby they do not contribute to the progress of R&D, which slows down the project.

The hypothesis: "*Participation in one of the specific programs of the NEA has a positive influence on successful phase transition*" can be rejected. The results even show that the contrary is more likely. Participation in a specific program has a negative influence on successful phase transition (-0.857***, p=0.005). This problem can have two possible sides. First of all, the NEA does not fulfil its role as venture capitalist successfully. One of the aims of the NEA is to form consortia to stimulate the development of possible collaborations and networks. As shown in table 11, out of 21 firms participating in the specific program, only 8 firms were situated in consortia without commercialisation partners. To stimulate the development of networks, the NEA thus steers more towards consortia that are not only helpful for the development of an innovation but also include actors that play a role in the commercialization. However, as already mentioned, commercialisation-oriented partners have a negative influence on successful phase transition.

[11] With regard to the ETA numbers, see appendix IV.

TABLE 11. THE NUMBER OF FIRMS WITH COMMERCIALISATION-ORIENTED PARTNERS (AS A PERCENTAGE OF TOTAL EXTERNAL PARTNERS) PARTICIPATING IN SPECIFIC PROGRAMS AND THEIR (UN) SUCCESSFUL PHASE TRANSITION[12].

		Successful phase transition (*ETA1*)		Total
		No	Yes	
Commercialisation-oriented partners (as a percentage of total external partners) of firms participating in the specific program (*ETA13, ETA15*).	0	3	5	8
	>0-10	2	0	2
	>10-20	0	0	2
	>20-30	0	2	0
	>30-40	0	1	2
	>40-50	0	1	4
	>50-60	3	1	4
	>60-70	0	0	0
	>70-80	0	0	0
	>80-90	0	1	1
	>90-100	1	1	2
Total		9	12	21

The other side of the problem is the possibility that the NEA provides subsidies to the wrong firms. As shown in the table below, a total of 21 firms participated in the specific programs. Of these 21 firms, almost 50% did not successfully reach a new phase. It is possible that the subsidies of the NEA make the participating firms lazy and are keeping those firms alive which are less able to realize any progress in their projects and thus no successful phase transition.

TABLE 12: THE NUMBER OF FIRMS PARTICIPATING IN SPECIFIC PROGRAMS AND SUCCESSFUL PHASE TRANSITION[13].

		Successful phase transition (*ETA1*)		Total
		No	Yes	
Participation Specific program (*ETA32*)	No	7	6	13
	Yes	9	12	21
Total		16	18	34

The last hypothesis, "*Participation in the specific programs of the NEA has a more positive influence on successful phase transition than the influence of the WBSO"* cannot be confirmed, given the results on hypothesis 7 and hypothesis 8.

The model above also shows that the control variables 'age' and 'size of the firm' have a significant effect on the successful phase transition of development projects in the bio- and solar energy fields. There is a negative effect of the age of the firm on successful phase transition (-0.889***, p=0.003). This can be explained by the fact that older firms can get stuck in routines that lead to inefficient processes. The other variable 'size of the firm' has a positive influence on successful phase transition (0.601**, p=0.01). This can possibly be caused by the fact that larger firms have more human capital and are thereby better able to combine human capital and financial capital.

One can conclude that five of the nine hypotheses cannot be confirmed based on the fact that the corresponding variables are not significant or excluded due to their tolerance from the final regression

[12] With regard to the ETA numbers, see appendix IV.
[13] See note 12.

model. Only one hypothesis can partly be confirmed namely financial capital. This variable should be split up in two types: private equity (-) and debt capital (+). Both social capital and participation in a specific program had a negative influence on the successful phase transitions of a firm. Employing relatively large numbers of academicians has a negative influence on firm success. Additionally, two of the four control variables showed an influence on the dependent variables. These variables were the age and size of the firm. Firm age had a negative influence on the successful phase transition of a firm and firm size had a positive influence on the dependent variable.

5. DISCUSSION

5.1 THEORETICAL IMPLICATIONS

This study is the first to examine the difference between the effectiveness of generic and specific regulations regarding renewable energy technology development by SMEs in the Netherlands. The theoretical framework used in this study was derived from the resource-based view (RBV). According to the RBV, a firm's performance is dependent on its (unique) resources. Six types of resources influencing firm performance were defined. Each of the resource types was suspected to support a firm in its successful phase transition. Thus, for each of them a positive influence on firm performance was assumed. However, the results show that except for part of the financial resources, all other resources had a negative influence, or no influence at all on the dependent variable. This can have two reasons. Firstly, this can be caused by a wrong operationalization, whereby concepts have not been measured correctly resulting in a low construct validity and internal validity (causal confirmation). Secondly, this can be caused by the fact that the different types of capital that were distinguished based on different literature, were to abstract and general. Therefore, it would be advisable to apply the RBV in a more detailed way. Thus splitting the types of resources into more detailed resources and thereby making the hypotheses more specified.

The negative influence of the specific programs on the successful phase transition of a firm indicates that firms participating in specific programs are more likely to fail in their attempt to successfully reach a next phase in the innovation process. This was not in line with the theory used in section 2 and is an important theoretical implication. Thus, researchers should keep in mind that participation in governmental programs can even work against the successful performance of SMEs. Furthermore, it is important to realize that the RBV suggests that if a firm has enough resources this will positively influence firm performance. The RBV however does not take into account the behavioural effects of the different amounts of resources on firms and thereby on the effectiveness of the innovation processes (Wiklund et al., 2011). In this study it appeared that SMEs reacted sometimes opposite to what one would expect, i.e. if they have excess resources this often had a negative influence on successful phase transitions. It is questionable whether this is caused by the role of the NEA in constructing the wrong consortia, or if the firms became lazy because of the subsidies. If one wants to gain more insights into the behavioural influence of the amount of resources on the success of an innovation, the intermediary effect the performance of the innovation process has to be addressed explicitly.

5.2 MANAGERIAL IMPLICATIONS

Overall, this study has shown the managers of a firm what resources could positively or negatively influence their performance. The negative influence of academics on SME performance, implicates for firm managers to not blindly assume that having more academics leads to better firm performance. As most firms were focused on engineering (as they were situated in the development and implementation phase) it is advisable to have technicians with sufficient vocational training in the project. Secondly, the negative influence of private equity on SME performance and the positive influence of debt capital implies that in order to acquire enough finances for the necessary investments, firms can better rely on debt capital than on private capital. Furthermore, having many partners and in particular commercialization oriented partners has a negative influence on SME performance. Managers should be careful to join large consortia and focus instead on limited consortia without commercially oriented

partners. Collaborations with more commercialization-oriented partners becomes of importance only after the implementation. In earlier stages, in which the focus is still on the technology development, they will only slow down the project.

The negative influence of participation in specific programs of the NEA on the dependent variable shows that firms should not rely on specific programs of the NEA if they want to progress in the innovation process. More specifically, if their aim is to reach successful phase transition, participation in specific programs is even discouraged. It would be better for them to consider other options (for example a venture capitalist).

5.3 POLICY IMPLICATIONS

The results of this study have important policy implications. As mentioned before, both types of programs do not reach the goals they originally aimed for. This problem can have two sources. First of all, the NEA is not able to select the firms that would profit the most from their support. The firms that the NEA should select are young firms active in the development phases of technology, based on private equity and suffering from too limited external financing and situated in limited consortia and with no commercialization partners.

The second cause can be the wrong fulfilment of their role as mediator. The NEA aims to form consortia to stimulate the development of possible collaborations and networks. However, they should not steer towards consortia that are both helpful for the development of an innovation and include actors that play a role in the commercialization from the start. This should be more gradually phased. Only after the implementation of the technology commercialization-oriented partners should be included in the consortia.

5.4 LIMITATIONS

This research suffers from three important limitations. The first limitation is the small sample size of this study. As already mentioned, with a response rate of only 14 per cent, the sample existed out of 35 respondents. This low response rate is probably due to the time firms have to invest in order to answer the questionnaire. Though the sample was rather small, it has an equal distribution of participating firms and non-participating firms as the original sample. However, a generalization towards other sectors and countries is not feasible. Furthermore, due to the possibility of selective responses to the survey, the results only hold for the 35 SMEs investigated in this study and cannot be generalized.

The second major limitation was with regard to the formulation of the hypotheses. These hypotheses were formulated too general and should have been specified in more detail. This way, more hypotheses can be confirmed or rejected on more specific grounds. Furthermore, the different types of capital distinguished based on the RBV were formulated too abstract and general. This led to problems in the construct validity and internal validity, because of a wrong operationalization.

The last limitation of this study is that it has not taken into consideration the behavioural influence of having resources on the execution of the actual innovation process, and thereby on success. As already mentioned, the SMEs sometimes reacted opposite on excess resources to what one would expect. This reaction can possibly be ascribed to the influence of the resources on the behaviour of the firms (Wiklund et al., 2011). However, these effects on the innovation process require further research.

6. CONCLUSION

This study focused on the following research question: *How do generic and specific regulations differ in their effectiveness regarding renewable energy technology development by SMEs?* Data from firms participating in these types of programs or in none of them were used to get insight into the effect of

these programs on SME performance. This study specifically focussed on the Dutch solar and bio-industry.

The results of this study show that participation in specific programs has a negative influence on the successful phase transition of SMEs. No significant influence has been found for participation in the WBSO on successful phase transition. This thus implicates that when SMEs participate in a specific program this is likely to have a negative influence on SME performance. This can have two possible causes. First of all, the NEA is not able to select the firms that would profit the most from their support. The NEA should select young firms active in the development phases of technology, based on private equity and suffering from too limited external financing and situated in limited consortia with no commercialization partners. Secondly, the NEA does not perform its role as venture capitalist correctly. With an aim on networking, the NEA steers towards consortia that include commercialization partners. However, these types of consortia are not effective, because commercialization-oriented partners have a negative effect on successful phase transition. This type of partners should be gradually added to the consortia only after the implementation phase.

There are also some theoretical issues that need to be solved. First of all, the RBV has not worked fully satisfactory, because the concepts were to abstract and general. For further research a more detailed description of the concepts based on the RBV is advisable. Secondly, the behavioural effect of resources on the innovation process has not been analysed in this study. As shown in this research, the SMEs sometimes appear to react opposite on the presence of too many resources. These effects on the innovation process require further research.

7. ACKNOWLEDGEMENTS

I would like to thank my supervisor Dr. Jan Faber who supported me throughout the entire process with his critical and useful feedback and his patience and devotion. I am also very grateful to my supervisors Drs. ing. Joost Koch and ir. Tom Monné from the Netherlands Enterprise Agency. Their insights and advice have greatly supported me.

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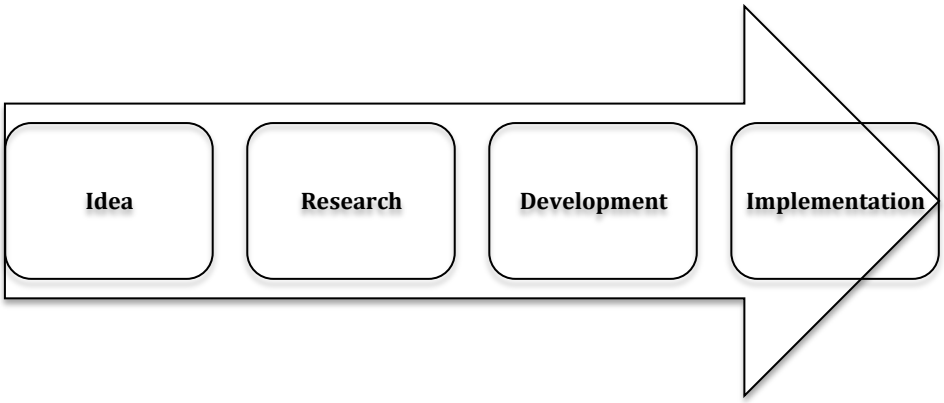
APPENDIX I. OVERVIEW QUESTIONNAIRE

Algemene achtergrond:
i. Naam bedrijf:
ii. Wanneer is het bedrijf opgericht:
iii. Functie respondent:
iv. Type industrie: Bio-energie / zonne-energie / anders, namelijk….
v. Aantal huidige werknemers:

Bedrijf specifieke vragen:
1. In welk jaar en welke fase van het innovatieproces (zie onderstaande figuur en tabel) heeft het laatste technologieontwikkeling project op het gebied van zonne- en/of bio-energie in de periode 2005-2012 van uw bedrijf plaatsgevonden?

Jaar: ….



Idee	Onderzoek	Ontwikkeling	Implementatie
Deze fase heeft betrekking op de ontwikkeling van een technisch voorstel of het concept van een ontwerp (basic research).	Deze fase heeft betrekking op het verkrijgen van kennis over hoe en of de technologie gemaakt en ontwikkeld kan worden.	De ontwikkeling van de technologie zelf. In deze fase vindt ook de ontwikkeling en demonstratie van het prototype plaats.	De introductie van de technologie op de markt (product/service).
O	O	O	O

2. Wat hield dit project in?

3. Hoeveel werknemers binnen het bedrijf waren betrokken bij dit laatste project?

4. Heeft uw bedrijf deelgenomen aan één of meer van de programma's van AgentschapNL in de periode 2005-2012 via projecten betreffende technologie ontwikkeling op het gebied van zonne- en/of bio-energie? Zo ja, in welke programma's? Zo niet, waarom niet?

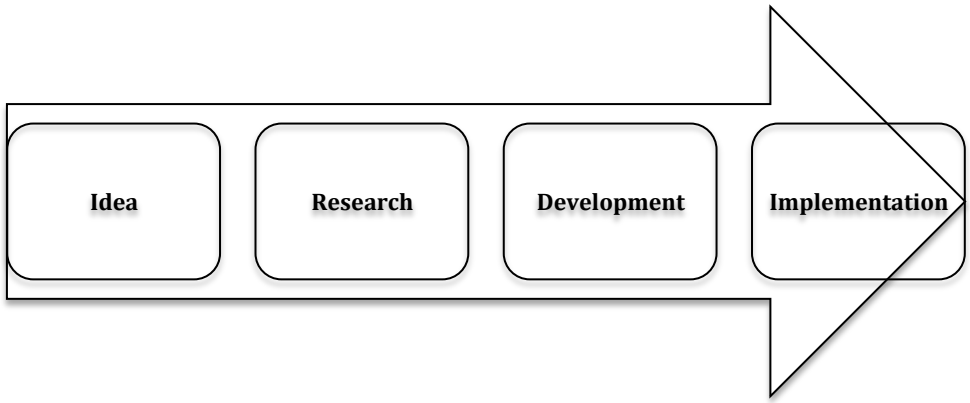
	Programma	Aantal projecten binnen het programma	Type industrie
O	EOS - LT		Bio-energie / Zonne-energie
O	EOS – KT		Bio-energie / Zonne-energie
O	EOS - DEMO		Bio-energie / Zonne-energie
O	EOS – NEO		Bio-energie / Zonne-energie
O	SBIR		Bio-energie / Zonne-energie
O	TERM		Bio-energie / Zonne-energie
O	UKR		Bio-energie / Zonne-energie

Nee, omdat……..

Indien uw bedrijf niet heeft meegedaan aan een van de programma's van AgentschapNL, ga dan naar ***vraag 9.***

5. Wat was het laatste project binnen AgentschapNL waarin uw bedrijf heeft geparticipeerd in de periode 2005-2012?

6. In welke fase van het innovatieproces kan dit project worden ingedeeld?



Idee	Onderzoek	Ontwikkeling	Implementatie
Deze fase heeft betrekking op de ontwikkeling van een technisch voorstel of het concept van een ontwerp (basic research).	Deze fase heeft betrekking op het verkrijgen van kennis over hoe en of de technologie gemaakt en ontwikkeld kan worden.	De ontwikkeling van de technologie zelf. In deze fase vindt ook de ontwikkeling en demonstratie van het prototype plaats.	De introductie van de technologie op de markt (product/service).
O	O	O	O

7. Wat hield dit project in?

8. Hoeveel werknemers binnen het bedrijf waren betrokken bij dit project?

Indien uw bedrijf heeft deelgenomen aan een of meerdere van de programma's van AgentschapNL, dan hebben de volgende vragen betrekking op het laatste project binnen deze programma's. Zo niet, dan hebben de vragen betrekking op het laatste project dat uw bedrijf heeft uitgevoerd in de periode 2005-2012.

9. Maakte uw bedrijf tijdens het laatste project gebruik van de 'Wet Bevordering Speur- en Ontwikkelingswerkregeling' (WBSO)?

Human Resources

10. In welke mate hebben de werknemers binnen het project deelgenomen aan werk gerelateerde opleidingen en trainingen die relevant waren voor het project?

Niet	Af en toe	Regelmatig	Veelvuldig	Continu

11. In welke mate hebben de werknemers binnen het project deelgenomen aan seminars, conferenties en andere werk gerelateerde externe bijeenkomsten die relevant waren voor het project?

Niet	Af en toe	Regelmatig	Veelvuldig	Continu

12. Welk percentage van de werknemers binnen het project had al eerder ervaring opgedaan binnen:

Een soortgelijk project binnen uw bedrijf	…%
Een ander project binnen uw bedrijf	…%
Een ander bedrijf binnen uw branche	…%
Een ander bedrijf buiten uw branche	…%

13. Wat is het gemiddelde opleidingsniveau van de werknemers binnen het project?

Type opleiding	Percentage van het totale aantal onderzoek & ontwikkeling werknemers
Geen opleiding	…%
Beroepsopleiding	…%
Middelbaar beroepsonderwijs (MBO)	…%
Hoger beroepsonderwijs (HBO)	…%
Wetenschappelijk beroepsonderwijs (WO)	…%
Gepromoveerd en hoger	…%

14. In welke mate vormden de beschikbare human resources binnen het project een beperkende factor voor de succesvolle uitvoering van het project?

Helemaal niet	Nauwelijks	In redelijke mate	In hoge mate	In zeer hoge mate

Reden:….

Investeringsbudget

15. In welke mate waren de investeringen van het bedrijf afhankelijk van de onderstaande externe bronnen?

	Helemaal niet	**Nauwelijks**	**In redelijke mate**	**In hoge mate**	**In zeer hoge mate**
Eigen vermogen					
Vrienden & Familie					
Venture capital (durfkapitaal)					
Bankleningen					
Anders					

16. Hoe groot was het beschikbare budget voor het laatste project?

a) € 0 - € 100.000
b) € 100.000 - €1000.000
c) €1000.000 of meer

17. In welke mate vormde het beschikbare investeringsbudget voor het project een beperkende factor voor de succesvolle uitvoering van het project?

Helemaal niet	**Nauwelijks**	**In redelijke mate**	**In hoge mate**	**In zeer hoge mate**

Reden:….

Faciliteiten van het bedrijf

18. In welke mate heeft u gebruik gemaakt van de beschikbare onderzoeks- en ontwikkelingsfaciliteiten (bijvoorbeeld laboratoria en materiaal) tijdens het project?

Helemaal niet	**Nauwelijks**	**In redelijke mate**	**In hoge mate**	**In zeer hoge mate**

19. In welke mate vormden de beschikbare onderzoeks- en ontwikkelingsfaciliteiten voor het project een beperking voor de succesvolle uitvoering van het project?

Helemaal niet	**Nauwelijks**	**In redelijke mate**	**In hoge mate**	**In zeer hoge mate**

Reden:….

Externe samenwerkingen

20. Hoeveel externe partners waren betrokken bij het laatste project?

21. Welk percentage van deze externe partners waren partners op het gebied van onderzoek & ontwikkeling, en welk percentage was gericht op commercialisatie?

……% Onderzoek & Ontwikkeling
……% Commercialisatie

22. In hoeverre was het mogelijk om via deze samenwerkingsverbanden de resultaten van uw project , indien van toepassing, te commercialiseren?

Niet van toepassing	**Helemaal niet**	**Nauwelijks**	**In redelijke mate**	**In hoge mate**	**In zeer hoge mate**

23. Hoe belangrijk waren deze samenwerkingen voor de uitvoering van het project? Geef aan in hoeverre u het eens bent met de volgende stellingen.

	Helemaal niet mee eens	**Niet mee eens**	**Neutraal**	**Mee eens**	**Helemaal mee eens**
Via deze samenwerkingen werd nuttige informatie verkregen voor het project.					
Via deze samenwerkingen werden nuttige resources (materiaal, werknemers, services etc.) verkregen voor het project.					
Binnen het project was er de mogelijkheid tot het verwerven en exploiteren van kennis via deze samenwerkingsovereenkomsten.					

24. In welke mate vormden de externe relaties een beperkende factor voor de succesvolle uitvoering van het project?

Helemaal niet	**Nauwelijks**	**In redelijke mate**	**In hoge mate**	**In zeer hoge mate**

Reden:….

<u>Technologie ontwikkeling</u>

25. Hoeveel patenten had uw bedrijf?

0	**1**	**2**	**3-5**	**5-10**	**>10**

26. Hoeveel patenten van uw bedrijf vormden de basis voor het project?

0	**1**	**2**	**3-5**	**5-10**	**>10**

27. Hoeveel patenten van partners vormden de basis voor het project?

0	1	2	3-5	5-10	>10

28. In welke mate vormden de technologieontwikkelingen een beperkende factor voor de succesvolle uitvoering van het project?

Helemaal niet	Nauwelijks	In redelijke mate	In hoge mate	In zeer hoge mate

Reden:….

<u>Organisatie</u>

29. De volgende vragen hebben betrekking op de organisatie van het laatste project waarnaar binnen die onderzoek wordt verwezen:
    a. Bij wie lag de eindverantwoordelijkheid van het project?
        i. Bij de afdelingen
        ii. Bij de projectleider
        iii. Anders, namelijk……..

    b. *Hoe wordt het project team geformeerd?:*
        a. Aangesteld vanuit de afdelingen
        b. Aangesteld door de projectleider
        c. Anders, namelijk……..

30. In welke mate zijn er onderlinge contacten tussen werknemers met dezelfde functie binnen verschillende projecten?

Helemaal niet	Nauwelijks	In redelijke mate	In hoge mate	In zeer hoge mate

31. In welke mate participeren werknemers tegelijkertijd in meerdere teams (en dus projecten)?

Helemaal niet	Nauwelijks	In redelijke mate	In hoge mate	In zeer hoge mate

32. De volgende vragen hebben betrekking op de organisatie van uw bedrijf. Geef aan in hoeverre u het eens bent met de volgende stellingen omtrent de organisatie van uw bedrijf tijdens het laatste technologieontwikkeling project.

	Niet	Na lange tijd	Na enige tijd	Kort daarop	Direct
Hoe snel past uw bedrijf zich aan aan veranderingen (zoals politieke veranderingen, veranderingen in vraag etc.) in uw omgeving?					

	Helemaal niet mee eens	Niet mee eens	Neutraal	Mee eens	Helemaal mee eens
Formele procedures en stabiliteit zijn van groot belang voor het bedrijf.					
Werknemers binnen het project waren sterk betrokken bij de organisatie van het project.					
Er was een gemeenschappelijke visie op de uitvoering van het project.					

33. Geef aan in hoeverre u het eens bent met de volgende stellingen omtrent de onderzoek & ontwikkelingsstrategie binnen het project:

	Helemaal niet mee eens	Niet mee eens	Neutraal	Mee eens	Helemaal mee eens
Kennis acquisitie					
Er is een geconsolideerd en vindingrijk onderzoek & ontwikkelingsbeleid.					
Er worden experimenten gedaan met nieuwe ideeën en benaderingen op werkprestaties.					
Kennis verspreiding					
Binnen het project informeerden werknemers elkaar persoonlijk langs informele weg over de stand van zaken.					
Binnen het project vond kennisuitwisseling tussen werknemers plaats tijdens formele, georganiseerde bijeenkomsten.					
De organisatie en uitvoering van het project was afhankelijk van teamwork.					
Kennis interpretatie					
De suggesties van de werknemers binnen een project worden geëvalueerd binnen de organisatie.					
Data organisatie en gebruik					
Projectevaluaties worden gearchiveerd in een database.					
Deze database werd vaak gebruikt gedurende het project.					
Deze database was erg nuttig gedurende het project.					

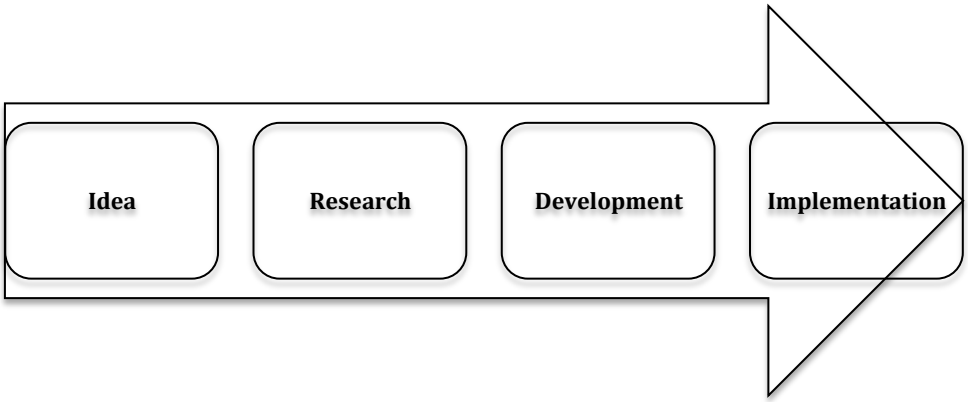
34. In welke mate de organisatie van het project een beperkende factor voor de succesvolle uitvoering van het project?

Helemaal niet	Nauwelijks	In redelijke mate	In hoge mate	In zeer hoge mate

Reden:….

<u>Uitvoering project</u>

35. Wat was de volgende fase in het innovatieproces van het project waarnaar wordt verwezen in dit interview?



Idee	Onderzoek	Ontwikkeling	Implementatie		Geen van de bovengenoem de fases
Deze fase heeft betrekking op de ontwikkeling van een technisch voorstel of het concept van een ontwerp (basic research).	Deze fase heeft betrekking op het verkrijgen van kennis over hoe en of de technologie gemaakt en ontwikkeld kan worden.	De ontwikkeling van de technologie zelf. In deze fase vindt ook de ontwikkeling en demonstratie van het prototype plaats.	De introductie van de technologie op de markt (product/service).	Het bedrijf zat al in de implementatie fase en focuste na afronding van het project enkel op interne bedrijfs ontwikkeling	Er kwam geen vervolgfase op het project
O	O	O	O	O	O

35. Als het project bij geen van de bovengenoemde fases terecht kwam, wat was hiervan de reden?

36. Indien van toepassing, in welke mate draagt de implementatie van uw technologie (product/service) bij aan de omzet en winstgevendheid van uw bedrijf?

Helemaal niet	Nauwelijks	In redelijke mate	In hoge mate	In zeer hoge mate

37. Indien van toepassing, in hoeverre was deelname aan een van de programma's van AgentschapNL nuttig voor het project?

Helemaal niet	Nauwelijks	In redelijke mate	In hoge mate	In zeer hoge mate

38. Indien van toepassing, in welke mate was deelname aan de WBSO nuttig voor het project?

Helemaal niet	Nauwelijks	In redelijke mate	In hoge mate	In zeer hoge mate

39. Heeft u met betrekking tot de programma's waaraan uw bedrijf heeft deelgenomen binnen AgentschapNL nog opmerkingen/suggesties voor verbetering?

APPENDIX II. RELATIONS BETWEEN RESOURCES, QUESTIONNAIRE AND VARIABLE NUMBER IN SPSS

Resources	**Question Nr. in questionnaire**	**Question in questionnaire**	**Variable Nr.**
Human resources	10	Deelname Training	V8
Human resources	11	Deelnam Seminars	V9
Human resources	12	Een soortgelijk project binnen uw bedrijf (%)	V10
Human resources	12	Een ander project binnen uw bedrijf %	V11
Human resources	12	Een ander bedrijf binnen uw branche %	V12
Human resources	12	Een ander bedrijf buiten uw branche %	V13
Human resources	13	Geen opleiding	V14 (rest category)[14]
Human resources	13	Beroepsopleiding	V15
Human resources	13	Middelbaar beroepsonderwijs MBO	V16
Human resources	13	Hoger beroepsonderwijs HBO	V17
Human resources	13	Wetenschappelijk beroepsonderwijs WO	V18
Human resources	13	Gepromoveerd en hoger	V19
Financial resources	14	In welke mate vormden de beschikbare human resources binnen het…	V20
Financial resources	15	Eigen vermogen	V21
Financial resources	15	Vrienden/familie	V22
Financial resources	15	Venture capital (durfkapitaal)	V23
Financial resources	15	Bankleningen	V24
Financial resources	15	Anders	V25
Financial resources	16	Hoe groot was het beschikbare budget voor het laatste project	V26
Financial resources	17	In welke mate vormde het beschikbare investeringsbudget voor het…	V27
Physical capital	18	In welke mate heeft u gebruik gemaakt van de beschikbare…	V28
Physical capital	19	In welke mate vormden de beschikbare onderzoeks- en ontwikkeling…	V29
Social capital	20	Hoeveel externe partners waren betrokken bij het laatste project	V30
Social capital	21	Onderzoek en ontwikkeling	V31
Social capital	21	Commercialisatie	V32
Social capital	21	Anders	V33 (rest category)
Social capital	22	In hoeverre was het mogelijk om via deze samenwerkingsverbanden…	V34
Social capital	23	Via deze samenwerkingen werd nuttige informatie verkregen voor….	V35
Social capital	23	Via deze samenwerkingen werden nuttige resources…	V36
Social capital	23	Binnen het project was er de mogelijkheid tot het verwerven en…	V37
Social capital	24	In welke mate vormden de externe relaties een	V38

[14] Variable 14 and 33 are both rest categories; therefore they are not included in the estimated polychoric correlations of all pairs of observed variables (see appendix III).

		beperkende factor..	
Technological capital	25	Hoeveel patenten had uw bedrijf	V39
Technological capital	26	Hoeveel patenten van uw bedrijf vormden de basis voor het project	V40
Technological capital	27	Hoeveel patenten van partners vormden de basis voor het project	V41
Technological capital	28	In welke mate vormden de technologie ontwikkelingen een beperken…	V42
Organizational capital	29a.	Waar lag de verantwoordelijkheid van het project	V43
Organizational capital	29b.	Hoe wordt het projectteam geformeerd	V44
Organizational capital	30	In welke mate zijn er onderlinge contacten tussen werknemers met…	V45
Organizational capital	31	In welke mate participeren werknemers tegelijkertijd in meerdere…	V46
Organizational capital	32	Aanpassingssnelheid	V47
Organizational capital	32	Formele procedures en stabiliteit zijn van groot belang voor het…	V48
Organizational capital	32	Werknemers binnen het project waren sterk betrokken bij de organisatie	V49
Organizational capital	32	Er was een gemeenschappelijke visie op de uitvoering van het pro..	V50
Organizational capital	33	De suggesties van de werknemers binnen een project worden geval..	V56
Organizational capital	33	Er is een geconsolideerd en vindingrijk onderzoek- en ontwikkeling…	V51
Organizational capital	33	Er worden experimenten gedaan met nieuwe ideeën en benaderingen	V52
Organizational capital	33	Binnen het project informeerden werknemers elkaar persoonlijk..	V53
Organizational capital	33	Binnen het project vond kennisuitwisseling tussen werknemers…	V54
Organizational capital	33	De organisatie en uitvoering van het project was afhankelijk van…	V55
Organizational capital	33	Project evaluaties worden gearchiveerd in een database	V57
Organizational capital	33	Deze database werd vaak gebruikt gedurende het project	V58
Organizational capital	33	Deze database was erg nuttig gedurende het project	V59
Organizational capital	34	In welke mate de organisatie van het project een beperken de factor…	V60
Successful phase transition	1,6,35	Succesvolle overgang volgende fase	V61
Question for the NEA	36	Indien van toepassing in welke mate draagt de implementatie van…	V62
Question for the NEA	37	Indien van toepassing in hoeverre was deelname aan een van de…	V63
Question for the NEA	38	Indien van toepassing in welke mate was deelname aan de WBSO..	V64
Firm background	ii.	Oprichtingsjaarbedrijf	V1
Firm background	iv.	Type industrie	V2
Firm background	v.	Aantal huidige werknemers	V3
Firm background	1/5	Jaar project	V4
Firm background	3/8	Werknemers project	V7

Participation specific program	4	Deelname specifiek	V6
Participation general program	9	Deelname WBSO	V5

APPENDIX III. ESTIMATED POLYCHORIC CORRELATIONS OF ALL PAIRS OF OBSERVED VARIABLES

Correlation Matrix

	V1	V2	V3	V4	V5	V6
V1	1.000					
V2	0.371	1.000				
V3	-0.422	-0.185	1.000			
V4	0.202	0.461	-0.048	1.000		
V5	-0.286	0.349	0.249	0.146	1.000	
V6	0.093	0.301	0.217	-0.228	0.248	1.000
V7	-0.245	-0.062	0.008	-0.208	0.134	-0.001
V8	0.213	-0.183	-0.048	-0.124	-0.224	-0.212
V9	0.209	-0.170	0.024	0.063	-0.671	-0.233
V10	-0.378	-0.150	0.166	0.126	0.417	-0.179
V11	-0.325	-0.281	0.090	0.211	0.311	-0.332
V12	0.489	0.201	-0.257	0.378	0.072	-0.241
V13	0.232	0.087	-0.188	0.066	-0.311	-0.370
V15	-0.151	-0.414	-0.075	0.325	-0.387	-0.657
V16	-0.786	-0.007	-0.147	0.028	0.088	-0.479
V17	0.161	0.376	-0.211	0.078	-0.437	-0.149
V18	0.089	-0.284	0.143	0.264	0.090	-0.339
V19	0.012	0.129	0.156	-0.309	0.602	0.630
V20	-0.159	-0.179	-0.129	0.323	-0.097	-0.440
V21	0.397	-0.116	-0.145	-0.062	-0.274	-0.206
V22	0.236	-0.008	-0.305	0.080	-0.144	-0.384
V23	0.186	0.272	-0.252	0.055	0.178	0.122
V24	-0.096	0.035	-0.187	0.089	0.311	-0.225

V25	0.102	0.219	-0.186	0.014	0.195	0.058
V26	-0.107	0.128	-0.124	0.286	0.036	-0.112
V27	0.290	0.336	-0.187	0.170	-0.094	0.077
V28	-0.089	0.132	0.056	-0.240	0.362	0.495
V29	0.134	0.105	-0.068	-0.253	-0.141	-0.005
V30	0.240	0.105	0.043	0.099	0.353	-0.041
V31	0.148	0.266	-0.136	-0.259	0.255	0.557
V32	-0.255	-0.376	0.330	0.148	0.329	-0.151
V34	-0.029	0.085	-0.165	0.037	0.040	0.159
V35	-0.210	0.209	0.175	-0.177	0.361	0.175
V36	0.008	0.103	0.079	-0.013	0.407	-0.024
V37	-0.006	0.188	0.063	0.023	0.093	-0.376
V38	-0.253	0.092	-0.092	0.168	0.053	-0.089
V39	-0.178	0.142	0.343	-0.202	0.371	0.670
V40	0.148	0.251	0.070	-0.143	0.588	0.340
V41	0.127	0.288	-0.156	-0.250	0.079	0.047
V42	0.030	0.455	-0.056	0.133	-0.126	0.141
V43	0.193	0.000	-0.152	0.154	-0.417	-0.341
V44	0.270	0.125	-0.176	0.208	-0.450	-0.631
V45	-0.171	0.032	0.170	-0.177	0.494	0.474
V46	-0.191	-0.181	0.178	0.008	0.312	-0.217
V47	0.247	-0.020	-0.040	-0.161	-0.322	0.205
V48	-0.240	-0.184	0.183	-0.044	0.146	-0.330
V49	0.315	-0.054	-0.192	-0.258	-0.370	-0.160
V50	0.446	-0.223	-0.440	-0.021	-0.108	-0.444
V51	0.345	0.268	-0.364	-0.202	-0.326	-0.048
V52	0.332	0.286	0.135	-0.066	-0.377	-0.096

V53	0.161	-0.305	-0.085	-0.192	-0.250	-0.087
V54	0.050	0.011	0.049	0.181	0.240	-0.518
V55	0.255	0.008	-0.096	-0.007	0.338	-0.252
V56	0.231	0.257	-0.061	-0.011	-0.003	-0.294
V57	0.124	0.062	-0.049	-0.004	-0.454	-0.277
V58	0.099	0.006	-0.044	-0.040	-0.353	-0.354
V59	0.043	0.039	-0.002	0.002	-0.138	-0.251
V60	-0.316	-0.019	0.163	0.026	0.100	-0.251
V61	0.182	-0.047	-0.166	0.020	-0.453	0.049
V62	0.271	-0.002	-0.138	-0.049	-0.268	-0.299
V63	-0.203	0.393	0.072	-0.099	0.456	0.721
V64	-0.050	0.367	0.112	0.059	0.870	0.067

Correlation Matrix

	V7	V8	V9	V10	V11	V12
V7	1.000					
V8	0.316	1.000				
V9	-0.123	0.487	1.000			
V10	-0.069	0.018	-0.398	1.000		
V11	-0.078	0.121	-0.036	0.358	1.000	
V12	-0.172	-0.126	0.069	-0.002	0.384	1.000
V13	-0.232	0.172	0.078	-0.188	0.556	0.460
V15	0.270	0.283	0.292	0.303	0.350	0.091
V16	0.630	0.240	0.027	-0.197	0.007	-0.189
V17	-0.031	0.061	0.196	-0.050	-0.180	0.282
V18	-0.132	0.334	-0.209	0.247	0.637	0.301

V19	-0.026	-0.155	-0.158	0.010	-0.021	0.055
V20	0.155	0.253	-0.111	0.011	0.453	0.222
V21	-0.287	0.185	0.252	-0.108	-0.202	0.389
V22	0.169	0.071	0.177	-0.110	0.044	0.106
V23	0.278	0.075	-0.184	0.103	0.050	0.037
V24	0.413	0.167	0.007	0.207	0.191	-0.102
V25	0.219	-0.038	-0.159	0.132	0.339	0.030
V26	0.533	-0.035	0.054	-0.207	0.169	0.263
V27	0.310	0.618	0.281	-0.060	-0.101	-0.009
V28	0.029	0.420	-0.010	0.270	0.219	-0.366
V29	0.344	0.672	0.344	-0.004	-0.014	-0.189
V30	0.169	-0.134	-0.025	-0.064	-0.007	-0.086
V31	0.105	0.135	-0.325	0.115	-0.022	-0.130
V32	0.302	0.004	-0.018	0.011	0.303	-0.126
V34	0.277	-0.006	0.108	0.034	0.205	-0.055
V35	0.159	-0.150	-0.242	0.177	-0.171	-0.566
V36	0.089	-0.052	-0.181	-0.091	0.062	-0.305
V37	-0.035	0.042	0.073	-0.037	-0.181	-0.343
V38	0.299	0.073	-0.235	-0.065	0.301	0.185
V39	0.140	0.071	-0.216	0.057	-0.200	-0.490
V40	0.428	0.401	-0.184	-0.073	-0.084	-0.241
V41	0.723	0.176	-0.046	-0.104	-0.154	-0.086
V42	0.012	0.302	0.110	0.105	0.090	0.121
V43	-0.176	-0.082	-0.038	-0.197	0.066	0.277
V44	-0.046	-0.038	0.172	-0.117	-0.156	0.179
V45	0.385	-0.329	-0.390	0.214	0.017	-0.229
V46	0.094	-0.062	-0.159	0.239	0.249	-0.217

V47	0.271	0.254	0.158	0.021	-0.094	-0.033
V48	-0.022	-0.022	-0.016	0.036	0.078	-0.116
V49	0.131	0.475	0.433	-0.016	-0.182	-0.009
V50	-0.054	0.455	0.223	0.335	0.168	0.070
V51	-0.162	0.510	0.333	-0.241	-0.139	0.009
V52	-0.054	0.437	0.128	-0.211	0.068	0.226
V53	0.199	-0.071	0.277	-0.176	0.138	0.321
V54	0.015	-0.004	0.151	-0.039	0.124	0.055
V55	-0.113	0.272	0.061	0.261	0.256	0.142
V56	0.257	0.348	0.162	0.101	-0.167	0.185
V57	0.108	0.344	0.619	-0.178	-0.082	0.146
V58	0.145	0.439	0.668	-0.217	-0.217	0.054
V59	0.019	0.375	0.558	-0.183	-0.070	0.111
V60	-0.174	0.235	-0.056	0.194	0.410	0.248
V61	-0.140	-0.092	0.082	-0.248	0.074	0.071
V62	-0.005	0.334	0.388	0.183	-0.080	0.047
V63	0.211	-0.258	-0.331	0.009	-0.077	-0.126
V64	0.351	-0.046	-0.210	0.052	0.283	0.237

Correlation Matrix

	V13	V15	V16	V17	V18	V19
V13	1.000					
V15	0.238	1.000				
V16	-0.246	0.585	1.000			
V17	0.039	0.286	0.265	1.000		
V18	0.666	-0.003	-0.248	-0.258	1.000	

V19	-0.129	-0.444	-0.397	-0.579	-0.355	1.000
V20	0.458	0.519	0.226	-0.103	0.559	-0.504
V21	0.339	0.220	-0.209	0.234	0.043	0.046
V22	0.201	-0.137	0.249	0.077	0.022	0.046
V23	0.272	-0.001	0.122	-0.031	-0.056	0.230
V24	0.044	0.187	0.287	-0.108	-0.075	0.131
V25	0.281	-0.309	-0.120	-0.117	0.319	0.045
V26	0.339	0.366	0.443	-0.050	0.183	0.032
V27	0.141	0.392	0.385	0.059	0.042	0.273
V28	-0.072	-0.347	-0.051	-0.067	0.131	0.269
V29	0.033	0.077	0.385	0.255	0.016	0.028
V30	0.049	-0.340	0.090	-0.450	0.002	0.133
V31	-0.090	-0.488	-0.002	-0.214	-0.177	0.498
V32	-0.155	0.118	0.307	0.001	0.025	-0.165
V34	0.036	-0.261	-0.073	-0.173	-0.105	0.045
V35	-0.259	-0.431	-0.160	-0.467	-0.116	0.257
V36	-0.095	-0.587	-0.089	-0.535	0.128	0.039
V37	-0.030	-0.269	-0.172	-0.336	0.007	-0.109
V38	0.218	0.377	0.452	0.134	0.107	-0.032
V39	-0.369	-0.543	-0.041	-0.119	-0.025	0.313
V40	-0.105	-0.272	0.405	-0.194	0.160	0.243
V41	-0.048	-0.022	0.546	0.173	-0.347	0.230
V42	0.231	0.419	0.121	0.179	-0.045	0.337
V43	0.249	0.044	0.267	0.612	0.265	-0.575
V44	0.079	0.479	0.670	0.372	-0.069	-0.460
V45	-0.325	-0.509	-0.047	-0.211	-0.237	0.221
V46	-0.122	-0.396	-0.348	-0.263	0.108	-0.101

V47	0.000	-0.315	-0.094	0.103	-0.051	-0.120
V48	-0.048	0.266	0.173	-0.041	-0.067	-0.161
V49	0.067	-0.035	-0.050	0.064	0.075	-0.226
V50	0.153	0.357	0.085	-0.024	0.411	-0.473
V51	0.390	0.249	-0.123	0.039	0.064	-0.052
V52	0.383	-0.095	0.055	0.288	0.187	-0.284
V53	0.108	0.148	0.020	0.240	0.130	-0.319
V54	-0.010	0.209	0.068	0.025	0.092	-0.353
V55	0.372	0.015	-0.153	-0.092	0.519	-0.052
V56	0.030	0.239	0.122	0.383	0.152	-0.417
V57	0.160	0.492	0.069	0.272	-0.039	-0.440
V58	0.016	0.516	0.168	0.227	-0.112	-0.391
V59	0.229	0.520	-0.080	0.080	0.029	-0.248
V60	0.520	-0.038	-0.297	-0.027	0.459	-0.155
V61	0.381	0.166	0.161	0.155	0.268	-0.102
V62	-0.075	0.115	0.146	0.196	-0.166	-0.008
V63	-0.210	-0.190	-0.090	0.033	-0.376	0.429
V64	0.004	-0.336	0.020	-0.101	0.199	0.159

Correlation Matrix

	V20	V21	V22	V23	V24	V25
V20	1.000					
V21	-0.211	1.000				
V22	-0.009	0.358	1.000			
V23	0.097	0.222	0.526	1.000		
V24	0.286	-0.031	0.539	0.814	1.000	

V25	0.108	-0.406	0.052	0.240	0.224	1.000
V26	0.555	-0.175	0.220	0.237	0.404	0.353
V27	0.199	0.255	0.370	0.554	0.363	0.152
V28	-0.327	-0.315	-0.142	-0.152	-0.162	0.055
V29	0.043	-0.030	-0.011	-0.123	-0.072	0.130
V30	-0.084	0.016	0.513	0.407	0.337	0.072
V31	-0.317	-0.263	0.056	0.058	-0.215	0.057
V32	0.268	-0.279	0.130	0.113	0.426	0.208
V34	0.162	-0.418	-0.020	0.144	0.301	0.448
V35	-0.464	-0.099	0.262	0.039	-0.023	0.206
V36	-0.289	-0.198	0.143	-0.131	-0.214	0.083
V37	-0.071	-0.217	0.161	-0.135	0.070	-0.056
V38	0.672	0.083	0.134	0.263	0.267	0.019
V39	-0.151	-0.338	-0.259	-0.084	-0.105	0.065
V40	0.110	-0.273	-0.193	0.252	0.158	0.120
V41	-0.570	0.025	0.159	0.358	0.187	0.253
V42	0.093	0.151	0.034	0.202	0.033	0.351
V43	0.042	0.078	-0.032	-0.168	-0.298	0.207
V44	-0.005	0.182	-0.029	-0.357	-0.334	-0.211
V45	-0.274	-0.445	0.017	0.247	0.178	0.209
V46	-0.017	-0.213	0.105	0.006	0.263	0.358
V47	-0.225	0.004	-0.067	-0.132	-0.216	0.345
V48	0.035	0.047	0.004	0.247	0.340	-0.135
V49	-0.127	0.314	-0.181	0.082	0.097	-0.048
V50	0.238	0.139	-0.042	0.020	0.033	0.000
V51	0.162	0.229	-0.348	-0.085	-0.133	0.042
V52	0.104	0.224	-0.113	0.002	-0.242	-0.168

V53	-0.077	0.227	-0.057	-0.230	-0.286	-0.120
V54	0.091	-0.009	-0.091	-0.069	-0.038	-0.112
V55	0.120	0.225	-0.236	0.143	0.030	0.140
V56	0.096	0.079	-0.289	0.040	0.131	0.175
V57	0.148	-0.022	-0.204	-0.123	-0.065	0.168
V58	0.019	0.014	-0.127	-0.129	-0.017	-0.057
V59	0.108	0.041	-0.193	-0.029	-0.020	-0.006
V60	0.396	-0.016	-0.198	-0.024	-0.016	0.560
V61	0.381	-0.225	-0.472	-0.278	-0.308	0.107
V62	0.053	0.081	0.507	-0.029	0.150	-0.105
V63	-0.157	-0.126	0.065	0.341	0.174	0.084
V64	0.108	-0.118	0.080	-0.084	0.104	0.236

Correlation Matrix

	V26	V27	V28	V29	V30	V31
V26	1.000					
V27	0.437	1.000				
V28	-0.272	0.070	1.000			
V29	0.189	0.623	0.445	1.000		
V30	0.287	0.190	-0.073	-0.212	1.000	
V31	-0.237	0.098	0.606	0.222	0.133	1.000
V32	0.382	-0.021	-0.058	0.046	-0.084	-0.340
V34	0.442	0.018	0.124	0.193	0.025	0.068
V35	-0.177	0.028	0.402	0.133	0.611	0.381
V36	-0.290	-0.165	0.278	-0.030	0.439	0.401
V37	-0.152	-0.140	0.116	-0.077	0.230	0.013

V38	0.545	0.435	-0.202	0.279	-0.078	-0.032
V39	-0.019	0.168	0.495	0.263	0.031	0.244
V40	0.331	0.477	0.433	0.292	0.233	0.209
V41	0.539	0.596	0.088	0.471	0.650	0.421
V42	0.214	0.762	0.133	0.558	-0.256	0.294
V43	0.120	-0.106	-0.266	-0.032	-0.116	-0.399
V44	0.189	0.003	-0.273	0.223	0.118	-0.098
V45	0.083	-0.284	0.202	-0.099	0.328	0.420
V46	-0.238	-0.346	-0.023	-0.119	0.030	0.067
V47	0.075	0.029	0.206	0.270	-0.213	0.210
V48	-0.215	-0.270	-0.131	-0.459	-0.035	-0.323
V49	0.050	0.102	0.109	0.199	0.045	-0.322
V50	-0.264	-0.002	0.163	0.010	-0.182	-0.217
V51	-0.025	0.256	0.052	0.381	-0.277	-0.046
V52	-0.052	0.062	0.195	0.319	-0.257	0.061
V53	0.081	-0.263	-0.073	-0.006	0.168	-0.279
V54	-0.178	0.000	-0.323	-0.021	0.115	-0.326
V55	-0.003	0.138	0.256	0.223	-0.116	-0.333
V56	0.091	0.126	-0.136	0.239	-0.176	-0.389
V57	0.199	0.141	-0.126	0.243	-0.012	-0.436
V58	0.090	0.167	-0.086	0.273	0.024	-0.416
V59	0.082	0.141	-0.032	0.117	0.012	-0.345
V60	0.231	0.098	-0.098	0.187	0.031	0.036
V61	0.467	-0.027	0.074	0.141	-0.296	-0.401
V62	0.028	0.348	0.047	0.515	-0.096	0.200
V63	0.121	0.168	0.324	0.046	0.023	0.442
V64	0.275	0.021	0.184	0.152	0.336	0.061

Correlation Matrix

	V32	V34	V35	V36	V37	V38
V32	1.000					
V34	0.617	1.000				
V35	-0.029	0.197	1.000			
V36	-0.087	0.079	0.767	1.000		
V37	0.032	0.267	0.528	0.658	1.000	
V38	0.333	0.122	-0.271	-0.374	-0.516	1.000
V39	-0.118	-0.042	0.305	0.084	-0.176	-0.015
V40	-0.164	-0.107	0.019	-0.007	-0.186	0.147
V41	-0.039	-0.086	0.462	0.115	-0.286	0.157
V42	-0.033	0.179	0.036	-0.187	-0.224	0.445
V43	0.092	-0.095	-0.266	-0.161	-0.278	-0.053
V44	-0.349	-0.274	-0.111	-0.107	-0.139	0.067
V45	0.071	0.372	0.452	0.359	-0.076	-0.042
V46	0.305	0.242	0.359	0.415	0.227	-0.077
V47	0.177	0.392	0.022	0.093	-0.102	-0.009
V48	-0.050	-0.236	-0.240	-0.105	0.099	-0.145
V49	-0.193	0.119	0.044	-0.120	0.033	-0.253
V50	-0.295	-0.175	-0.214	0.022	0.144	-0.255
V51	-0.422	-0.127	-0.196	-0.165	0.094	-0.167
V52	-0.134	0.076	-0.214	0.020	0.055	-0.025
V53	-0.260	-0.318	0.001	0.035	-0.364	-0.174
V54	-0.015	-0.338	0.009	0.350	0.144	-0.143
V55	0.044	-0.024	0.004	-0.033	-0.058	-0.103

V56	-0.141	-0.016	-0.188	-0.262	0.016	-0.283
V57	-0.143	0.211	-0.230	-0.283	0.125	-0.249
V58	-0.123	0.084	-0.116	-0.162	0.297	-0.462
V59	-0.181	0.015	-0.130	-0.131	0.258	-0.452
V60	-0.065	0.027	-0.215	-0.074	-0.092	0.128
V61	-0.023	-0.008	-0.602	-0.612	-0.438	0.306
V62	-0.066	0.147	-0.033	-0.045	0.218	-0.031
V63	0.310	0.512	0.383	0.111	-0.011	0.288
V64	0.080	0.080	0.370	0.372	0.063	0.163

Correlation Matrix

	V39	V40	V41	V42	V43	V44
V39	1.000					
V40	0.796	1.000				
V41	-0.017	0.347	1.000			
V42	0.057	0.091	0.240	1.000		
V43	-0.102	0.005	0.104	-0.029	1.000	
V44	-0.100	0.063	0.502	-0.048	0.531	1.000
V45	0.427	0.276	0.207	-0.305	-0.207	-0.101
V46	0.049	-0.269	-0.241	-0.131	-0.406	-0.344
V47	-0.144	-0.203	0.449	0.248	-0.006	-0.277
V48	-0.046	0.246	-0.456	-0.302	0.022	-0.091
V49	0.071	0.444	0.195	-0.125	0.197	0.183
V50	-0.113	0.228	-0.608	-0.119	0.040	-0.001
V51	-0.030	0.239	-0.056	0.416	0.042	0.081

V52	-0.078	0.172	0.116	0.038	0.201	0.194
V53	0.012	0.033	0.415	-0.431	0.306	0.355
V54	-0.126	-0.103	0.275	-0.141	-0.082	0.033
V55	0.117	0.355	-0.015	0.083	-0.036	-0.200
V56	0.121	0.366	0.136	0.034	0.301	0.246
V57	-0.160	0.086	-0.080	-0.046	0.300	0.345
V58	-0.132	0.150	-0.040	-0.118	0.258	0.332
V59	-0.086	0.206	-0.241	-0.035	0.040	0.104
V60	-0.247	-0.043	0.261	0.294	0.226	0.040
V61	0.203	0.374	-0.024	-0.076	0.514	0.345
V62	-0.026	-0.162	-0.210	0.292	-0.283	0.231
V63	0.302	0.106	-0.109	0.314	-0.302	-0.435
V64	0.311	0.295	0.129	-0.016	-0.068	-0.069

Correlation Matrix

	V45	V46	V47	V48	V49	V50
V45	1.000					
V46	0.400	1.000				
V47	0.088	0.168	1.000			
V48	-0.062	0.055	-0.446	1.000		
V49	0.046	-0.160	0.199	0.220	1.000	
V50	-0.177	-0.041	0.016	0.470	0.646	1.000
V51	-0.525	-0.339	-0.010	0.167	0.442	0.320
V52	-0.231	-0.384	0.173	0.022	0.481	0.274
V53	0.217	-0.185	-0.009	-0.132	0.461	0.184
V54	-0.112	0.343	-0.068	-0.025	-0.009	0.139

V55	-0.196	0.066	0.086	0.072	0.606	0.540
V56	-0.161	0.006	-0.122	0.242	0.697	0.500
V57	-0.226	-0.386	-0.059	0.126	0.556	0.439
V58	-0.280	-0.387	-0.230	0.194	0.614	0.458
V59	-0.275	-0.293	-0.308	0.284	0.513	0.478
V60	-0.226	0.111	0.203	-0.161	-0.099	0.013
V61	-0.282	-0.583	0.056	-0.078	0.189	0.017
V62	-0.020	0.031	-0.045	-0.228	0.003	0.188
V63	0.576	0.064	0.052	-0.257	-0.157	-0.371
V64	0.340	0.263	-0.117	-0.217	-0.122	-0.110

Correlation Matrix

	V51	V52	V53	V54	V55	V56
V51	1.000					
V52	0.514	1.000				
V53	0.026	0.191	1.000			
V54	-0.032	-0.080	0.397	1.000		
V55	0.307	0.337	0.202	0.382	1.000	
V56	0.460	0.273	0.271	0.273	0.517	1.000
V57	0.468	0.222	0.421	0.041	0.120	0.571
V58	0.540	0.252	0.422	0.161	0.179	0.653
V59	0.651	0.223	0.382	0.242	0.374	0.602
V60	0.478	0.015	-0.022	0.149	0.125	0.116
V61	0.149	0.196	0.144	-0.313	0.320	0.003
V62	0.099	0.210	-0.154	-0.034	-0.174	0.058

V63	-0.309	-0.076	-0.278	-0.315	-0.157	-0.208
V64	-0.145	-0.236	0.348	0.280	0.145	0.204

Correlation Matrix

	V57	V58	V59	V60	V61	V62
V57	1.000					
V58	0.966	1.000				
V59	0.865	0.937	1.000			
V60	0.160	-0.012	0.138	1.000		
V61	0.318	0.078	0.046	0.113	1.000	
V62	0.115	0.199	0.066	-0.070	-0.375	1.000
V63	-0.274	-0.301	-0.216	-0.363	-0.335	0.106
V64	-0.004	-0.016	0.044	0.104	-0.252	-0.047

Correlation Matrix

	V63	V64
V63	1.000	
V64	0.323	1.000

APPENDIX IV. OVERVIEW OF RESOURCES, QUESTIONNAIRE, VARIABLE NUMBER IN SPSS AND ETA NUMBER AND NAME OF ALL FACTORS

Resource	Question Nr. in questionnaire	Question in questionnaire	Variable	ETA Number	ETA (factor name)
Human resources	10	Deelname Niet Continu (Training)	V8	3	Employee training
Human resources	11	Deelname Niet Continu (Seminars)	V9		
Human resources	12	Een soortgelijk project binnen uw bedrijf (%)	V10	4	Internal experience
Human resources	12	Een ander project binnen uw bedrijf %	V11		
Human resources	12	Een ander bedrijf binnen uw branche %	V12	5	External experience
Human resources	12	Een ander bedrijf buiten uw branche %	V13		
Human resources	13	Geen opleiding	V14	Not included.	
Human resources	13	Beroepsopleiding	V15	6	Employees with a low education
Human resources	13	Middelbaar beroepsonderwijs MBO	V16		
Human resources	13	Hoger beroepsonderwijs HBO	V17		
Human resources	13	Wetenschappelijk beroepsonderwijs WO	V18	7	Academic education
Human resources	13	Gepromoveerd en hoger	V19	8	PhD and higher
Financial resources	14	In welke mate vormden de beschikbare human resources binnen het…	V20	Question for firm managers, not included.	
Financial resources	15	Eigen vermogen	V21	9	Private equity
Financial resources	15	Vrienden/familie	V22	10	Debt capital
Financial resources	15	Venture capital (durfkapitaal)	V23		
Financial resources	15	Bankleningen	V24		
Financial resources	15	Anders	V25	Not included.	
Financial resources	16	Hoe groot was het beschikbare budget voor het laatste project	V26	11	Budget for the project
Financial resources	17	In welke mate vormde het beschikbare investeringsbudget voor het…	V27	Question for firm managers, not included.	
Physical capital	18	In welke mate heeft u gebruik gemaakt van de beschikbare…	V28	12	Research facilities of the firm
Physical capital	19	In welke mate vormden de beschikbare onderzoeks- en ontwikkeling…	V29	Question for firm managers, not included.	
Social capital	20	Hoeveel externe partners waren betrokken bij het laatste project	V30	13	Number of external partners
Social capital	21	Onderzoek en ontwikkeling	V31	14	R&D partners
Social capital	21	Commercialisatie	V32	15	Commercialization-oriented partners
Social capital	21	Anders	V33	Not included.	
Social capital	22	In hoeverre was het mogelijk om via deze samenwerkingsverbanden…	V34	16	Usefulness of external partners
Social capital	23	Via deze samenwerkingen werd nuttige informatie verkregen voor….	V35		
Social capital	23	Via deze samenwerkingen werden nuttige resources…	V36		

Social capital	23	Binnen het project was er de mogelijkheid tot het verwerven en…	V37		
Social capital	24	In welke mate vormden de externe relaties een beperkende factor..	V38	Question for firm managers, not included.	
Technological capital	25	Hoeveel patenten had uw bedrijf	V39	17	Firm patents
Technological capital	26	Hoeveel patenten van uw bedrijf vormden de basis voor het project	V40	18	(Internal & External) patents for the project
Technological capital	27	Hoeveel patenten van partners vormden de basis voor het project	V41		
Technological capital	28	In welke mate vormden de technologie ontwikkelingen een beperken…	V42	Question for firm managers, not included.	
Organizational capital	29a.	Waar lag de verantwoordelijkheid van het project	V43	19	Organization of the project
Organizational capital	29b.	Hoe wordt het projectteam geformeerd	V44		
Organizational capital	30	In welke mate zijn er onderlinge contacten tussen werknemers met…	V45	20	Teamwork
Organizational capital	31	In welke mate participeren werknemers tegelijkertijd in meerdere…	V46		
Organizational capital	32	Aanpassingssnelheid	V47	21	Adjustment speed
Organizational capital	32	Formele procedures en stabiliteit zijn van groot belang voor het…	V48	22	Importance of formal procedures
Organizational capital	32	Werknemers binnen het project waren sterk betrokken bij de organisatie	V49	23	Employee involvement
Organizational capital	32	Er was een gemeenschappelijke visie op de uitvoering van het pro..	V50		
Organizational capital	33	De suggesties van de werknemers binnen een project worden geval..	V56		
Organizational capital	33	Er is een geconsolideerd en vindingrijk onderzoek- en ontwikkeling…	V51	24	Knowledge acquisition
Organizational capital	33	Er worden experimenten gedaan met nieuwe ideeën en benaderingen	V52		
Organizational capital	33	Binnen het project informeerden werknemers elkaar persoonlijk..	V53	25	Knowledge diffusion
Organizational capital	33	Binnen het project vond kennisuitwisseling tussen werknemers…	V54		
Organizational capital	33	De organisatie en uitvoering van het project was afhankelijk van…	V55		
Organizational capital	33	Project evaluaties worden gearchiveerd in een database	V57	Not included.	
Organizational capital	33	Deze database werd vaak gebruikt gedurende het project	V58	26	Use of database
Organizational capital	33	Deze database was erg nuttig gedurende het project	V59	Not included.	
Organizational capital	34	In welke mate de organisatie van het project een beperken de factor…	V60	Question for firm managers, not included.	
Successful phase transition	1,6,35	Succesvolle overgang volgende fase	V61	1	Successful phase transition
Questions for the NEA	36	Indien van toepassing in welke mate draagt de implementatie van…	V62	Question for the NEA	
Questions for the NEA	37	Indien van toepassing in hoeverre was deelname aan een van de…	V63	Question for the NEA	
Questions for the NEA	38	Indien van toepassing in welke mate was deelname aan de WBSO..	V64	Question for the NEA	

Firm background	ii.	Oprichtingsjaarbedrijf	V1	27	Firm age
Firm background	iv.	Type industrie	V2	28	Type of industry
Firm background	v.	Aantal huidige werknemers	V3	29	Firms size
Firm background	1/5	Jaar project	V4	30	Year of project
Firm background	3/8	Werknemers project	V7	2	Employees in project
Participation specific program	4	Deelname specifiek	V6	32	Participation specific program
Participation general program	9	Deelname WBSO	V5	31	Participation generic program

APPENDIX V. ESTIMATED PEARSON CORRELATIONS BETWEEN ALL FACTORS

Correlation Matrix of ETA

	ETA 1	ETA 2	ETA 3	ETA 4	ETA 5	ETA 6
ETA 1	1.000					
ETA 2	0.052	1.000				
ETA 3	0.333	0.146	1.000			
ETA 4	0.307	-0.303	-0.065	1.000		
ETA 5	0.006	-0.450	-0.391	0.461	1.000	
ETA 6	0.280	0.427	0.441	0.229	0.163	1.000
ETA 7	-0.210	-0.131	0.099	0.346	0.226	-0.229
ETA 8	0.078	-0.026	-0.224	-0.302	-0.215	-0.737
ETA 9	-0.016	-0.287	0.312	-0.125	0.674	0.171
ETA 10	0.302	0.369	0.090	-0.067	-0.184	0.126
ETA 11	-0.056	0.561	-0.124	-0.297	-0.396	0.417
ETA 12	0.148	0.029	0.301	0.265	-0.581	-0.284
ETA 13	0.084	0.139	-0.019	-0.390	-0.022	-0.254
ETA 14	0.151	0.003	-0.226	-0.048	0.050	-0.579
ETA 15	-0.173	0.230	-0.094	-0.077	-0.501	0.109
ETA 16	0.014	0.171	-0.258	-0.309	-0.273	-0.734
ETA 17	0.082	0.235	-0.142	-0.158	-0.711	-0.294
ETA 18	0.028	0.926	0.224	-0.558	-0.903	0.118
ETA 19	0.071	-0.145	0.012	0.057	0.521	0.839
ETA 20	0.275	0.400	-0.553	0.183	-0.373	-0.742
ETA 21	-0.062	0.271	0.297	0.032	-0.094	-0.199
ETA 22	-0.345	-0.022	-0.028	0.113	-0.027	0.229
ETA 23	-0.055	0.161	0.556	-0.082	-0.183	0.270
ETA 24	-0.087	-0.155	0.712	-0.066	0.217	0.161
ETA 25	-0.041	0.016	0.302	-0.185	-0.247	0.103
ETA 26	-0.007	0.145	0.788	-0.309	-0.222	0.521
ETA 27	-0.263	0.245	-0.302	0.365	-0.221	0.350
ETA 28	0.018	-0.062	-0.252	-0.466	0.009	-0.097
ETA 29	-0.157	0.008	-0.019	0.035	-0.008	-0.212
ETA 30	0.003	0.208	0.047	0.107	-0.049	-0.265
ETA 31	-0.193	0.134	-0.633	-0.182	-0.715	-0.430
ETA 32	-0.180	-0.001	-0.318	-0.405	-0.384	-0.706

Correlation Matrix of ETA

	ETA 7	ETA 8	ETA 9	ETA 10	ETA 11	ETA 12
ETA 7	1.000					
ETA 8	-0.355	1.000				
ETA 9	0.043	0.046	1.000			
ETA 10	-0.053	0.171	0.183	1.000		
ETA 11	0.257	-0.045	-0.399	0.397	1.000	
ETA 12	0.131	0.269	-0.315	-0.186	-0.171	1.000
ETA 13	0.191	0.179	-0.025	0.306	0.421	-0.111
ETA 14	-0.056	0.471	-0.194	-0.079	-0.306	0.565

ETA 15	0.172	-0.261	-0.231	0.323	0.563	-0.201
ETA 16	0.009	0.101	-0.232	0.080	-0.011	0.269
ETA 17	-0.069	0.279	-0.414	-0.096	0.085	0.559
ETA 18	-0.105	0.394	-0.236	0.319	0.639	0.467
ETA 19	0.119	-0.700	0.182	-0.375	0.239	-0.368
ETA 20	-0.142	0.131	-0.528	0.275	0.123	0.165
ETA 21	-0.051	-0.120	0.004	-0.181	0.058	0.206
ETA 22	-0.067	-0.161	0.047	0.269	-0.222	-0.131
ETA 23	0.259	-0.426	0.259	0.054	-0.124	0.048
ETA 24	0.166	-0.220	0.313	-0.254	-0.400	0.163
ETA 25	0.512	-0.337	0.289	-0.157	0.084	0.043
ETA 26	-0.112	-0.391	0.014	-0.099	-0.016	-0.086
ETA 27	-0.089	-0.012	-0.397	-0.099	0.106	0.089
ETA 28	-0.284	0.129	-0.116	0.122	0.053	0.132
ETA 29	0.143	0.156	-0.145	-0.287	-0.111	0.056
ETA 30	-0.264	0.309	0.062	-0.091	-0.358	0.240
ETA 31	0.090	0.602	-0.274	0.181	0.113	0.362
ETA 32	-0.339	0.630	-0.206	-0.184	-0.049	0.495

	ETA 13	ETA 14	ETA 15	ETA 16	ETA 17	ETA 18
ETA 13	1.000					
ETA 14	0.393	1.000				
ETA 15	0.038	-0.659	1.000			
ETA 16	0.522	0.469	0.268	1.000		
ETA 17	0.113	0.407	-0.123	0.128	1.000	
ETA 18	0.583	0.612	-0.147	0.099	0.895	1.000
ETA 19	0.088	-0.205	-0.043	-0.247	-0.126	0.360
ETA 20	0.153	0.312	0.128	0.636	0.421	0.092
ETA 21	-0.276	0.030	-0.015	0.087	-0.189	0.139
ETA 22	-0.415	-0.258	0.051	-0.172	-0.024	-0.104
ETA 23	-0.230	-0.291	-0.167	-0.109	0.004	0.490
ETA 24	-0.310	0.089	-0.368	-0.144	-0.178	0.291
ETA 25	0.171	-0.399	0.085	-0.037	-0.046	0.461
ETA 26	0.079	-0.340	-0.007	-0.038	-0.138	0.110
ETA 27	-0.258	-0.139	0.225	0.113	0.116	-0.231
ETA 28	0.117	0.420	-0.301	0.258	0.285	0.444
ETA 29	0.028	-0.144	0.193	0.188	0.415	-0.050
ETA 30	-0.197	0.265	-0.197	0.065	0.096	0.315
ETA 31	0.295	0.333	0.428	0.394	0.480	0.604
ETA 32	-0.097	0.502	-0.319	-0.007	0.633	0.350

Correlation Matrix of ETA

	ETA 19	ETA 20	ETA 21	ETA 22	ETA 23	ETA 24
ETA 19	1.000					
ETA 20	-0.502	1.000				
ETA 21	-0.205	0.184	1.000			
ETA 22	-0.052	-0.021	-0.446	1.000		
ETA 23	0.341	-0.134	0.040	0.363	1.000	
ETA 24	0.235	-0.789	0.102	0.138	0.649	1.000
ETA 25	0.084	-0.022	0.037	-0.019	0.863	0.394
ETA 26	0.406	-0.492	-0.230	0.194	0.663	0.563

ETA 27	-0.320	0.271	-0.247	0.240	-0.401	-0.469
ETA 28	0.091	-0.085	-0.020	-0.184	0.016	0.383
ETA 29	-0.225	0.263	-0.040	0.183	-0.281	-0.186
ETA 30	-0.249	0.151	0.161	0.044	0.115	0.192
ETA 31	-0.593	0.634	-0.322	0.146	-0.185	-0.483
ETA 32	-0.675	0.283	0.205	-0.330	-0.344	-0.097

Correlation Matrix of ETA

	ETA 25	ETA 26	ETA 27	ETA 28	ETA 29	ETA 30
ETA 25	1.000					
ETA 26	0.416	1.000				
ETA 27	-0.302	-0.099	1.000			
ETA 28	-0.143	0.006	-0.371	1.000		
ETA 29	-0.101	-0.044	0.422	-0.185	1.000	
ETA 30	0.034	0.040	0.195	-0.461	0.057	1.000
ETA 31	0.234	-0.353	0.286	0.349	0.249	-0.146
ETA 32	-0.442	-0.354	-0.093	0.301	0.217	0.228

Correlation Matrix of ETA

	ETA 31	ETA 32
ETA 31	1.000	
ETA 32	0.248	1.000