Showcases from

Green Innovations

Solar Energy in Europe

The adoption and diffusion of solar panels in the Netherlands

The effect of institutional pressures on solar energy business models in the Netherlands

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Acknowledgements

This thesis has been written within a larger research project between TNO and Vrije Universiteit Amsterdam. The focus of the whole research project is the diffusion of sustainable innovations whereby the diffusion of different innovations (solar energy, sustainable lighting, and electric car) in several countries has been researched.
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Introduction

Sustainable energy is becoming more and more important in modern day society. It is common knowledge that fossil fuels lead to global warming and that fuel sources will be drained in the next 20/30 years. Therefore countries and companies all over the world invest in renewable energy sources to decrease CO2 emissions, stop global warming and also to create new energy sources. Currently the most popular renewable energy sources are wind, water, solar energy, bio fuel, biomass and geothermal heat.

Considering the political point of view in the past, all the countries in the European Union agreed that 16 % of the total use of energy should be sustainable by 2020, while currently only 8.5% is coming from renewable energy (NRC, 2008). In practice this means that a lot of steps have to be made and that there is a large growth potential in the coming years for companies in the renewable energy sector. In the last twenty years there have been many developments in this sector: new companies entered, some (voluntarily) exited the market, some went bankrupt and others succeed. Because of my entrepreneurial background with a specialization in entrepreneurial strategy, these developments raise my interests and therefore the focus of this research will be on the business side of solar energy.

Researching the academic background of doing business in innovative and increasing markets leads to research performed by Shafer, Smith & Linder (2005). These researchers stress the importance of business models for company performance, it is even so that business models could explain company success or failure (Shafet et al., 2005). Business model theory is a relatively new and popular concept in economic theory, which could be explained by the rise of business models for e-business companies in the mid 1990’s. Combining the needs and expectations of institutions in the coming years, with the goal of becoming more energy sustainable and the business model developments in the renewable energy sectors, leads towards an interest in the influence of institutions on business models.

Currently there is a theoretical gap between institutional pressures and business model development and innovation. Research by Osterwalder (2004) focuses on pressures influencing business models design but does not identify the influence of institutional actions, while Goodstein (1994) focuses on the strategic responses of companies on institutional pressures. Although many researchers acknowledge the importance of business model innovation (Zott, Amit & Massa , 2010, Osterwalder, 2004, Chesbrough, 2010, Chesbrough & Rosenbloom, 2000) and institutional theory by DiMaggio & Powell (1983) is widely used, no research has demonstrated the connection between institutional actions and business models. Therefore this study has the goal to acknowledge and research this connection.

For this research to be relevant and of practical use there has to be a narrow focus. I have chosen to focus on the solar energy sector within the renewable energy sector because of the significant growth in the renewable energy market in the last few years and its expected growth in the coming years. Solar energy companies are an interesting segment to analyse because of their already differentiated
business models; solar energy is used as a marketing tool, green-washing or as a vital part of the product offering. Moreover the research will have a geographical focus on the Netherlands. I have chosen the Netherlands because of its fast changing energy market in the last five years and the widely available market information. In the recent past renewable energy was not a focus point in the Dutch industry, but times are changing and companies are adapting their strategies towards new energy sources, especially solar energy (BNR Newsradio, 2012). Therefore this research paper will focus on these two theoretical concepts: institutional pressures in the Netherlands and company business models within the empirical domain of solar energy. The research question of this paper is:

“What is the effect of institutional pressures on solar energy business models in the Netherlands?”
1. Theoretical framework

The theoretical framework for this research paper is based on three concepts: institutions and institutional pressures based on DiMaggio & Powell (1983), business models (Osterwalder, 2004, Osterwalder & Pigneur, 2010) and business model innovation (Osterwalder, 2004, DiMaggio & Powell, 1983).

![Figure 1: The theoretical framework of this paper](image)

1.1 Institutional theory

Many researchers have studied institutions in the past (DiMaggio, 1988, Zucker & Tolbert, 1983) and more recently Heugens & Landler (2009) compared current research status in their meta-analysis. These studies have led to a broad spectrum of definitions and conceptualizations. Institutionalisations are suggested to be based on changes organizations go trough because of participants and the external environment influencing the organization (Scott, 1987). These adaption are both external as internal, because institutional pressures are able to influence the structures and systems within organizations (DiMaggio & Powell, 1983). The importance of institutions and institutional theory is underestimated, although they are a result of interaction and adaption within society and therefore have more long-term influence than organizations (Selznick, 1948).

One of the effects of institutional pressures is isomorphism. Isomorphism is the structural, cultural homogenisation within industries and organisations (DiMaggio & Powell, 1983) and homogenous outputs are a result of isomorphism. There are two types of isomorphism found in theory, competitive and institutional (DiMaggio & Powell, 1983) and combined they state that organizations compete not only for resources and customers but also for political power and institutional legitimacy plus social and economic fitness. This does not mean that homogenization purely leads to efficiency increase, it can also leads towards an increase or rumination of bureaucratization (DiMaggio & Powell, 1983). Other institutionalists’ agree and suggest that isomorphism has advantages for organizations: decrease in organizational confusion, increase in intelligibleness, legitimacy and increases funding possibilities (Donaldson, 1995).
Recently the meta-comparison research performed by Heugens & Landler, (2009) dives deeper in the central debates of institutional theory, prime in their research is the question whether organizational behaviour is primarily the product of macro social forces or of organizational agency. It should be noted that structuralists’ research stresses the constraining effect of institutions on organizational agency, pointing out that they deliver stability and recognisability in organizational structures (Jepperson, 1991). Structuralists suggest that these stability measures impose bounds for organizations to perform which leads to reducing variation in policies and structures (Donaldson 1995). More specifically the meta-analysis of Heugens & Landler (2009) defines that isomorphism adds to the abstract performance, which in practice means that organizations generate positive social valuations. The most important institutional theory element for this study is the three kinds of institutional pressures: coercive, mimetic and normative pressures (DiMaggio & Powell, 1983).

Coercive pressures are based on the political pressures governments can have on organizations, via laws, subsidies and tax incentives. An example of a coercive pressure is that governments are introducing new financial reporting methods for large organizations. This directly influences the activities of the companies. Large multinationals also have the same influence on smaller subsidiaries in the same industry, because they are able to force specific standards. Overall coercive pressures regulate behaviour by setting rules, monitoring compliance and sanctioning behaviour (Fligstein, 1997). Mimetic forces are the second institutional pressure described by DiMaggio & Powell (1983) and are based on the uncertainty and focus on uncertainty reduction. Markets and industries are uncertain fields for organizations to operate in therefore organizations try to mimic successful companies. The transfer of employees between companies in the same industry, who transfer company specific information, stimulates this mimetic behaviour. This does not automatically mean that mimetic behaviour increases performance. Mimetic behaviour could be a problem for innovative companies who try to enter the market and try to legitimize themselves by imitating other companies in the market. There is a possibility that this negatively influences the possibilities of success for these companies and that market innovativeness decreases. Overall mimetic pressures stabilize life by stimulating further adoption of features that are already popular amongst others (DiMaggio, 1991). Normative pressure is the third and last institutional pressure described by DiMaggio & Powell (1983) and is mostly based on the professional society. There are possibilities that the government could also influence normative behaviour, but in most cases these are exceptions. Professionals are individuals or organizations who have the knowledge, position or education to influence markets and industries. They are able to collectively define norms and standards, which are assumed to be right within a society. In addition, professionals have the possibility to create licensing and crediting for educational achievements, which consequently will lead to scholar using their learned norms and standards in organizations. Successively this will lead to organizations with the same educational background of professionals, which increases the similarity between organizations. Overall normative pressures harmonize the authoritative readings of everyday happenings (Scott, 2001).

These institutional pressures are of vital importance for the organizational survivability, organizations should not purely focus on technical and material resources because this is not enough for organizations to survive (Scott, Ruef, Mendel & Caronna, 2000). In addition to technical and material resources organizations
require cultural and political authorities to conform their activities and therefore subsequently operate in society (Scott et al., 2000). Parties such as the state, professionals, trade associations and critics are of essential importance for organizations. To attract the support organizations need, they tend to act in comply of the rules, set by these institutions. On the other hand organizations are not obliged to adapt to institutional norms and values, and some organizations tend to distinct themselves from competitors by not adapting to these norms. Although it could be beneficial for companies to not adapt, there are several arguments for organizations to adapt, for example: legitimacy gain, easy access to resources and capabilities (Meyer & Rowan, 1977).

1.2 Business models

The next section of the theory section of this paper focuses on business models. Business models are a well-known concept in recent management and economic literature and although they are widely discussed no definition is found which precisely explains what a business model is (Amit & Zott, 2001). In recent 1990’s business models were widely used as a pitching tool for e-business companies in search of capital investors, while other firms used business models to demonstrate their value proposition, revenue model and their network of partnerships. In the last 20 years business models acceptance has made many steps and it is fair to suggest that business models have found its place in any company, market and country. In addition business models are a useful feature for scholars to classify groups of companies (Baden-Fuller & Morgan, 2010). Since the rise of e-business companies, substantial research has been performed on business models. These developments have led to a widespread of business model definitions and building blocks. Amit & Zott (2005) have analysed at a general level all the business model definitions used in research and have come up with many different theoretical segments, subsequently they defined three phenomena’s that are all business models try to address or explain:

- The use of information technology in organizations;
- Strategic issues, value creation, competitive advantage, and firm performance;
- Innovation and technology management.

Although definitions differ widely and each business model definition will focus on different features, business model research is build upon the comparable components: value (value stream, customer value, value proposition), aspects related to the architecture of the network between the firm and its exchange partners (delivery channels, network relationships, infrastructure) and financial aspects (revenue streams and cost structures) (Zott et al., 2010, Chesbrough, 2010, Teece, 2010, Osterwalder & Pigneur, 2010) and in most cases they all have the same goal: describing typical kids of organizations and behaviours of firms (Zott et al., 2010).

In the next part of this theory section I will discuss the theoretical meaning of these component. The value component is of vital importance for business model design and is based on how to deliver value to the customer and to capture value for the company while doing so (Teece, 2010). Furthermore the value component defines the importance of the network (Hamel, 2000). Value creation never occurs in an organizational vacuum, but occurs within a network that includes suppliers, partners and distribution channels. The network component describes what partners, relationships and resources are needed to provide for the value component.
This demonstrates the connection between the value and network component discussed before. Therefore it is of vital importance for business model design to be successful external factors as well as the business eco-system is incorporated into the value proposition (Teece, 2010). In addition external relationships within the business network offer companies the possibility to keep a close sight on the developments within the industry. Research by Osterwalder (2004) and Kim & Mauborgne (2005) has demonstrated that superior market performers are the companies, who are able to innovate, constantly improve their value proposition and therefore are able to keep up with market developments.

Financial aspects are the third business model characteristic discussed and is based on revenue streams and costs structures. These characteristics focus on revenue flows and the pricing mechanisms of a firm. The financial characteristic is intertwined with the other two business model characteristics. A business model tries to optimize value streams and external relationships to get to the most efficient business model. Consider a profit-seeking firms in a competitive environments, this company will do its outmost best to meet customer wants through constant process perfection and the development of new value propositions. Subsequently managers want their companies to be designed efficiently to create commercially viable architectures for revenues and costs (Teece, 2010). This example demonstrates the relationship of the three business model characteristics and the importance of a mixture of these three characteristics.

For this research I have chosen to use the Business Model Canvas developed by Osterwalder & Pigneur (2010) for specifically analysing the business models in the solar energy industry. This model has been selected because of its wide acceptability, broad focus and extendibility. In addition, the business model has been developed as a tool for fast analysing, mapping and co-creating existing, as well as future scenario’s, which fits exceptionally well with the purpose of this research. The business model canvas is constructed by Osterwalder & Pigneur (2010) in their initial research on business model ontology. Their research has been expanded in cooperation with 470 other professional writers from 45 countries. This broad spectrum of writers increased the practicality of this theoretical framework and therefore it is not illogical that its been used by Coca Cola and Groupon.

The importance of the business model definition selection has been discussed in the previous part of the theoretical framework. The business model canvas is based on a selected business model definition by Osterwalder & Pigneur (2010) “a business model describes the rationale of how an organization creates, delivers and captures value”. The model can be used to describe a business model that is compatible around the world across companies. The business model framework exists out of nine building blocks: customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partnerships and cost structure. In the next section of the theory section I will shortly describe the building blocks and their practical use.
The first element in the business model canvas is the customer segments section. Customer segments are the groups of people or organizations that a company aims to serve by offering its product or services. Defining the different groups is essential for a successful business model. Therefore (Osterwalder & Pigneur, 2010) had provided some guidelines to distinguish different customer groups: groups require and justify a distinct offer, groups are reached through different distribution channels, groups require different types of relationships, groups have different probabilities and groups are willing to pay for different aspects of the offer. In addition, there are several standardized customer segments on which companies can focus in their business market: mass market, niche market, segmented, diversified and multi-sided platform. It should be noted that the company market focus could change along the way, because it is directly linked with business model innovation.

The second business model element is based on the relationship a company has with its customer in their specific segment and is closely related to the customer segment building block. It is essential for organizations to define the type of relationship it wants to establish with each customer segment. In practice several relationships can exist and they can range from personal to automate. Considering the type of relationships an organization can have with its customer, Osterwalder & Pigneur (2010) have provided three different customer relationship motivations: customer acquisition, customer retention and boosting sales.

The third business model element is the value proposition. The value propositions element is based on the combination of products and services that offer value to a specific customer segment. A value proposition generates value for a customer segment through a broad mixture of elements providing to those segments. It should be noted that a value proposition can both have a quantitative and qualitative character (Osterwalder & Pigneur, 2010). There are many elements that contribute to customer value creation and they all have there unique influence, such as: newness, performance, customization, getting the job done, design, brand/status,
price, cost reduction, risk reduction, accessibility and convenience.

The channels element is the fourth business model element and focuses on how a company communicates with and reaches its customer segments to deliver the previously discussed value proposition. Channels are the customers touch point that play an important role in the customer experience and can be divided into four types of channels: own, partner, direct and indirect. Each type of channels has its own focus and history and therefore a different influence. In addition channels have their distinct phases and each customer channel can cover some or all of these phases. The five phases are: awareness, evaluation, purchase, delivery and after sales (Osterwalder & Pigneur, 2010).

The fifth business model element is the revenue streams building block, which represents the cash a company generates from each customer segments. There are two different types of revenue streams: transaction revenues resulting from one-time customer payments and recurring revenues from on-going payments to either deliver a value proposition to customer or provide post purchase customer support (Osterwalder & Pigneur, 2010). It is not only important to know what the types of revenue streams are, but even more interesting is it to know how organizations can create the revenue streams. A company can generate revenue streams via different methods, such as: usage fee, subscription fees, renting, licensing, brokerage fees and advertising fees (Osterwalder & Pigneur, 2010). The revenue streams have the same adaptive characteristics as the value proposition elements and adjust to the business model innovation activities.

The key resources building block is the sixth element and describes the most important assets required to make a business model work. A company’s resources are its overall building block and can distinguish one company from another. There are four different categories of key resources: physical, intellectual, human and financial (Osterwalder & Pigneur, 2010). The key resources have the most influence on the value proposition of the company and define the actual value of the business model, even in most cases the key resources of a company are hard for competitors to imitate and could offer a competitive advantage.

The seventh business model element is the key activities, which focuses on the most important things a company must do to make business model work. There are several different type of activities, but the key activities business model element focuses on activities that distinguish the organization from others. Researchers suggest that key activities are required to create and offer a value proposition, reach markets, maintain customer’s relationships, and earn revenues (Osterwalder & Pigneur, 2010). Adding to this is the categorization of key activities based on customer segments: production, problem solving and platform/network activities.

The eight business model element is key partnerships, which is based on the network of suppliers and partners who are essential for the organization to make the business model work. In their study Osterwalder & Pigneur (2010) suggest that there are four types of partnerships: strategic alliances between non-competitors, co-opetition, strategic partnerships between competitors, joint ventures to develop new businesses and buyer-supplier relationships to assure reliable suppliers. All these partnerships have different characteristics and different use and therefore have a different influence on the overall partnership element. Furthermore it is interesting to know the motivations behind a partnership, there are three motivations for companies to create
partnerships: optimization and economy of scale, reduction of risk and uncertainty and the acquisition of particular resources and activities (Osterwalder & Pigneur, 2010).

The last building block of the business model canvas is the cost structure, which demonstrates all costs incurred to operate a business model. There are broad classes of business model cost structures: cost driven or value driven. Where the first structure focuses on the costs to produce and sells products the second structure focuses on the value a product has for a customer. Furthermore Osterwalder & Pigneur (2010) define characteristics a cost drive structure can have: fixed costs, variable costs, economies of scale and economies of scope. It is clear that these characteristics are compatible with the known economic concepts and standards.

Overall this business model canvas offers the ideal structure to analyse company actions within a specific market and enables me to compare companies within an industry with each other. What comes into mind are the possible competitive advantages that companies can create via the business model canvas. Business models itself will not generate enterprise level competitive advantages (Teece, 2010), while redefining existing business models could create short term advantages but in most cases are easy to imitate. When imitation is not a possibility, business model refinement could create higher returns for the first mover, therefore companies could compete via their business models (Masanell & Ricart, 2010). Contrary to this are Afuah & Tucci (2001), who use business models to analyse competitive advantages. They suggest that a business model is a method by which a firm builds and uses its resources to offer customer better value and to make money by doing so, which also fits in the three characteristics model discussed above.

1.3 Business model innovation

The last step in the theoretical framework is to analyse the influence of external forces on business model design and innovation, also called business model innovation. I have created a connection between the institutional pressures section and the business model canvas, which will be demonstrated in the methodology. Based on research by Osterwalder (2004) and Osterwalder & Pigneur (2010) I have divided institutional pressures into four concepts: key trends, market forces, macro-economic forces and industry forces. These four concepts consist out of many sub forces depicted in appendix 1 and Osterwalder (2004) has picked the four most influential: competitive forces, customer demand, social environment and legal environment. I will use these four influences as the theoretical basis for this research and will connect them with the coding scheme.

Competitive forces is the first institutional pressure I will discuss in this part of theory. There are different ways in which a company could react towards competitive forces and although it is clear that for some companies reacting on competitive forces is of less vital importance, it is clear that companies in one way or another have to respond. This is especially the case for traditional industry organizations, for which adapting to changes in the competitive environment is crucial. In most cases these organizations operate in a market where new competitors are more dynamic and are able to attack their market position (Christensen, 1997; Christensen, 2001), which increases the importance of reacting to competitive forces. Overall competitive forces can be divided into several different forces explained by Porters’ (1985) five forces model: entrants, buyers, substitutes and suppliers are cumulative towards a competitive industry. Competitive forces have a mimetic character and
therefore are the perfect example of a mimetic institutional pressure (DiMaggio & Powell, 1983). As stated before in the theory section, mimetic pressures lead to uncertainty reduction, therefore I am able to suggest that an increase in competitive forces would directly lead to mimetic behaviour.

Pressures to adapt a company’s business model can also come from customer demand. There are many possibilities in customer demand changes, such as: changes in consumption patterns, revenue fluctuations and fashion changes. Customer demand has a normative character and changing demand and preferences is a part of normative institutional pressure. Although normative pressures do not have the direct influence coercive pressures do have, it is vital for organizations to adapt its business model to meet customer preferences and demands.

In some cases the social environment and social mood can influence the business model of a firm. This kind of pressure is known as the stakeholder theory, which suggests that when stakeholders are not able to identify with corporate behaviour, they expect organizations to change (Osterwalder & Pigneur, 2010). Social ethics is a well-known example used in the stakeholder theory. Furthermore the social environment also has a direct influence on customer behaviour, which is the case for technology adoption. The social acceptance of technologies and innovation by a majority has the strength to open up new markets and demands. Therefore it is essential for organizations to understand social moods and changes (Osterwalder & Pigneur, 2010)

Furthermore changes in the legal environment can also make it necessary for companies to adapt business models and even rumours of a typical law can have a major influence. For example the introduction of new privacy laws can make the use of some business models illegal, which would bring the company in big problems. Overall it is states that the legal environment has a large influence on business models and fits perfectly within DiMaggio & Powell’s (1983) coercive pressures. Organizations have the obligation to meet the legal standards and act according to the legal environment. Therefore coercive measures are on the direct pressures on business model innovation.

The practical implications of business models innovation are hard to manage. Especially in the case of an imminent technology such as solar energy business model changes have proven to be deadly for established firms (Tripsas & Gavetti, 2000). Overall it is the managers’ role to make the company adapt towards external changes, think rational and rely simplified representations of reality (Simon, 1955). Operating in a modern day society in which changes and developments have become the standard, managers will find it hard to adapt their mental models, which will eventually result in poor organizational performance (Eisenhardt, 1989).

With the use of this theoretical framework I am able to analyse the influence of institutional pressures on solar energy business models. In the next sections of this paper I will connect the institutional pressures discussed in this section with their respective business model elements and industry and company actions. The industry and company actions can be found in the coding scheme discussed in the methodology of this paper.
2. Industry overview

2.1 Country characteristics

Currently there are two types of solar panels in the Netherlands: solar panels and solar collectors. Solar collectors receive solar energy and use this energy to heated up water boilers and in most cases is used in addition of the house’s heating. Solar panels transform solar energy into electricity, which can be widely used. Currently citizens do not need to have a permit to collect solar energy via both the panels and boilers but the government has issued certain specific regulations for the construction of solar panels. The Dutch government tries to increase the interest in solar energy by introducing subsidies for companies and consumers, but this is difficult. The political distribution makes it hard to create a long-term political policy. This is illustrated by past subsidies:

- In 2009 the Dutch government introduced a subsidy on solar panels and the selling of solar energy for consumers.
- In 2011 this subsidy ended but companies became increasingly interested in this particular energy source.
- In 2012 the Dutch government introduced a new subsidy with the goal to increase solar panel sales.

Another interesting fact about the Netherlands is its agreement in the European union that renewable energy at least should have a 16% market share of the total energy consumption in 2020, while currently only 4% of the total energy consumption comes from renewable energy. The necessary growth in renewable energy consumerism offers many possibilities for companies in this sector, or for other companies to enter. The growth of renewable energy consumerism would also increase the total employment in the Netherlands. WNF and Ecorys have performed a study on the clean tech industry in the Netherlands. Currently 15,600 FTE (full time equivalent) are specialised in renewable energy, with an expected 20,000 FTE to be operating in service operations. With the necessary growth in the next seven years the Central Bureau of Statistics (CBS) expects this to grow towards 51,400 FTE in 2020 in this particular field, which is a €4 billion economic growth. In addition to this growth in the total sustainable energy sector, the increase in energy efficiency necessary to reach the 16% mark could also increase by 56,100 FTE in 2020, which will lead towards a €1 billion growth. Overall this demonstrates the relevance of sustainable energy and the influence of institutional pressures on companies.
## 2.2 History of solar energy in The Netherlands.

<table>
<thead>
<tr>
<th>Period</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>1920</td>
<td>Research performed by physicists and chemists</td>
</tr>
<tr>
<td>1930</td>
<td>Research performed by Philips on PV’s which stopped short after.</td>
</tr>
<tr>
<td>1950</td>
<td>N.A.S.A used solar Energy in space.</td>
</tr>
<tr>
<td>1957</td>
<td>Dutch governmental organization (FOM) criticizes Dutch PV research and suggests that research should focus on nuclear energy.</td>
</tr>
<tr>
<td>1959</td>
<td>Discovery of large gas fields decreased needs of alternative energy sources.</td>
</tr>
<tr>
<td>1970</td>
<td>Nuclear power is being contested; Oil embargo is introduced by OPEC this leads to renewed interest in Solar energy research.</td>
</tr>
<tr>
<td>1974</td>
<td>Research group on alternative energy sources (LSEO) is established by the Dutch government. Reports state that after the year 2000 alternative energy sources will become interesting.</td>
</tr>
<tr>
<td>1980</td>
<td>Low governmental investments in solar energy research because of lacking potential</td>
</tr>
<tr>
<td>1985</td>
<td>Shift towards solar energy of Dutch government because of high profile professors lobbying and successful foreign projects.</td>
</tr>
<tr>
<td>1989</td>
<td>First grid-connected PV systems are tested by research organization.</td>
</tr>
<tr>
<td>1990</td>
<td>Dutch governmental organization (Novel) states that solar energy will become the most important alternative energy source after 2012.</td>
</tr>
<tr>
<td>1991</td>
<td>Small building PV integrated in 10 houses</td>
</tr>
<tr>
<td>1995</td>
<td>PV project of 500 houses is launched</td>
</tr>
<tr>
<td>1998</td>
<td>Collaboration of research institutes and industry leads to the launch of many High-Tec spin-offs.</td>
</tr>
<tr>
<td>1999</td>
<td>Dutch government &amp; WWF start campaign to switch to green energy via subsidies.</td>
</tr>
<tr>
<td>2000</td>
<td>Dutch government issues PV system subsidies.</td>
</tr>
<tr>
<td>2004</td>
<td>Complete liberalization of energy market in the Netherlands, green energy is used as a marketing tool.</td>
</tr>
<tr>
<td>2010</td>
<td>Reduction of sustainable energy subsidies by Dutch government.</td>
</tr>
<tr>
<td>2011</td>
<td>Collective research institutes (TNO, ECN, and Eindhoven University) demonstrate PV large job creation potential in manufacturing and industry.</td>
</tr>
</tbody>
</table>

Table: 1: History timeline of solar energy in The Netherlands
2.3 Focal companies in the solar energy industry

The focal companies have a vital role in this study and are the focus of this study. They are used to test the influence of institutional pressures on company business models. Therefore I have selected six different companies from within the solar energy market. While some companies such as: Delta, Nuon and Eneco, focus both on the production and delivery of solar energy and solar panel production, other tend to focus purely on solar panel production (Shell and Scheuten Solar). Combined the focal companies provide a representative mixture of multinationals and pure Dutch companies with turnovers differing from billions (Shell) to millions (Scheuten Solar).

**Delta**

Delta is the Zeeland based NUTS Company, founded in 1991 by the partnering of two local companies. NUTS facilities are facilities essential for society, for example the supply of gas, electricity and water. It is not uncommon that NUTS companies have a monopolistic position in a specific area, which for Delta is the southwest of the Netherlands. Currently Delta has a turnover of approximately €2,172 billion. Delta’s solar activities focus principally on energy retailing as solar panel production is a minor activity. In 2009 Delta bought the solar panel production facilities of Solland Solar, which then was a leading company in solar panel production. Incorporating the solar panel facilities were harder than expected and the changing economic situation lead to a bankruptcy of the solar panel activities. Therefore currently Delta’s solar activities solely focus on the retailing of energy.

**Shell**

Shell is Dutch/English based Oil Company. Founded in 1890, Shell is one of largest independent energy companies in the world. With a various range of activities the solar activities were brought together in Shell Solar. Shell’s solar primary activities were based on solar panel production and development. Large investments were made in the starting period of these activities and subsequently partnerships were made with Siemens. Despite the few successes and the large investments Shell decided to shutdown its solar activities in 2008 and withdraw completely from this market. Recently Shell invested €350 million in Solar frontier which is a daughter company of Shell. Solar Frontier has solar panel production facilities in Japan and develops a secret new solar panel technique Therefore currently Shell’s business model does not incorporate solar activities but future developments are noticed in this market.

**Nuon**

Nuon is a Dutch based NUTS company. Founded in 1994, by the partnering of four governmental energy companies. Nuon’s activities are based in the southeast of the Netherlands and focuses on the retailing and production of energy. Nuon solar energy activities focus on both energy production and solar panel production. Nuon inherited the solar panel production facilities when it took over Helianthos Nuon solar energy activities
focus on both energy production and solar panel production. While energy production and retailing being the largest solar energy activity Nuon acquired solar panel production facilities when it took over Helianthos in 2006. Helianthos is a research and development factory and focused its activities on the development of flexible solar panels. Because of the changing economic situation and the rise of cheap Chinese solar panels Nuon decided to close down Helianthos in 2012. Currently Nuon’s solar energy business model focuses on the retailing of solar energy, produced in the Netherlands or bought from surrounding countries.

**Eneco**
Eneco is a Dutch based Energy Company, founded in 1995 and based in Rotterdam. Eneco focuses on all kinds of energy activities and has a turnover of €5.3 billion and a profit of €233 million. Eneco’s key statement is to focus on sustainable energy for everyone. Its solar activities can be divided into two segments; solar energy production and solar panel production and research. In 2009 Eneco acquired the bankrupt Ecocern. Ecocern was a sustainable energy company with 1.200 employees around the world and its key activities focused on solar, wind and biomass energy. Via an auction Eneco was able to buy Ecocern’s solar activities, which rapidly made Eneco one of the largest solar panel producers. Currently Eneco’s is increasing its focus on solar panel retailing and decentralized energy production. This essentially means that Eneco’s tries to enable the consumer to produce its own solar energy and sell its remaining’s. Eneco tries to differentiate from other energy companies by its solar panel activities and clearly incorporated these activities in its business model.

**Essent**
Essent is a Dutch based energy company, founded in 1999. Essent focuses on energy, gas and heating retailing in the Netherlands and Belgium. In 2009 Essent was taken over by RWE, but the name remained the same. Currently there is a turnover of approximately €5.8 billion in the Netherlands and Belgium. Currently Essent’s solar energy activities exist purely out of solar energy production and distribution. Only recently Essent has announced to sell solar panels in the near future, aiming on decentralized energy production. Essent is going to sell solar panels in the end of 2013 to enable customers to produce their own energy and sell the remaining’s to the market. Currently Essent’s business model focuses on the retailing of solar energy produced in the Netherlands or in surroundings countries but in the near future this will change by the adaption of solar panel production and instalment activities.

**Scheuten Solar**
Scheuten Solar is a spin-off of the Dutch glass company Scheuten founded in 1959. Scheuten Solar was founded in 2002 and became very successful in the first few years. Scheuten solar is the only company in this study that purely focuses on solar panel production and research. With the acquisition in 2003 of a German solar panel factory and the construction of a silicium factory in 2006, Scheuten Solar became one of the leading solar panel companies in the Netherlands. Because of the rise of Chinese solar panels and the economic crisis Scheuten Solar went bankrupt in 2011 and its remaining’s were taken over by a Chinese company; Aiko Solar. Only
recently the solar panels of Scheuten Solar came in the news because of the fire hazard of possibly 650,000 solar panels. Because of the bankruptcy in 2011 there is no current business model information available.

3. Methodology

The next part of this paper is based on the methodology. I have divided the methodology in two parts, the first part focuses on the theoretical part while the second part is based on the practical side of the methodology. I have chosen to use a mixed methods research model and focuses both on a quantitative and qualitative analysis of qualitative data. The mixed method research approach is a research in which the investigator collects and analyses data, subsequently integrates findings and concludes using both qualitative and quantitative methods within a single study (Teddle & Tashakkori, 2009). Therefore this research approach combines the strengths of both a quantitative and qualitative research approach, while decreasing its weaknesses. Overall this fits extremely well in the research focus of this study, therefore I have chosen for a mixed-method approach.

3.1 Research onion

The construction of the methodology is based on Saunders, Lewis & Thornhill (2009) research onion, depicted in figure 3. For this study I have chosen an outside in approach. One of the biggest advantages of the research onion is that it helps to create internal validity amongst chosen concepts. I will start with the outer layer of the research onion. The outer layer of the research onion is focused on the research philosophy of a study, research philosophies motivate the way knowledge is developed and provides information on the nature of this particular knowledge. The research philosophy provides information about the way the researcher thinks about the world and is subsequently indispensable for methodological and strategically choices (Saunders et al., 2009). In addition research philosophies offer basic assumptions about the world and how can develop knowledge about it. (Saunders et al., 2009). I use a positive research approach, based on the ontological choice to create a generalizable research model focused on both observable phenomena and subjective meanings of these phenomena. In addition the study researches causal relationships, contexts and the meaning of these relationships.

The next layer in the research onion concentrates on the research approach. As stated before this study is based on a mixed methods research approach, established on an inductive quantitative analysis of qualitative interpretations of newspapers. A hybrid structure for this study is suitable because of the nature
of the theoretical concepts, institutional pressures and business models. These theoretical concepts will be used to analyse the possible relationships between events and concepts. Furthermore the institutions and institutional pressures are a mature research field, because of the high amount of studies conducted in this particular field. On the other side of the theoretical framework are the business models. Business models are a relatively new theoretical concept and therefore this research field is between nascent and intermediate a state. Figure 4 is based on research by Saunders et al. (2009) and describes the necessity of a hybrid research structure when operating in these theoretical fields.

This study will be conducted into two phases, in the first phase a qualitative analysis of the newspapers will be conducted with the use of the developed coding scheme. The coding scheme has been developed within the research group this study fits and will be used for approximately 15 studies as well. More information can be found in the Capita Selecta paper of Steven Ammerlaan (2013) and in the coding theme section of the methodology. In the second phase of the research a quantitative analysis will be made. The developed coding scheme will assist in this quantitative analysis.

The third layer of the research onion is based on the research strategy of this study. I have chosen for secondary document data sources, a print media archival research. Secondary data are sources that include both quantitative as qualitative data and are used principally in both descriptive and explanatory research. Secondary data can be divided into three classifications: documentary, survey-based and from multiple sources (Saunders et al., 2009). This particular study is based on news articles as a secondary data source. The main reason for secondary data use is the enormous saving in resources (Ghauri & Gronhaug, 2005). Subsequently secondary data sources offer the possibility for researchers to analyse far larger data sets. It is even suggested that secondary data are of a higher quality than primary data(Osterwalder & Pigneur, 2010). A third advantage of secondary data is the possibility for longitudinal studies, because of the possible longer historical background. Of course there are also some dis-advantages of using secondary data sources. There is a possibility that data is gathered with another purpose that is different than yours, which decreases the usability. Another disadvantage is the accessibility of secondary data: it is possible that secondary data sources are not as easy to access or cost money (Saunders et al., 2009). The last disadvantage of secondary data focuses on the control over data quality, although Stewart & Kamins (1993) suggest that secondary data is of higher quality, practice illustrates that this is not always the case. Therefore data sources have to be carefully evaluated to see if it intentional goal fits the purpose of the particular study.

3.2 Process method

The next section of the methodology will focus on the process method. The way data is analysed is of vital importance for this research to be reliable and therefore the correct research strategy has to be chosen. There are two different possibilities for analysis of data: variance and process methods. I will shortly describe both methods before I will continue with the subsequent steps. The variance methods focuses on the change in relationships between independent and independent variables (Schoonhoven, Eisenhardt & Lyman, 1990), where the process method is based on how events react over time (Gersick, 1994).
Because this study has a long-term focus and tries to find connections between events and actions the process method is the best fitted research method. In addition to process method there are several sub-strategies distinguished by Langley (1999), such as: narrative, quantification, alternate templates, grounded theory, visual mapping, temporal bracketing and synthetic strategy and this study is based on combing several research strategies. I have chosen to combine quantification, narrative, visual mapping and temporal bracketing strategy. In the next segment I will shortly discuss the unique elements of these strategies and their applicability for this study.

The first research strategy is the quantification strategy, which starts with an in-depth process data analysis. After the data analysis is done this strategy continues with a systematically listing and coding of qualitative events according to characteristics determined within the coding scheme (Langley, 1999). This process is based on the reduction of complex information to a set of comprehensible quantitative data that is easier to use, eventually this will lead to conceptualizations and an increased simplicity of data. Furthermore the conceptualizations and the subsequent mathematical testing increase the generality of the study. One side note to this process is the fact that to achieve these results, along the way data is drastically simplified and general concepts replace rich data. Overall this increases the chances of losing important data. It is strange that by using these kind of methods, first investments are done in collecting rich data that is subsequently deducted to much thinner data. Overall the reliability of the quantification will be tested via an inter-rater reliability test based on Landis & Koch (1977).

The narrative research strategy is the second strategy used in this study and focuses on creating a story from raw data. There are several objectives when using the narrative research strategy: it can be used as a preliminary step towards chronology analysis or as a validation tool and a tool for contextualization (Langley, 1999). Occasionally it is also possible that a narrative analysis is the main argument of the analysis. The biggest advantage of a narrative strategy is that it does not require conceptual definitions when boundaries are not clear, because a narrative study integrates the risk that it will result in a story of marginal interest for readers who are not involved in this particular research segment (Langley, 1999).

The third research strategy incorporated in this study is the visual mapping strategy. The visual mapping strategy enables the depiction of large amounts of data in easy to understand graphics, eventually these graphics can be used for the development and verification of theoretical ideas (Langley, 1999). Visual mapping is ideally for representations of large number of dimensions and enable the researcher to illustrate progress and developments. Visual mapping is often used as a step between raw data and more abstract conceptualizations and often-equivalent visual maps are compared to demonstrate common sequences (Langley, 1999). Approaches like visual mapping require a high amount of observations and similarity, therefore visual mapping is most successful in situations where there are multiple holistic cases. To conclude the visual mapping strategy offers the researcher the possibility to reduce data and make it more accessible.

Temporal bracketing is the last research strategy used in the study and is based on using periods to analyse data. Using periods enables the researcher to compare results in an interval period. In almost all the cases the selected periods are not of any theoretical substance but enable the researcher to compare events and
structure the analysis (Langley, 1999). There are also risks in using the temporal bracketing strategy, which lies in the fact that it can create certain misrepresentations. There is no guarantee that unique events will synchronize themselves with specified time periods, which could lead to misunderstanding these events and their effect.

The fifth part of the research onion emphasis the timeline of the study. This study focuses on a time horizon of almost twenty years in the solar energy market, which means that there is a longitudinal focus. This time horizon is necessary to be able to analyse the influence of events on the long-term operations of a company.

3.3 Data collection.

The data collection in this study is, as stated in the process method section, based on the process method theory. The initial data collection exists out of two sections: database selection and the search procedure. The data collection segment is evident for the research to create construct validity. Construct validity focuses on the connection between what the researcher is investigating and what he claims to investigate (Gibbert, Ruigrok & Wicki, 2008). This connection is of vital importance for the reliability of the research.

Database selection

Secondary document data will be used from an online database, where a well-structured database composition is needed to gain reliable results. There are several factors influencing the reliability of results: the database composition, the specific characteristics of the database and the total number of publications (Benders, Nijholt & Heusinkveld, 2006) and each factor should be incorporated in the search for the online database. To enable reliability the databases in this research will be analysed according to these factors: focus of the database, the number of publications per year, representation of different disciplines and types of media covered. These factors are widely available and offer a representable insight in the database itself.

Search-procedure

The next step in the data collection process is the search procedure. It is clear that the search procedure influences the search results and therefore the research results and therefore should be well thought through (Benders et al., 2006). The search procedure consists out of two important phases: understanding how to capture the organization concept under investigation and operationalize it into adequate key words and database users are required to express their search requests in the language and format of the system they are using (Hutchins, 1985). Database users always have to break down search questions into several individual search terms and determine how these should be combined and entered and in most cases the researcher uses this label when doing research on print media indicators. Because these concepts and labels have a certain degree an interpretative viability (Benders & Van Veen, 2001), they are characterized by certain degrees of generality, ambiguity and vagueness (Giroux, 2006). In practice this means that the users can shape the concept in different ways and in various contexts.

Data analysis
The data analysis will be conducted in a quantitative and a qualitative form based on the process method described in a previous part of the methodology. With the use of the combined quantification, narrative, visual mapping and temporal bracketing strategies the data will be analysed and processed. During the analysis process it is of vital importance to keep research questions in mind, although flexibility is sometimes needed (Saunders et al., 2009).

3.4 Solar energy market case

The next in this study is to bring the methodology to practice. The first step is the analysis of the database selection, which will be continued by an insight in the search procedure. In the last part of this section the future data analysis will be described and discussed.

Database selection

This study is based on a process method archival data research. Because of the particular research focus on the Netherlands a database has to be selected which incorporates the Dutch newspapers and magazines. In this particular case LexisNexis is the only option. LexisNexis is stated to be the most complete news archive for universities in the Netherlands and has a focus on Dutch sources. This online database is updated daily by the scraping technologies of LexisNexis. From the seven newspapers and six magazines in the database the author has selected three structural different sources. The sources selected are: De Volkskrant, Het Financieele Dagblad and De Telegraaf. These newspapers are selected because of fundamental cultural differences and their widely acceptance. In addition all the newspapers have a reach of more than 200.000 readers, which demonstrates their influence on Dutch society. The number of publications is hard to measure for an online database with a daily update such as LexisNexis, therefore the author decided the starting point of the archive. The timeframe focus of this study is between 1995-2013, both de Volkskrant and the Het Financieele Dagblad their archive before this period, while the articles of De Telegraaf where only added after 1999. This could lead to conflicting results within the timeframe. Despite these discrepancies the author has chosen to add De Telegraaf, the main argument for this is the scale and reach of the paper. De Telegraaf has by far the largest reach of the three newspapers and therefore has the most influence of all three newspapers.

Profile De Volkskrant

The main sub line of de Volkskrant is “Bringing facts like there are, fast, trusting and without bias”. In the Netherlands de Volkskrant has a reader basis of approximately 310.000 readers, with a total reach of 705.000, 53% of the readers are high educated, 12% is still studying and 60% is working.
Profile Het Financieele Dagblad

Het Financieele Dagblad is the newspaper in the Netherlands that focuses on entrepreneurial and financial news. It has a long tradition of investigative reporting which makes Het Financieele Dagblad an institute in the Netherlands. Het Financieele Dagblad currently has 65,000 subscriptions with a total reach of 212,000 readers with an average age between 25-60 and highly educated.

Profile De Telegraaf

De Telegraaf is stated as the biggest newspaper in the Netherlands. De Telegraaf targets to inform its readers as good as possible with all the news that is of importance. The newspaper is widely read within all groups in the Netherlands; male, female, old and young. The newspaper has approximately 705,000 subscriptions with a total reach of 2.3 million readers.

Source: Upmedia.nl & Motivaction

Search procedures

The search procedure exists out of the two phases described earlier in this study. The first phase focuses on the selection of adequate key words. This study focuses on the solar panel industry in the Netherlands and therefore the keywords ‘solar’, ‘solar panels’, ‘solar energy’ and ‘solar industry’ are chosen. The second phase is based on the translation of these keywords in actual search requests. It is clear that there are differences not only in language but also in use of terms per country. In Dutch newspapers the term PV is used to describe solar panels and therefore will be added to the key search words. Furthermore the key word ‘solar’ will be used as a noun, to find broader information on solar news. The database of LexisNexis offers the possibility to search on a chosen word, per source and per year, therefore no other transformations have to be made.

<table>
<thead>
<tr>
<th>English</th>
<th>Dutch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar energy</td>
<td>Zonne-energie</td>
</tr>
<tr>
<td>Solar Panels</td>
<td>Zonnepanelen</td>
</tr>
<tr>
<td>Solar industry</td>
<td>Zonne-energie industrie</td>
</tr>
</tbody>
</table>

Table 1: Search words in LexisNexis database

Data analysis

The total amount of newspapers events used in the analysis is demonstrated in table 1. Practice has demonstrated that one out of fifty news articles was found to be interesting. The data analysis in this research is based on the quantitative coding scheme created by the research group. The coding scheme offers the possibility to transform qualitative data into quantitative by using response quantification.
All the qualitative information from the newspapers will be coded via a scale method. Transforming rich information into a ‘’+3, +2,+1,0,-1,-2,-3’’ scale could give some problems, because concepts always have a certain degree of interpretative viability. Which in practice means that users of the scheme can interpret the concept in different ways and contexts. To analyse these interpretative differences and to test research reliability I have conducted an inter-rater reliability test via Cohen’s Kappa. This test focuses on the agreement among raters and scores the homogeneity or consensus. Cohen’s Kappa is a statistical measures often used for measuring the inter-rater reliability. The inter-rater reliability test has been conducted by comparing the results of two different coders. The calculation method can be found in the appendix 2. The Kappa has a score of 0.74, which is a substantial score for satisfactory inter-rater reliability. This means that inter-rater reliability is statistically sufficient and that research reliability is guaranteed.

### 3.5 Coding in practice

The next section of this paper focuses on the coding of the newspaper events and its practical use in the rest of this paper. Coding with the help of the coding scheme is the essential instrument in the data gathering and analysis process of this study and therefore deserves enlightenment. The students in the VU-TNO research group supervised by Rosalinde Klein Woolthuis and Hans Berends created the coding scheme for the Capita Selecta course. During the process we developed a coding framework and agreed on the exclusiveness of the codes and their definitions. During the data gathering process the research group modified and adjusted the codes and definitions to be as specific as possible. The coding scheme is based on the three types of pressures earlier discussed in the theory section, coercive (C), mimetic (M) and normative (N) and four types of institutional actors, governments, industry actors, professional sources and the public. To enable research possibilities at a micro level a firm specific column has been added, which focuses on these companies explicit actions. With a micro level focus integrated in the coding scheme the research group is able to study the different activities of individual companies within a particular industry. Furthermore each segment in the coding scheme has its specific actions, as demonstrated in appendix 3. In addition a five-point scale from ‘’-2’’ until ‘’+2’’ has been added to be able to judge the influence of the institutional pressure. A ‘2’ implies a strong negative or positive impact on the diffusion rate whereas a ‘1’ shows a minor effect. An event can also be coded as a ‘0’ if the impact is not clear yet or it constitutes relevant information but without any direct impact. Now I have shortly discussed the coding scheme the next step is to make a connection between the coding scheme elements
and the nine business models elements of Osterwalder & Pigneur (2010). The focus of this particular research is to investigate the influence of the industry and focal company actions on business model elements. To identify these influences I have created a framework that defines the connection between these actions and the nine building blocks of the business model canvas). The framework is depicted in appendix 4 and will be used in the analysis.

Now I have created a framework that enables me to analyze the industry and company actions the next step is to consider the institutional pressures and their effect on business models. Before I am able to continue it should be noted that in this paper the industrial institutional pressures are measured by industry labels and not as an individual institutional pressure. In this analysis I will consider the industry labels as actions, which enables me to specially study the overall industry business models and the focal company business models. Considering the influence the other institutional pressures have on business models, Osterwalder and Pigneur (2010) provide a pressure framework depicted in appendix 1. Combining this framework with the institutional actions from the coding scheme, based on theoretical operationalizations of institutional theory by DiMaggio & Powell (1983), and an expectations framework is created. The framework, which is depicted in appendix 5, illustrates the theoretical influence of institutional actors on business model elements and is based on the four segments of institutional pressures on business models suggested by Osterwalder & Pigneur (2010): competitive forces, customer demand, social environment and legal environment. All these forces have an institutional background and have a different influence. The competitive forces element has a mimetic basis and is linked to the mimetic industry and professionals actions, while the customer demand element, which is characterized as normative, is based upon normative professional and governmental. Furthermore the social environment also has a normative character and is based upon the normative public and professionals actions. The legal environment is the last pressure and with its coercive structure focuses on coercive governmental, industrial and public actions.

3.6 Research validity and reliability.

For a research to be valuable and reliable certain criteria have to be met. Four criteria are commonly used in comparable studies: internal validity, construct validity, external validity and reliability (Gibbert, Ruigrok & Wicki, 2008). In the next section of this paper I will shortly discuss these measures and demonstrate if the study meet’s the scientific criteria.

Internal validity

Internal validity focuses on the relationship between variables and results and one of the main arguments to create internal validity is that the research framework should be explicitly derived from literature (Cook & Campbell, 1979). This particular research is build upon theoretical concepts, such as institutional pressures, business model and business model innovation. The provided concepts are used throughout the study and form the basis of the used coding scheme for the analysis. In addition the research onion model by Saunders et al. (2009) is used to guarantee internal validity.
Construct validity

Construct validity focuses on the quality of actual conceptualization or on the operationalization of the theoretical concepts (Gibbert, Ruigrok & Wicki, 2008), in other words the construct validity refers to the extent to which a study investigates what it claims to investigate (Denzin & Lincoln, 1994). In this study several research strategies are combined to analyse data. One of the effects of using different research strategies is that construct validity is increased. Another aspect, which increases the construct validity, is the fact that during the research the data has been checked and discussed by peers within the research group. Finally in the methodology the data collection process has been widely discussed and the actual circumstances fitted within the expected research circumstances. Therefore it is safe to state that a sufficient level of construct validity has been met.

External Validity

External validity is grounded in the instinctual belief that concepts must be shown to account for phenomena not only in the setting in which they are studies but also in other settings (Gibbert, Ruigrok & Wicki, 2008). Considering the external validity aspect of this study it is suitable to demonstrate the situation in which this research has been performed. I conducted this research within a research group of approximately fifteen students at the Vrije Universiteit Amsterdam. This research group focuses upon the diffusion of innovation in a few European countries. Within the research group each study is based upon the same coding scheme, provided in the appendices and focuses on different products and countries. Using the same coding scheme within several countries and industries increases the external validity of this research. I do not see many hurdles for performing this particular study with some minor adjustments within many countries outside of Europe. Therefore a sufficient level of external validity is met.

Reliability

Reliability refers to the nonexistence of random error, enabling subsequent researchers to arrive at the same insights if they conduct the study along the same path (Denzin & Lincoln, 1994). This research is based on the earlier discussed coding scheme. To create reliability within the coding scheme as test in necessary. As discussed in the data collection segment of this study I have performed an inter-rater reliability test, with lead to a substantial Cohen’s Kappa score of 0.74. In addition a case study protocol has been created within the research group, which can be found in appendix 2. This particular case study protocol is a guideline for using the coding scheme and the interpretation of qualitative data within the chosen news articles. Both the case study protocol as the inter-rater reliability test makes this study score reasonably high on reliability.
4. Analysis

In the next section of this research I will analyse the data gathered from the newspapers and is coded within the coding scheme that can be found in appendix 3. In addition to the coding scheme theoretical constructs will be used to define specific trends. Figure 5 illustrates the total coded events per research segment and illustrates that the industry and company part of the analysis is based on the most events. The focus of the analysis starts with a broad outline of the three segments that create institutional pressures. After that I will dismantle these three segments to demonstrate precise influences of the institutes. Successively I will continue with an analysis of the overall solar industry and the specified focal companies. It should be noted that the coding scheme defines differences in industry labels and company actions which offers the possibility to extend the research on focal companies by adding overall industry assumptions. Subsequently the actual influence of the institutional pressures on business models will be discussed for both the overall industry as the focal companies. The industry and focal analysis section is based on the connections template in appendix 4, discussed in the methodology section. This based on business model elements by Osterwalder & Pigneur (2010), institutional pressure by DiMaggio (1988).

4.1 Institutional pressures

The institutions in this analysis consist out of the public, government and professional pressures. It is useful to describe these pressures before using them to analyse. The governmental segment is with 54 % of the events the largest institutional in this analysis and consists out of all the governments involved in decision making, which could be local, provincial, national and European governments. The professional segment is the second largest institutional segment with 35% of the events. The professional segments consists out of people who are linked towards the Solar Energy market because of their profession but do not represent a company. Examples of professionals in the solar energy market could be, environmental organizations, professors and research journalist. The public segment is with 11% the smallest institutional segment and consists out of a group of individuals who are not directly attached towards the solar energy business but do have an opinion about solar energy. Examples
of the public as actor in news events are for example; consumers, public and public coalitions.

Now we know more about the size of institutional pressures it becomes interesting to see to sentiment per institutional pressure. To calculate these sentiments I have created periods in the total timeframe. This is necessary because of the differences in amount of events per segmented period. It should be noted that these periods do not have any scientific meaning, but are picked randomly. I have divided the total timeframe of 1995-2013 into 2-year periods, which lead to a total of 10 periods. To calculate the sentiment I have used the -2 till +2 scale explained in the coding scheme section of this study. Cumulating all the scores per institutional segment and timeframe lead a sentiment analysis depicted in figure 6 and exhibits the increase and decrease of sentiment per market. The governmental pressure can be seen as the most extreme pressure, but all the pressures illustrate the same fluctuations. In the rest of the institutional analysis the key focus will be on governmental pressures and its effect on the solar energy market, which is because of the high amount of governmental events and therefore its great influence on the total institutional pressures. One side note to this research is the amount of pressures used per segment, not all the different possibilities of the coding scheme were found in the analysed events and will not be part of the analysis. A total overview of all the possible pressures per institutional segment can be found in the coding scheme in appendix 3.

4.1.1 Governmental analysis

The next section of the analysis will focus on analysing the governmental pressures. Governments can influence the solar energy market via both coercive and normative pressures. This study is based upon 61 coercive governmental pressures and 51 normative governmental pressures. Analysing the coercive governmental pressures demonstrates the large influence subsidies have on the coercive actions of governments. With 59% of the events subsidies is the most important coercive influence in the total time period while fiscal measures being a respectable second with 15% of the events. Continuing with an analysis of the normative pressures demonstrates political discussion with a 61% score have by far the largest influence. A total overview of the coercive and normative governmental pressures can be found in appendix 6. Overall the coercive and normative pressures demonstrate that there has been a governmental focus on financial rewards via the government in the solar energy market, while most of the normative pressures are based on discussing governmental activities regarding the solar energy market. The next step in the analysis focuses on the quantity of government pressures per time period and their respective sentiment, illustrated in figure 7. I have selected only the governmental pressures with more than 5 events in total, which increases the reliability of the analysis.
The quantities of pressures and the changing amounts of both the subsidies and political discussions pressure are striking to see. The quantity of news events in the period 1995-2002 was reasonably low while it grew forcefully in the period 2007-2012. The political discussion pressures demonstrate a comparable fluctuation with a minor difference in the fact that it started growing significantly in the period 2005-2006 instead of the subsidies starting in the 2007-2008 period. This could indicate that there is a possible connection between subsidies and political discussions, which I will discuss in the next section of the analysis.

The following step in the analysis is to demonstrate the sentiment scores of the coercive and normative governmental pressures based on the earlier discussed timeframe. Figure 7 exhibits the sentiment per governmental pressure based on the total governmental sentiment and an interesting development in figure 7 is the inconsistency of the subsidies sentiment compared to the financial measures sentiment. The subsidies pressure illustrates many extreme outliers while the fiscal measures are more consistent. This demonstrates the changes in governmental behaviour concerning subsidies. In practice this means mean that changes in governmental subsidies would have had an excessive effect on the solar energy market. I will continue with analysing the largest in governmental pressures in the subsequent paragraphs, figure 7 will be the foundation for the newspaper analysis.

Considering the changes in subsidies especially the differences between 2005-2006 and 2007-2008 & 2008-2009 are striking. In the 2005-2006 period there was the largest negative score in the whole timeframe, which indicates a negative sentiment towards governmental subsidies. This is contradicting to the 2007-2008 & 2008-2009 time period in which there is a highly positive sense towards solar energy.
subsidies. Interesting is it to see that there is a possible connection between subsidies and political discussions. It appears that every rise or fall of political discussion sentiment towards solar energy is followed by a comparable fluctuation in subsidies. I will consider both the periods 1995-1996 & 1997-1998, because there is a decrease of political discussion sentiment. The first event focuses on the Kyoto agreements failing in Buenos Aires. The Kyoto meeting was a worldwide meeting in which governments are discussing Co2 reduction. These Kyoto agreements had as goal to lead towards a world wide agreement on sustainability, the article specifies the influences of this failing agreement and the negative effects on the Dutch solar energy developments. This demonstrates the direct influence of international politics on national politics, and the negative effect on national solar energy politics.

Furthermore the second event is based on Dutch European minister Bolkenstein reacting on political discussions focused on the problems concerning environmental change, renewable energy and specifically solar energy. Minister Bolkenstein suggests that he sees many hurdles on the road for solar energy developments and that it would take many years for solar energy to become competitive. These negative statements decrease the sentiment of the national political discussion and form the basis for the decrease in solar energy subsidies. This is explained by analysing the subsidy newspaper events in these periods. For example the news article of 15-11-2003 in Het Financieele Dagblad named “Subsidie voor zonne-energie wordt afgeschaft” reports that consumers are not able to apply for solar panel subsidies anymore. Dutch minister Kamps states that he only wants to have large co-operations applying for the subsidy. Subsequent to his article is the article of 19-08-06 in de Volkskrant “Wijn staat subsidie op groene stroom”, which reports that the subsidy on solar panels is stopped by the government. Although it took a couple of years, the negative trends in the political discussion lead to a decrease in governmental subsidies. In first instance the decrease was only for the consumer but eventually for the large cooperation’s as well. This indicates a connection, although it is time-consuming, between political discussions and subsidies.

In the period of 2005-2006 there is a comparable connection between political discussions and subsidies. In this particular period there is positive political development towards solar energy. Illustrative for this development is the newspaper article of 21-06-2005 in De Volkskrant, “Borssele mag van D66 toch blijven draaien”, which is about the governmental party D66, who is willing to negotiate not to close the nuclear power plant in Borssele, but only if the government decides to invest more in renewable energy such as solar energy. This is clearly a positive development in the political discussion sentiment and is followed by a news article in De Volkskrant of 28-09-2007 “Subsidie zonnepanelen net genoeg”, which reports that a new subsidy is issued by the government for consumers to buy solar panels. This indicates that there is also a positive relationship between political discussions and subsidies, and its relatively fast compared to the negative relationship discussed before.

Another interesting governmental pressure is the normative public procurement, which measures the amount of actions the government takes to be an example for society with respect to solar energy. Figure 8 illustrates the sentiment of government public procurement and illustrates its fluctuations. There are a few assumptions to be made from this pressure. The first is that there is no negative sentiment score, which in this
case means that the government never tried to demotivate the public of using solar energy panels. Another assumption is that the public procurement reached its most positive sentiment in the same time period as the political discussion depicted in figure 8. This automatically means that there is a difference in timing between subsidies and public procurement, both the subsidy and the public procurement display opposite movements. This is supported by the newspaper article of 09-03-2011 in De Volksrant “Gemeenten stappen in zonne-energie”, which reports that governments are increasing their investments in using solar energy for their own use. The article suggests that local governments are increasingly investing in solar panels for their own use and therefore try to be an example for the public. This indicates a change in governmental behaviour, when the national governments decides to decrease the subsidies, local governments try to fill this gap by focusing on public procurement investments such as the one illustrated in the news article.

The last government pressure is the law proposal sentiment. This pressure is interesting because it gives information on the governmental policy concerning solar energy. While there was an increase in law proposal sentiment in the period 1999-2000 this period was followed by a decrease in 2001-2000. In practice this means that there was a law proposal in period 1999-2000 which was meant to promote the adaptation of solar energy, while in the next time period a law proposal was created which goal was to decrease solar energy adaption. Interesting is it to see what the reason was behind the negative score in the 2001-2002 period. Analysing the newspaper articles in this period, one event is stands out. De Telegraaf publishes a news article on 18-05-2002 that states “Energiebedrijven hopen op nieuwe visie privatisering”. This article describes how the government is obliged to privatise energy companies by European law. This article states that this would have a negative effect on sustainable energy policies of these companies. This negative effect is explained by the fact that privatized companies would focus on decreasing costs, instead of investing in solar energy. Therefore this privatising law proposal of the Dutch government is accounted as a negative influence for solar energy diffusion. It seems that the government tried to make up these negative effects by proposing laws, which positively influence solar energy adaption in the period 2007-2008. When considering the events in this particular time frame two stand out. Het Financieele Dagblad publishes both articles. The first article was published on 06-08-2007 and has the title “Nijmegen wil vergoeding zonnestroom” and focuses on the local government of Nijmegen who wants to introduce a minimum reimbursement for small solar energy producers. This reimbursement would mean that these producers would have a guarantee of revenue that stimulates the sell of solar energy panels. The second article was published on 10-05-08 and is expresses the preference of the PVDA, a Dutch political party, to initiate a tax on grey energy. The incomes of these taxes should be invested into renewable energy projects. Both events have the same goal, stimulating solar energy, but they try to do so via different means.

Overall it is observed that governmental behaviour is continuously changing, contradicting and sometimes even negative towards solar energy. This could be explained by the frequent changes in governmental structure, but this is not undisputable. This part of the analysis demonstrated that the largest changes were noticed in the subsidies segment of governmental pressures, which in the mean time is the most important governmental pressure on the solar energy market. Furthermore the connection between political discussions and subsidies has been demonstrated and explained by the hand of news article events, this
connection is important because of the relevance of subsidies for coercive pressures and political discussions for normative pressures.

4.1.2 Professional analysis

This part of the study will focus on the professional pressure segment. Professionals can have both a normative and mimetic influence on the solar energy market, but in this study only normative pressures were found. This part of the analysis is based upon ninety-four professional events. With 49.50% the professionals expressing their opinion is the largest pressure, while knowledge reports (39.4%) and sharing knowledge (6.6%) are much smaller. The differences between expressing professional opinions and knowledge reports lies in the fact that expressing opinions can be done anytime and anywhere, while a knowledge report needs long term preparation and research. In addition only a small portion of the professionals tends to share their knowledge with peers.

The second step in the analysis of the professional pressures segment focuses on the quantity of pressures per time period and the sentiment per pressure. Analysing the quantities illustrates that there are differences in solar energy relevance for newspapers. Furthermore when analysing the overall scores there are significant differences between time periods in relevance and maybe even in popularity of solar energy for professionals. Another assumption could be made based on the amount of influence each event has on solar panel diffusion. In periods of high quantities of pressures the influence is stronger than in periods of low quantities.

Further analysing demonstrates that although the expressing opinions professional pressure was presented during every time period, there are clear differences between the 2005-2006 and 2011-2012 time period. During the 2005-2006 period the expressing opinions was less popular for professionals or was less relevant for newspapers. The same developments accounts for the knowledge reports pressure, although these amounts differ less. After considering the relevance and popularity of the professionals pressures the next step of the analysis focuses on the sentiment scores of the normative pressures, based on the already discussed time period bracketing.
The sentiment analysis of the professional pressures segment illustrates large sentiment changes in every time period. Figure 8 exhibits that both the pressures follow a comparable fluctuation, with one time period of delay. It should be noted that knowledge reports tend to be a bit more negative than the professionals expressing their opinion. There seems to be a break into this fluctuation in the beginning of the 2013 period, but there are no conclusions to be made because of the current date of this study (Q2/Q3 2013). The relative long period of high scores in the expressing opinions pressure raises questions. News articles from within this timeframe indicate that experts are positive towards solar energy because of new subsidies for both consumer and companies on solar panels. Considering the news articles in this period demonstrates that one of the articles is illustrative for most of the others. A news article in De Telegraaf of 08-01-09 with the title “Crisis gaat voorbij aan duurzame sector”, reports that the economic crisis does not hit the sustainable energy sectors because of political ambitions and issued subsidies. Another article in De Volkskrant of 25-04-2009 discusses the possibilities for consumers to get access to solar panel subsidies, and offers solutions for problems consumer occur during this process. Once again an illustrative example of how professionals are trying to motivate consumers to buy more solar panels.

Contradicting to the positive score of the professionals expressing their opinions is the low score on knowledge reports. Analysing the news events in this particular timeframe demonstrates that knowledge reports in this period are sensibly negative about the short-term future of sustainability in the Netherlands. A news article of 30-07-09 in De Volkskrant with the title “Duurzaam energiebedrijf lastig voor gemeenten” is based on a knowledge report, which indicates that governments will have difficulties maintaining their investments in sustainable energy. Governments are planning to invest in small sustainable energy companies but the report suggests that governments do not have the knowledge to make these investments. Another news article of 30-09-09 in De Volkskrant is based on a research report by PWC, this report states that local governments will have difficulties meeting the previously set standards and that the economic crisis makes this even harder. Both the news articles take into account the economic crisis and its effect on sustainable
investments. Overall the knowledge reports expect that the economic crisis will have a negative effect on solar energy investments and therefore in the long-term the adaptation of solar panels will decrease.

**4.1.3 Public analysis**

The next section of the analysis focuses on the pressures by the public. The public segment in this research is the smallest in this study, with only 11% of the total events. A total overview of the public pressures can be found in Appendix 7. As suggested in the theory segment of this study the public can have coercive and normative pressures and in this case the normative pressures are with 52% the largest pressure. There could be several reasons for the low quantity of public events, but because of a different research focus I cannot make definite statements about the low quantities. What I can state is that because of the lower quantity of pressures, the public will most probably have less influence on the business models of solar energy companies. For the rest of this analysis I have selected only the two pressures with five or more results for the sentiment analysis, political consumerism and shareholder activism, illustrated in figure 9. Because of the low amount of events I have not included the quantity distribution of the public events.

![Figure 9: Sentiment public pressures](image)

An interesting development in the public pressures sentiment figure is the decrease in the later period of shareholder activism. In the period 1999-2000 shareholder activism score very high on the sentiment chart, all the articles in this period focus on activities performed by Greenpeace with concern to solar energy. In the article of 10-05-00 in De Volkskrant with the title “Een brave Greenpeace-actie bij Shell” reports that Greenpeace got involved in the shareholders meeting of Shell and protested against the decrease of solar energy activities. Another news article of 18-11-2000 in De Volkskrant with the title “Prijs van schone stroom gaat omhoog” reports the actions of Greenpeace member Samsom, who is against the rising solar energy prices. Here you can notice the direct influence of attention from such a large organizations as Greenpeace has on shareholder activism. With the shifting focus of Greenpeace shareholder activism heavily declined in the later periods and finally almost disappeared.

The negative political consumerism pressure in 2009-2010 is another interesting development, which needs explanation. The negative score of political consumerism is based upon two news articles that state both
states that the applications of consumers for solar panels are lower than expected. In the news article of 02-04-2008 in De Volkskrant with the title “Lager subsidie aanvragen dan verwacht” a governmental organization, Senternovem, suggest that consumers are applying less for solar panel subsidies. This is supported by a news article in Het Financieele Dagblad of 11-07-2008 with the title “Subsidies moeilijk te verkrijgen voor consument” which reports that consumers are applying less for solar panel subsidies because of the difficult bureaucratic rules. This article supports the first article in De Volkskrant and adds an explanation for these low applications. This section of the analysis illustrated that organizations such as Greenpeace have a large influence on public shareholder activism. Furthermore the negative political consumerism demonstrates the possible connection between bureaucratic rules and consumer behaviour.

4.2 Industry analysis

With a total of 297 coded events the industry combined with focal company analysis is the largest part of this research. This part of the analysis combines the events concerning the total industry as well as the focal company events. I have chosen to combine both segments to get a more extended and reliable business model analysis. The industry business model events are based on the industry label in the coding scheme, while the focal company events are based on company actions. The analysis will start with a broad study of the industry labels and will continue with a more specific focal company analysis. The analysis is based on the comparison model created and depicted in appendix 4. This model is based on a combination of business model design theory, industry actions and focal company actions and offers the possibility to analyse the influence of actions on business model elements. I will conclude each focal company analysis with an overview of the institutional pressures on the specific business model elements, which is based on the institutional pressure analysis in 4.1 section of the analysis.

4.2.1 Industry Analysis

I will start the industry analysis with a sentiment and timing analysis of the industry labels depicted in figure 10. Considering the individual industry actions, industry adaption is with 36% of the total events is the largest industry action. The innovative character of the solar energy industry could explain this phenomenon, because in the past 25 years large developments are noticed in this industry and only in the last 10 years companies tended to notice the potential of this market. Recognizing this potential lead to large investments and a high rate of industry adaption both negative as positive. When adaption is low, it is most likely that organizations operate in a niche of segmented market. Whereas the degree of adaption grows the customer market develops towards a mass-market concept, in which all customers roughly have the same needs and demands.
In addition figure 10 illustrates the sentiment of industry adaption, the most positive score was signalized in 2011-2012 and the most negative score in 2009-2010, which is very contradicting. Analysing the newspaper events in the 2009-2010 periods there are many events on companies stopping solar energy activities. Illustrative for this trend is a newspaper article of 11-11-10 in Het Financieele Dagblad with the title “Delta staakt productie zonnecellen”. This article reports that energy companies (Delta & Nuon) are stopping their solar panel activities because of lacking growth in solar panel sales and the high prices. This trend is supported by other news articles, which state that both Shell and Eneco have changed their focus on other energy activities, such as biomass energy.

Contradicting to the negative newspaper articles in the 2009-2010 are the very positive news articles in the 2011-2012 period. Studying the newspapers within this time period defines that the Fukushima disaster has a major positive influence on the industry adaption, which is illustrated by a news article of 02-04-11 in Het Financieele Dagblad with the title “Winnaars van het Japanse Fukushima-drama”. This article focuses on the positive side effects of the Japanese nuclear disaster in Fukishima and suggests that companies such as Eneco tend to focus more on renewable energy instead of nuclear energy because of this disaster. This positive stimulus is followed by other companies, such as RWE and Shell and leads towards the depicted positive growth. Considering the effects on industry business models it is clear that an increase in sentiment has positive influence on the solar energy market. The positive sentiment leads towards a mass market, while the negative scores lead to a niche market. Indirectly this could also be an explanation for the positive score rise in 2011-2012, the decreasing sentiment in 2009-2010 lead to a niche market, which is extra interesting for new companies to enter and start competing with the current companies.

Studying the effect of these developments on the business model elements the template in appendix 4 illustrates that changes in industry adaption influence the customer segments. A continuous development towards a mass market increases the quantity of customers for the industry, while a shift towards a niche market decreases the quantity. The customer segment block has gone through many changes in the total timeframe, solar energy developed towards a mass-market product, with a downfall in the 2009-2010 timeframe. This
downfall made the solar market more interesting for new companies to enter. Because of the high prices and low margins the industry adaption decreased intensively in 2009-2010. It is not a coincidence that the high prices in 2009-2010 are in the same time period as the decreasing governmental subsidies. Because of the decreasing subsidies, the prices had to go up and the margins eventually went down. For the solar energy market this meant that it went from a mass market towards a niche market again. This development lead to chances for companies to enter the solar energy market and is illustrated by a news article in Het Financieele Dagblad of 07-04-2011 with the title “HVC stapt in zonne-energie”. This article is based on HVC entering the solar industry for the first time. The management sees chances in developing a sound solar energy strategy to improve current operations. Overall this development exemplifies the direct influence of governmental subsidies on industry adaption and therefore the customer segment business model element. Because of the Fukushima disaster the government became more positive towards solar energy. As illustrated in the governmental analysis there is a linkage between subsidies and political discussions that would explain the rise in solar industry adaption. It could be augmented that because of the positive political discussion companies were expecting subsidies to rise again, which subsequently increased their chances in the solar energy market.

With 18% of the total events the firm & industry turnover action is the second largest industry action. The changes in firm & industry turnover are depicted in figure 10 and indicate that the industry is continuously developing and illustrates a continuously changing development of firm and industry turnover, with an extreme positive score in the 2003-2004 period and a comparable negative score in 2009-2010. Studying the news articles in the 2003-2004 period, a trend of increasing prices is noted. Because of the higher demand, solar energy suppliers tend to have a shortage of solar energy, which they have to buy from foreign countries. A news article in De Volkskrant of 11-11-2003 with the title “Groene stroom blijft populair” illustrates this trend. This article reports that solar energy stay interesting for consumers although prices are rising. In addition the article explains that the prices are rising because of a shortage of solar energy and subsequently companies tend to buy solar energy from other countries. Another interesting point is the extreme negative score in 2009-2010. In this time period there was a negative trend, illustrated by the bankruptcy of Econcern and the decreasing turnover of Delta. The news article in De Volkskrant of 30-05-2009 with the title “Reconstructie Econcern groeide in duizelingwekkend tempo, maar balanceert nu op de rand van de afgrond” investigates the reasons behinds this downfall. The article reports that the whole solar industry is in trouble because of cheap Chinese solar panels entering the market. Because of the high costs of Dutch solar panels, the industry is not able to compete and loses market share. The connecting template in appendix 4 illustrates the connection between the change in turnover action and the cost structure & revenue streams business model elements. In practice this means that turnover changes are directly related to the revenue and costs for a company. Considering the institutional pressure influence, one of the direct institutional influences on the change in firm/industry turnover is the governmental subsidy. The low score on industry turnover 2011-2012 is in the same period as in a low score for subsidies, which indicates connection between firm / industry turnover and governmental subsidies. The news articles used in the analysis supports this phenomena and suggest that solar energy prices are rising because of increasing demand. In the same period the subsidies decreased which lead to even higher prices. Ultimately this
development leads to cheap Chinese competitors entering and taking over the market. Here the direct effect of decreasing subsidies on the cost structure and revenue stream business model element is illustrated. The rising prices and decreasing subsidies lead to a gigantic decrease in turnover for Dutch companies and even bankruptcies. Within an increasing turnover the business model will have less of a cost driven focus, and business models will focus more on the sale of assets. While the other way around a decreasing turn over companies should inherit a cost driven focus with a focus on subscription and licensing fees. Consequently this would mean that changes in turnover sentiment have a direct influence on business model construction. In practice this means that the revenue stream and cost structure business model canvas element are continuously adapting to companies turnover fluctuations.

The third industry action to be studied is the degree of interconnectedness. Figure 10 illustrates that there are large shifts in the 2007-2012 time periods. Especially in the 2009-2010 timeframe a large quantity of interconnectedness events occurred. The connecting template in appendix 4 illustrates the connection between interconnectedness events and partnering actions. The most likely reasons for an increase in interconnectedness would be: reaching scale advantages, reduction of risk or acquisitions. Interesting is it to see that no negative scores were noticed for interconnectedness actions, which means that companies with the industry focus on finding partners. It is interesting to analyse the newspapers in the 2009-2010 period, in which there was an extreme positive score of interconnectedness. Illustrating for his period is the news article of 31-08-2010 in Het Financieele Dagblad with the title “Duitse partner voor zonneelmaker Solland”. This article reports about the cooperation of Solland Solar with a German partner. This cooperation was initiated because of decreasing profits, margins and the possibility to gain scale advantages for Solland Solar. This same trend can be noticed in this period for companies such as Nuon and Scheuten Solar.

The effect of the rising interconnectedness on key partnering is clear, companies within the industry are searching and finding possibilities to cooperate with mostly international partners, which increases the importance of the key partnership business model element. This trend can be noticed, although less extreme, within the whole timeframe and clarifies the importance of key partnerships for the solar energy industry. There are several connections founds between institutional pressures and interconnectedness. First of all in the 2009-2010 timeframe there was a rising score on professionals expressing their opinions but a decreasing score in subsidies. This illustrates that there is professional faith in the solar industry, while governmental subsidies are decreasing. This particular development leads to decreasing margins and profits, but increasing organizational faith in the solar industry. Therefore the industry tends to focus on partnerships, which enables the organizations to stay in the market while it in the meanwhile offers the possibility to cut costs and improve margins.

The remaining industry actions only have a small quantity of events. Figure 10 illustrates two outliers in the remaining industry actions. The first extreme outlier is the positive score of prestige and visibility in 2003-2004. The connecting template in appendix 4 illustrates the connection between prestige and visibility and the channels business model element. Studying the content of the news articles in this period demonstrates a trend towards promoting cheap solar panels. In this particular period energy companies added their own subsidies to the already existing governmental subsidy for solar panels. By using the discounts on solar panels as a
marketing tool, these energy companies tend to get more familiar within the solar energy market customers. Considering the effect for business model channels, it is clear that energy companies try to change the way they communicate with their customers by using solar panels as marketing stunt. These energy companies want to demonstrate their sustainable products by marketing solar energy panels, in other words the industry is trying to create awareness for the solar energy activities. Studying the effect of institutional pressures on the change in visibility and prestige and subsequently the channels business model element, it can be augmented that political consumerism influenced the marketing activities of solar energy companies. There is striking positive score in political consumerism in the period before the high score in prestige & visibility. This indicates that the industry needs a one-year period to adapt marketing activities towards consumer behaviour. This connection indicates political consumerism influencing the channels business model element. Additionally the low score of subsidies in 2003-2004 could indicate that companies try to make up for this decrease by investing in prestige/visibility measures. This connection has also been illustrated before in the newspapers used in the analysis, which report that companies add their own discounts to make solar panels more interesting. This suggests a connection between governmental subsidies and the channels business model element.

The second outlier is the high score for the change in innovations in 2007-2008. In this particular time period two incremental innovations are made, first the flexible solar energy panels by Helianthos and the collecting solar energy via glass innovation of Scheuten Solar. These two innovations create a positive movement in this timeframe and raise awareness for solar energy innovation in the newspapers. Here you can see the extreme effect of two large innovations in this timeframe in perspective with the other time periods. It is clear that if two innovations have this amount of an effect, the solar energy companies in the Netherlands are not very innovative. Know that the connecting template in appendix 4, connects the change in no of innovations to the key resources, it is clear that a major innovation positively increases the importance of key resources for a company in this specific time period. Although there are no negative scores in the number of innovations sentiment, the analysis does not illustrate a very innovative industry. For the business model this would mean that overall there is no large focus on key resource management. It is not a coincidence that the two largest innovations are done by the end of a positive subsidies streak in 2007-2008. Innovations are essential part of key resources and therefore the largest change towards key resource innovation is in this same time period and innovations are partially possible through governmental subsidies. This illustrates the linkage between governmental subsidies, number of industry innovations and the key resources business model element.

4.3 Focal company analysis

The next section of this analysis will focus on the company actions per focal firm. I will start this part with a small overview of the focal firms and subsequently I will analyse the influence of institutional pressures on the business model design. Delta is the largest company in the focal analysis, while Scheuten Solar is the smallest. More information on the focal company contributions to the analysis can be found in appendix 8. For the analysis of the focal companies the company actions in the coding scheme will be used. To be able to have a reliable view of the effect of focal company actions on business models I have chosen to only analyse the focal
company actions with more than 4 events. Without this limitation actions with a low quantity of events could be overestimated. The focal company analysis starts with a small overview of the company actions and subsequently dives into the influences of these actions on business model canvas elements with the help of the analysed newspapers. Every focal company section starts with a small overview of the specific company actions and continues with an analysis of the specific business model elements influenced based on Osterwalder & Pigneur (2010) For this part of the analysis I will use the connecting template depicted in appendix 4, this template connects the specific company actions and the business model elements.

4.3.1 Delta’s company actions

Delta is the largest company in this analysis with fifty-four events. Figure 11 illustrates the Delta solar actions in the specified timeframes. During the data collection process no newspaper events were found in the first 5 periods of the total time frame, therefore only the last 5-time periods are used. In addition there are no scores in the 2013 time period, which is explained because of the sale of Solland Solar to investors in 2011 and the subsequent changing focus of Delta on nuclear energy. Figure 11 illustrates that in the first three periods there are equal or more negative company actions. Only in the 2011-2012 there is a small positive news event score. The largest positive score is in 2007-2008, while the most negative score is in the subsequent timeframe. Overall figure 11 illustrates the negative trend Delta & Solland Solar went through during their cooperation.

The next step is to analyse what Delta actions suggest about their business model. I will start with the key activities element. The connecting template illustrates that this element for Delta & Solland solar is influenced by 5 company actions: shut down BU/Facility, new BU/Facility, de-investment in internal capabilities, introducing new business models and shut down new business models and figure 12 illustrates the fluctuations of the company actions.
Figure 12: Delta’s key activities.

In the first timeframe there is a growth in production facilities of solar panels for Delta. This is explained in a news article of 10-10-2006 in Het Financieele Dagblad with the title “De oneindige belofte van de zon”. This article examines the new production facilities of Delta bought via their acquisition of Solland Solar. The acquisition of Solland Solar leads towards an increasing focus on the development and production of solar panels. This same acquisition explains the introduction of new business models in the 2009-2010. In this particular case, introduction of new business models suggests that the company tends to find new products or markets to operate in within the same segment it is already operating in. In the news article of 05-07-2008 in De Telegraaf the CEO of Delta states that because of the acquisition of Solland Solar, there are new (international) market for Delta to enter. Considering the acquisition leads to a new production facility, it is clear that Delta was slowly increasing their focus on combing production and selling of the product, which signals a change in the key activities business model block. This development could be interpreted contradicting to the divestment of internal capabilities in this same time period. News articles in this period demonstrate that the firing of Solland Solar top management by Delta. In the news article of 04-10-2008 in Het Financieele Dagblad it is explained that the Delta management fired two former Solland Solar directors because of different opinions on future developments. This development could be seen as a prelude for future company actions.

In the 2009-2010 period there are many contradicting company actions. In the beginning of the 2009-2010-time period, Delta introduced new business models by expanding their focus on solar energy. In practice this means that Delta’s overall business model expanded its focus on solar energy key activities. In the subsequent months the market was overwhelmed by cheap Chinese solar panels and Delta & Solland Solar came in trouble. This is illustrated by the shut down in business models and the shutting down of BU/Facilities in 2009-2010. A newspaper article in the De Telegraaf of 17-09-2009 with the title “Delta lijdt onder moeizame markt voor duurzaamheid” explains the decrease in BU/Facilities. The article reports that Delta is cutting almost ninety jobs in Solland Solar activities because of decreasing profits. In addition a news article in het Financieele Dagblad of 11-11-2010 reports that Delta has written off €250 million because of the decreasing value of Solland Solar. One day later, there is a news article in Het Financieele Dagblad with the title “PVDA vreest
uitverkoop” which reports that Delta management has decided to explore possibilities for selling Solland Solar. This time period illustrates the fast changes Delta went through. It is clear that by willing to sell Solland Solar the key activities of Delta transformed towards the selling of energy instead of focussing the production of solar panels.

The next section to analyse is the influence of partnering or stopping of partnering activities on the key partnerships business model elements. Before starting this part of the analysis, it should be noted that key partners are undoubtedly of vital importance for both Delta and Solland Solar’s business model, which is because of the fact that Delta acquired Solland Solar to enter the solar energy market. Figure 13 illustrates the fluctuations of Delta’s partnering activities. There are three interesting points in this figure. In 2007-2008 & 2011-2012 there is small negative score, while there is large positive score in the 2009-2010-time period. Studying the news events in both the 2007-2008 & 2011-2012 it is noticed that failed partnerships are the trend. On 01-04-2008 there is an article in Het Financieele Dagblad, with the title “Essent investeert miljarden in zonnestroom”, which reports that Delta has stopped their cooperation with TCM, which is now taken over by Essent. TCM was a small organization within the solar panels research and development field, and was not very successful. Although this partnership failed Delta started a joint venture with Scheuten Solar in 2009. Expectations were high eventually but this joint venture failed as well. The news article in Het Financieele Dagblad on 10-03-2012 with the title “Kroniek van afgeblazen overnames en fussies” illustrates this. This article reports that Delta is stopping the joint venture with Scheuten Solar because of inefficiency problems. Both news articles indicate that although Delta & Solland Solar are searching for more partnerships these are hard to find. Although both partnerships failed the effect on the key partnerships element of Delta & Solland Solar’s business model is low. Reason for this is the fact that Delta & Solland Solar are in a partnership that is vital for both their business activities.

**Institutional pressures on Delta**

Analysing the institutional pressures on Delta business model demonstrates the influence of subsidies on Delta. Delta has a positive score on new BU/Facility in the 2007-2008, which is the same period in which the governmental subsidies sentiment reaches its highest score. In practice this means that Delta was able to invest in new BU/Facilities because of the subsidies available. The fact that Delta was unable to invest in new BU/Facilities when subsidies were decreased in 2009-2010 indicates that Delta does not have the financial strength to invest without subsidies. This suggests that because of the subsidies Delta was able to expand its activities and invest in new facilities and when the subsidies were decreased Delta needed to shut down these activities. Furthermore this clearly demonstrates the connection between governmental subsidies and Delta’s activities and subsequently the influence of subsidies on Delta’s key activities business model element.
In addition it is interesting to see that Delta’s partnering activities illustrate the same score in the matching time period as the overall industry interconnectedness analysis. This is explained by the fact that both partnering activities and interconnectedness labels focus on finding partners to cooperate with. Considering the influence of institutional pressures on the key partnerships business model element previous sections have demonstrated that there is connection between subsidies and professionals expressing their opinion. In the 2009-2010 timeframe subsidies were decreasing, which in the case of Delta meant that organizational turnovers and profits were decreasing as well. Although the financial situation is getting worse Delta kept its believe solar energy opportunities. Most of this believes is based on the positive opinions expressed by professionals. In the 2009-2010 professionals were very positive towards solar energy and illustrated all the opportunities arising the near future. Because of this positive vibe Delta did not want to leave the market and searching for a partnership was the only way out of financial trouble. This signals that because of the decreasing subsidies and positive professional vibe Delta increased its partnering and interconnectedness activities. For Delta’s business model this meant that it increased its focus on partnerships and thus the key partnerships business model element gained more importance.

4.3.2 Shell’s company actions

Shell is the second largest company in this analysis with forty-seven events and figure 14 illustrates the overall company actions. Several interesting developments are noticed in Shell’s company actions, the differences between the negative and positive company actions are striking to see. In the 1995-1996 there was only one negative action that is very small compared to the subsequent period in which there are seven positive events. Furthermore the sentiment develops more negatively towards the end of the timeframe, with the biggest negative score in 2009-2010.

![Figure 14: Shell company actions](image)

Continuing with Shell’s business model analysis the key activities element of the business model canvas is influenced by three company actions; shut down BU/Facility, new BU/Facility and investments in internal capabilities. Figure 15 illustrates the fluctuations of these company actions. It is
interesting to see the developments in the new BU/Facility action and the shut down BU/Facility action. In 1997-1998 there is a high score in the new BU/Facility segment, illustrative for the high score in this period is a news article in De Volkskrant of 17-10-1997 with the title “Oliefabriek legt half miljard opzij voor bosbouw”. This article reports on the opening of a new solar panel factory in the Netherlands. Shell decided to open this factory because of the increasing solar panel demand and is looking for other future investment possibilities. In the subsequent period, 1999-2000, Shell invested heavily in internal capabilities. This is illustrated by the 1 Billion gulden investment in wind and solar energy discussed in the news article of 29-07-1999 in de Volkskrant with the title “Shell kijkt verder vooruit dan Bolkestein”. Shell is investing in these sustainable energies because they see a profit to be gained in this energy sectors. Both events indicate that Shell has faith in solar energy and is willing to invest heavily. Opening new factories and investing in internal capabilities suggests that Shell increases its focus on producing solar panels, which changes the key activities business model block towards more solar panel activities.

Contradicting to this development is the decrease of BU/facilities in 2001-2002. The news articles in this period report that Shell wants to close its factories in the Netherlands and Germany. Exemplary for this development is a news article in De Volkskrant of 25-10-2002 with the title “Shell sluit fabriek zonnecellen”. This article reports that Shell wants to close the factory because of decreasing demand and subsequently 170 employees will be fired in the Netherlands alone. An even more extreme reduction is noticed in 2009-2010. In this period Shell clarified that the company would stop its solar energy activities and instead started focusing on second-generation fuels. In De Volkskrant of 02-04-2009 the CEO of Shell stated that the company would stop focusing on solar energy and suggested that solar energy development was more or less the obligation of the government. The reduction in BU/Facilities indicates a trend towards decreasing producing solar facilities, which shifts the key activities of Shell’s business model away from production towards other activities.

The next step for the Shell analysis is the influence of innovation activities on the key resources business model element. Figure 16 illustrates the innovations of Shell. Two extreme values are noticed, one in 1997-1998 and one in 2009-2010.
2005-2006. Analysing the newspapers in both these periods demonstrates that voluminous investments in innovations are needed. Illustrative for this development is a news article in De Volkskrant of 25-10-1997 with the title “Voor niks gaat de zon op”. In this article a yearly investment €100 million of Shell in solar energy research and development is reported and illustrates the willingness of Shell to invest in solar energy development. Accumulating are the investments in thin fill solar technology. A news article in De Volkskrant of 03-02-2006 with the title “Shell wil profiteren van opmars ethanol” reports about the discovery and investments in thin film solar technology. Shell is convinced that this innovation would help make solar energy profitable. Overall the increasing investments in research and development illustrate the focus of Shell on innovations. While innovations are one of the elements within the key resources business model element, it is clear that innovative investments influence the key resources element of Shell’s business model.

Partnering is another company activity for Shell and is related to the key partnerships business model element. Figure 17 illustrates the partnering events in two time periods, 1999-2000 and in 2009-2010. In the newspapers two partnering activities of Shell are reports. One news article in De Volkskrant of 09-12-2000 demonstrates that Shell is initiating a partnership with Siemens to cooperate in the solar energy industry. Furthermore in the 2009-2010 period Shell instigated cooperation with other companies within the solar energy industry. This is illustrated by a news article in De Volkskrant of 18-05-2010 with the title “Bedrijven in ontwikkelingshulp”. The article reports that the motivation behind Shell’s cooperation is the decreasing investments and margins in the solar energy industry. Therefore companies have to start cooperating to be able to create a sustainable solar energy market. Considering the effects of these partnering events on Shells business model indicates the relative importance of partnering. Although cooperation’s were started, Shell massive size enabled Shell to operate solely in the solar energy industry within many partnerships, this illustrates the relative low importance of partnerships for Shell’s business model.

Institutional pressures on Shell.

The next step is to study the institutional pressures for Shell with the help of the connecting template in appendix 4. The three business model elements discussed in the analysis for Shell; key activities, key resources and key partnerships demonstrate that institutional pressures do not have much influence of Shell. The only business model element in which an institutional influence was found is the key activities element. The key activities analysis illustrates a comparable development as the professional knowledge reports pressure discussed in the governmental institutional section of this study. It could be augmented that Shell linkage with
the professional knowledge reports is based on the internally developed market knowledge within the solar energy market, which are comparable to the professional knowledge reports. In practice this means that because of its scale Shell is able to perform its own research that is most likely to be comparable with the professional knowledge reports. This indicates why Shell’s key activities demonstrate the same development as the professional knowledge reports and indicates the influence of professional knowledge reports in Shell’s key activities business model element. With years of experience in the energy industry and gigantic research and development possibilities Shell is not influenced by short-term changes such as subsidies and professionals expressing their opinions. Because of its size and international focus Shell is able to create long-term strategies based on internal developed market knowledge and innovations. This explains why institutional pressures do not influence Shell’s innovation and partnering activities.

4.3.3 Nuon’s company actions

Nuon is the next focal company in this and with thirty-six events is of a medium size. Figure 18 illustrates Nuon’s overall actions. The events of Helianthos have been added to the analysis because Nuon acquired Helianthos in 2006 and Helianthos activities are focused on research and development of solar panels. For Nuon & Helianthos no events were found in the second and third time period, therefore these periods do not illustrate any data. Analysing figure 18 signifies the changing landscape in which the Nuon is operating. It is interesting to see the positive trend in the first few periods evolving in a more negative trend in the later periods.

Considering the influence of the company actions on the business model of Nuon several business model elements are analysed with the help of the connecting template in appendix 4. The key activities element of the business model canvas for Nuon is influenced by five company actions: shut down BU/Facility, new BU/Facility, introducing new business models and shut down new business models and figure 19 illustrates the fluctuations of these specific actions. The first interesting development is signified in 2003-2004 in this period a large amount of attention is given towards introducing new business models, a news article in De Volkskrant of 11-11-2003 with the title “Groene stroom blijft populair” indicates this development. This news article reports that Nuon is buying solar energy from surrounding countries because of the increasing demand, which is stated...
to be the only short-term solution.

Another newspaper article reporting about this development is in De Telegraaf of 15-09-2011 with the title “Groene stroom via postkantoor” and describes the fact that Nuon is looking for new customer via selling solar energy in Germany in post offices. This new customer strategy clearly indicates a new business model. These two news articles illustrate the movement towards business model innovation and changing organizational activities. Considering the effect of this development on the key activities business model element, it is clear that the key activities slightly change. Nuon develops from an energy producer towards an energy buyer and solar panel seller. This clearly is a different activity with different management specialties. The new business models innovated the key activities of Nuon & Helianthos towards a more energy buyer/seller focus in the 2003-2004-time period.

The new BU/Facility in the 2007-2008 is another interesting development. Reflecting the news events in this period, one news article stands out. A news article in Het Financieele Dagblad of 02-09-2008 with the title “Nuon dochter Helianthos set in op fabriek voor uitrolbare zonnecellen”, reports that Helianthos is investing in a factory to produce roll able solar panels. This development sounds logical because of the large research and development investments made by Helianthos in previous periods. Therefore in practice no adjustments are made on the key activities business model element. The next interesting point most defiantly has an impact on the key activities of Nuon. The extreme low score on shutting down BU/Facilities in the 2009-2012 is explained by the closing down of the Helianthos factory by Nuon. A news article in Het Financieele Dagblad of 09-09-2011 with the title “Nuon sluit deuren van miljoenen verslindende zonneceldochter” explains this development. The articles reports that Nuon had to sell Helianthos because of the losses made. In addition solar energy does not fit very well in the strategy of Nuon’s new mother company “Vattenfall”. It is clear that the selling of Helianthos influences the key activities of Nuon. The initial development towards energy buying and solar panel selling activities suddenly changed, which means that Nuon increases its focus on energy producing and selling again. In addition another change in key activities is the decreased focus on sustainable activities. Helianthos was one of the biggest pillars of Nuon’s sustainable activities, which was lost because of the sell.

The second business model element for analysis is the key resources element, which is influenced by Nuon innovation activities. Figure 20 illustrates the fluctuation of innovation for Nuon & Helianthos. This figure illustrates an extreme high score in the 2007-2008-time period, while the other time periods are
reasonably calm. Examining the news articles in this time period, it is clear that the roll able solar energy panels of Helianthos are the most important development. A news article in De Volkskrant of 20-12-2007 with the title “Zonne-energie loopt straks op rolletjes” exemplifies this. The article reports that Helianthos opens a new factory for roll able energy panels, which is a groundbreaking innovation. The solar panels are much cheaper, easier to use and most importantly have a higher efficiency rate. All the other news events in this period, discuss this same innovation. It is without a doubt that there is an effect of this groundbreaking innovation on the key resources element. This particular innovation had the potential to make Nuon a world leader in solar energy panels market, which at that point in time was a gigantically increasing market. Therefore it is clear that the roll able solar panels became one of the key resources of Nuon.

Institutional pressures on Nuon

The next step is to analyse the institutional pressures on Nuon business model. The influence of subsidies on Nuon’s activities is more than clear. Nuon’s positive score on new BU/Facility activities in 2007-2008 is in the same time period as the extreme rise in governmental subsidies, while it did not invest in the 2011-2012 period when subsidies decreased. An investment in new BU/Facilities in practice means that Nuon expands its activities and increases its focus on solar energy, but shutting down facilities decreases Nuon’s activities and focus. This could indicate that Nuon does not have the financial strength or the belief in the solar energy industry to invest without governmental support and illustrates the importance and direct connection of governmental subsidies on Nuon’s activities and therefore influences Nuon’s key activities business model element. In practice this means that positive governmental actions such as subsidies increase Nuon’s business model focus on solar energy and therefore directly influence company actions. Furthermore a connection can be noticed between Nuon’s activities and professional knowledge reports. In the 2011-2012 time period professional knowledge reports have a comparable negative score as the shutting down of BU/Facilities activity of Nuon. This signals that Nuon could be influenced by professional knowledge reports. This possible connection is dismissed in the 2011-2012-time period. In this timeframe the knowledge reports tend to become more positive while Nuon keeps increasing its shut down of BU/Facilities activities.

In addition a connection is found between subsidies and Nuon’s innovation activities. The extreme rise in innovation in 2007-2008 is in the same period as the most positive subsidies sentiment score. Even the rise of both the lines is the same, which underlines this connection even more. Subsequently this means that Nuon is willing to invest in innovation within a positive subsidy sentiment. Although it is not proven this could signal the fact that governmental subsidies directly stimulate innovation. The analysis has demonstrated that Nuon found new techniques and tries to incorporate these techniques in its business activities. Incorporating new innovations within its business model either changes Nuon’s key resources business model element or
demonstrates the positive effect of subsidies on Nuon innovation. Either way it is clear that governmental subsidies both influence Nuon’s key activities as key resources business model element.

### 4.3.4 Eneco’s company actions

Eneco is the next focal company in this analysis and with only thirty-one events is one of the smallest companies in this study. Figure 21 illustrates the overall timeframe of Eneco’s actions in the solar energy market. The undesirable influence of the small quantity of events is demonstrated by the empty time periods in the figure. In the time periods 1995-1996, 1999-2000 and 2005-2006 no actions were found to analyse. Analysing figure 21 demonstrates the positive trend towards solar energy and with only two small negative scores it is fair to suggest that Eneco acts positive towards solar energy.

**Figure 21: Eneco’s company actions**

Another interesting fact is that Eneco is very active in marketing new products, which links to the positive trend. The next step is to analyse Eneco’s business model innovation, where the key activities business model element of Eneco is influenced by five actions: shut down BU/Facility, new BU/Facility, investment in internal capabilities, introducing new business models and shutting down new business models and figure 22 illustrates the fluctuations of Eneco’s actions.
It is interesting to see that no actions were found in the first three periods of the timeframe. This signals a relatively long start up phase of Eneco’s solar energy activities. The second interesting development is spotted in 2003-2004 and subsequently was followed until 2011-2012, a focus on new business model activities. A news article in De Volkskrant of 11-11-2003 with the title “Groene stroom blijft populair” illustrates this trend. The article reports that Eneco is buying solar energy for foreign countries to meet the rising demand in the Netherlands, which is a short-term solution. This development signals a movement towards business model innovation and changing activities. Subsequently a comparable trend has been spotted in news articles in 2011-2012. A news article in De Telegraaf of 02-04-2011 with the title “Winnaars van het Fukushima drama” reports that because of the nuclear disaster in Japan solar energy has become even more important for Eneco’s activities. Both articles stress influence of solar energy on business model key activities. Eneco increases its focus selling solar energy, but also concentrates on buying solar energy from other countries. These change in activities clearly influence the key activities element towards solar energy. Contradicting to this development is the shutting down of new business models in 2007-2008. A news article in De Telegraaf of 29-03-2007 with the title “Probjecten duurzame energie vertraagd” illustrates this action. The article reports that investments in solar energy projects are delayed or even stopped because of the decreasing subsidies of the government. Eventually this decrease of governmental subsidies leads to a decrease in Eneco’s business models. Another interesting development is the very high score in investment in internal capabilities in the 2009-2010-time period. A news article in De Volkskrant of 25-05-2009 with the title “Eneco koopt Ecostream” explains this development. This news article reports that Eneco buys the almost bankrupt business activities of Ecostream in solar panels production and instalment. In addition another news article in this same period states that Eneco buys the bankrupt Econcern. Econcern was a producer of solar energy in the Netherlands. These two acquisitions indicate that Eneco is increasing its current solar panel activities and is expanding its total solar activities. The addition of business activities directly influences the key activities business model element by adding production and instalment of solar panels activities.
schoon op zonne-energie”. This article reports that Eneco is offering heavy discounts on their solar energy for promotion purposes. The goal of the discounts is to promote solar energy as a product and increase the awareness of this relatively new energy product. Another news article in De Volkskrant of 02-11-2009 explains the second high score. This article reports that Eneco is trying to position itself as a sustainable energy supplier. By focusing its marketing actions on its sustainable activities Eneco is trying to differentiate itself from other companies and offer an exclusive product. Both articles demonstrate Eneco’s activities towards a changing product offering and consequently a changing value proposition. Changing its overall product offering and brand recognition has a direct effect on the value proposition of Eneco. Therefore figure 45 illustrates a value proposition changes towards sustainable energy product, and specifically solar products.

Institutional pressures on Eneco
The next step is to analyse the influence of institutional pressures on Eneco with the help of the connecting template in appendix 4. First of all Eneco’s the influence of governmental subsidies on Eneco’s activities is noticed and can be measured. The analysis demonstrates that Eneco’s positive score on new BU/Facility and investment in internal capabilities activities in the 2009-2010-time period is in simultaneous positive subsidy period. In practice this means that Eneco increases its investments when subsidies are available. In addition it is interesting to see that these investment activities are not conducted in the actual highest subsidy sentiment score but is in a subsequent period. This signals that it takes at least two years for Eneco to adjust to changing institutional pressures. Although Eneco’s motivations are not publicly known this connection is not a coincidence. Furthermore the precise influence of the governmental subsidies is hard to measure but it is clear that the existing of these subsidies positively influences Eneco’s investments. The investments in new BU/Facilities subsequently lead to an expansion of Eneco’s solar energy activities and an overall increasing focus on solar energy. An increasing focus on solar energy activities will consequently affect Eneco’s business model. Eneco’s investment activities are summarized in its key activities business model canvas element and therefore I am able to suggest that Eneco’s key activities business model element is changed by its expanded activities which are a result of investments made possible by subsidies.

The second business model element influenced by Eneco’s actions is the value proposition element, which is influenced by new product marketing actions. The two high scores of product marketing in 2003-2004 and 2009-2010 indicate a connection with the professional expressing opinion pressure. Although both the company action and the professional pressure illustrate the same positive scores in the same time period, the connection is vague. This vagueness is explained by the fact that no news articles in Eneco’s analysis demonstrate the influence of professionals on new product marketing. Considering value proposition theory a connection with political consumerism or public procurement would be more logical, but this is not demonstrated in the analysis. Therefore no institutional pressure influences new product marketing for Eneco and pressures should be found elsewhere. Furthermore the analysis illustrates that governmental procurement pressures, with an almost comparable two-year delay, influence the key activities business model element. Eneco’s is influenced by procurement activities and tries to expand its current activities by incorporate these
procurement activities in its product offering, noticed by an increase in new business model activities. Overall the new business model introduction activities suggest that Eneco is following the example of the government. This indicates the influence public procurement activities have Eneco’s activities and therefore influence Eneco’s key activities business model element.

4.3.5 Essent’s company actions

With thirty-four events Essent is a medium sized company in this analysis. It should be noted that Essent was taken over by RWE in 2009. I decided to keep using the name Essent because it is the brand name of RWE’s Dutch activities. Figure 24 illustrates Essent’s overall actions in the solar energy market and no company events were found in 1995-1998 and 2005-2006. This signals the low solar energy activities of Essent within these periods. Furthermore the figure depicts some high scores in period 2007-2012 that indicates a positive trend towards solar energy.

![Figure 24: Essent's company actions](image-url)

The next step is to analyse the business model innovation activities of Essent based on business model literature of Osterwalder & Pigneur (2010). The key activities element of the business model for Essent is influenced by four company actions; shut down BU/Facility, new BU/Facility, introducing new business models and shutting down of new business models. Figure 25 illustrates the fluctuations of Essent’s actions and their particular influence on the key activities business model element.
The first interesting development in this figure is noticed in the 1999-2002-time period. In this period there is a reasonably high score in opening new BU/Facilities. This score is explained by a news article in De Volkskrant of 12-10-2000 with the title “Essent investeert miljoenen in groene stroom”, which reports that Essent is increasing its investments in solar energy. Supporting this trend is another news article in de Volkskrant of 01-06-2008 with the title “Run op groene stroom eist extra inzet stroombedrijven”. This article explains that because of the expected high demand of solar energy Essent is speeding its investments in solar energy facilities. Both the articles argument that Essent is investing in solar energy facilities because they are expecting increasing demands. This development clearly demonstrates the changes towards solar energy production activities and a comparable change in the business model key activities element. Another interesting development is the rise of new business models, in both 2003-2004 and 2011-2012. A news article in De Volkskrant of 11-11-2003 with the title “Groene stroom blijft populair” reports about this rise. This article suggests that Essent is buying their solar energy from surrounding countries to deal with the deficit. This clearly demonstrates the shift towards energy buying activities combined with energy selling activities. Another article, concerning new business model development, in De Volkskrant of 18-10-2012 with the title “Energie giganten en lokale producenten zoeken toenadering” reports that Essent starts to focus on decentralized energy production. In practice this would mean that Essent will focus on the production and instalment of the solar panels and individuals take care of the energy production. Both articles demonstrate a shift in business activities, which eventually will lead to changes in the key activities business model element. Focusing on decentralized energy production has the potential to have a massive influence the key activities of Essent but in its current state this development would not have much influence. The negative score in the BU/Facility line in 2011-2012 is the last interesting point from this part of the analysis. A news article in De Volkskrant of 25-06-2012 with the title “Niet genoeg productie groene stroom” explains this decrease. This article suggests that Essent is decreasing its attention on solar energy because of the lower prices of biomass fuel. To stay profitable Essent needs to decrease its costs that illustrate the increasing cost awareness of energy companies. The decrease in solar activities and the increase in other activities subsequently demonstrate the influence of cost awareness on the key activities business model element.
The second business model element influenced by Essent’s action is the key partnerships element. Figure 26 illustrates the development in partnering activities for Essent. The interesting point in this analysis is the extreme high score in 2009-2010. Studying the newspapers in this period demonstrates that Essent was taken over by RWE. The acquisition itself is not the basis of the positive score, but the motivation of the acquisition is. This motivation is explained in a news article in De Volkskrant of 21-05-2012 with the title “Snelschaker met weinig inlevingsvermogen” that reports that the motivation for RWE to buy Essent is because of its solar energy projects. RWE wants to focus more on sustainable projects and the acquisition of Essent fits perfectly in this strategy. This acquisition changes much in the key partnership elements of Essent’s business model. Before the acquisition Essent was just a small organization in the energy market, while after the acquisition Essent is able to use its solar energy knowledge across Europe.

Institutional pressures on Essent.

The next step is to analyse the institutional pressures on Essent’s business model with the help of the connecting template in appendix 4. The key activities business element signifies a direct influence of governmental subsidies on the business model key activities element. The positive scores in new BU/Facilities and the negative scores in shutting down of BU/Facilities perfectly congregates both positive and negative scores in the governmental subsidies sentiment analysis. This connection illustrates the dependency of Essent’s investments on subsidies and in practice means that without a positive subsidy climate no significant investments are made. This could be because of two reasons: lacking investments could be because of the fact that Essent does not have the financial power to make these investments or secondly because of the fact that Essent is uncertain about the solar energy industry potential. This study does not research the financial strength of Essent but professionals expressing their opinion could explain the uncertainty measure. The previous institutional pressure analysis has demonstrated that new/shuttingdown business model activities are linked with the institutional professionals expressing its opinion pressure. In a negative time frame of the professionals Essent decreased its business model activities, but when professionals were more positive about solar energy Essent introduced new business model activities. This connection fits with the corporate strategy that Essent wants to be an overall sustainable energy provider and does not purely focus on solar energy, because there are other options. For Essent’s business model this means that when investments and new solar energy business models are stopped or decreased, Essent changes its key activities business model element towards other activities such as wind or biomass energy. While Essent’s solar energy focus increases when subsidies are given and professionals become more positive. This subsequently means that the key activities business model element adapts towards

Figure 26: Essent’s key partnerships
solar energy activities.

The second business model element influenced by institutional pressures is the key partnering element. As discussed before the key partnering business model element is closely connected with the industry interconnectedness label and in Essent’s situation this is also the case. Decreasing subsidies and professionals expressing positive opinions stimulated Essent’s focus on partnerships. For Essent a partnership was the only solution to stay in the solar energy industry and survive the decreasing subsidies. Essent wanted to stay in this particular market because of that fact that professionals were very positive towards solar energy. A partnership with RWE was the ideal solution for Essent and subsequently Essent increased its focus on solar energy. This makes clear that because of decreasing subsidies and increased market knowledge Essent’s only possibility to stay in the market was to find a partnership. This makes clear that there is a connection between governmental subsidies, professionals expressing their opinion and the key partnership business model element.

4.3.6 Scheuten Solar’s company actions

Scheuten Solar is with twenty-three events the smallest company in this analysis. Figure 27 demonstrates the fluctuation in Scheuten Solar’s actions. For Scheuten Solar no events were found in the 1995-1998 and the 2001-2002-time period, therefore these time periods are empty. Subsequently the figure illustrates an interesting development in BU/Facilities, while in the 2003-2008 period investments are made in new BU/Facilities these are closed in the 2011-2013 timeframe.

Figure 27: Scheuten Solar’s company actions

The next step is to analyse the business model elements of Scheuten Solar based on the business model canvas by Osterwalder & Pigneur (2010). For Scheuten Solar both the key activities and the key partnerships elements of the business model are influence. The key activities element is influenced by three actions: new BU/Facility, shut down BU/Facility and introducing new business models. In addition the key partnerships element is influenced by Scheuten Solar’s partnering activities. Figure 28 illustrates the fluctuations of Scheuten Solar’s
actions. It is interesting to see that there is an extremely high score on new BU/Facility in the 2007-2008 time period. Illustrating for this phenomenon is a news article in De Telegraaf of 20-06-2007 with the title “Zonnecelproducenten: Shell zit fout met voorspelling toekomst”. This article reports that Scheuten is investing €30 million in a new solar panel factory. Furthermore an additional news article in De Telegraaf of 15-10-2008 states that Scheuten is investing an additional €400 million in a new silicium factory, the main material of solar panels. Both the investments signal that Scheuten Solar is expanding its solar panel production facilities, which indicates an expanding focus on solar panels as a market. It should be noted that solar panels already was the basis of Scheuten Solar’s activities and the extra investments do not necessarily mean a change in the business model key activities element.

Figure 28: Scheuten solar’s key activities

An additional interesting development is the positive scores in new business models activities. A newspaper article in De Telegraaf of 30-04-2010 with the title “Solar industrie lonkt naar beursgang” reports that Scheuten Solar is considering an IPO. Scheuten Solar is in need of investors and an IPO could be the only perfect solution. First of all this illustrates the atmosphere Scheuten Solar was operating in. In this particular time period Scheuten Solar was under continuous pressure to cut costs and search for investors and eventually this lead to bankruptcy and the shutting down of the solar panel factory in the 2011-2012-time period. An article in De Telegraaf of 03-04-2010 with the title “Deel Scheuten maakt doorstart” illustrates the bankruptcy, in this article both the bankruptcy and a possible restart of Scheuten Solar are discussed. This demonstrates the pace in which key activities can feasibly change. In the 2007-2008 large investments were made in solar panel factories, while these investments eventually lead to the bankruptcy of the organizations.
The second business model element influenced by Scheuten Solar actions is the key partnerships element. This fluctuation in Scheuten Solar’s partnering actions is illustrated in figure 29. This illustration is a little bit misleading because of the bankruptcy in 2010. To be able to make a restart it was of vital importance for Scheuten Solar to find partnerships. Several newspapers articulate the willingness of several companies to buy Scheuten Solar’s remaining’s. Scheuten Solar was eventually taken over by Aiko solar in Germany. The partnering actions before the bankruptcy are more interesting for this analysis. In the 2009-2010 steps were made to start a partnership with Solland Solar. A news article in de Telegraaf of 23-07-2009 with the title “Fusie zonne-energie giganten aanstaande” reports on this possible partnership. The article suggests that Scheuten Solar and Solland Solar are going to cooperate because of the different business activities, which combined could become an interesting proposition. The changing proposition demonstrates the influence of partnerships on the business model of Scheuten Solar; therefore it is fair to state that this particular partnership influenced the key partnerships element of Scheuten Solar. The key activities element changed towards more linkages between Scheuten Solar and Solland Solar, and increased focus on offering combined business propositions.

Institutional pressures on Scheuten Solar
The next step is to analyse the institutional pressures on Scheuten Solar with the help of the connecting template in appendix 4. When analysing the institutional pressures on Scheuten Solar’s activities it is interesting to see that the positive scores in new BU/Facilities activities in the 2007-2008 are in the same period as the most positive score in governmental subsidies. This connection is the same for the shut down of BU/Facilities activities and the decreasing subsidy sentiment. This linkage suggests that Scheuten Solar does not have the financial strength to make capital-intensive investments without subsidies. Although Scheuten Solar’s main activities are based on solar energy it was not able to horizontally expand it activities without governmental subsidies. The fact that subsidies are the reason why Scheuten Solar was not able to increase its current activities signals a relationship between subsidies and Scheuten Solar’s key activities business model element. Because of the subsidies Scheuten Solar was able to expand its activities in 2007-2008, which eventually lead to a change in key activities business model element. Additionally a connection is found between the public procurement sentiment development and Scheuten Solar’s new business model activities. The two positive scores in 2001-2002 and 2009-2012 time periods match perfectly with the public procurement pressure fluctuations. This indicates that Scheuten Solar defiantly follows governmental actions and tries to adapt its business activities towards governmental policy. Although it could be augmented that Scheuten Solar only followed this normative pressure because of the decreasing profits it still signal’s a connection between public procurement and Scheuten Solar’s key activities business model elements. Overall this suggests that Scheuten
Solar’s key activities business model element is influenced by both the coercive subsidies and the normative public procurement activities. Furthermore a connection between the institutional pressures and Scheuten Solar’s partnering activities is found. Scheuten solar was obliged to have a long period (2008-2012) of positive partnering activities because of decreasing profits. Scheuten Solar was not able to survive without the subsidies and therefore had to find other solutions such as partnering. It is said that the only reason why Scheuten Solar did not leave the market was because of its pure focus on solar energy activities. This focus was strengthened by the positive professional sentiment in the 2009-2012 time periods. Scheuten Solar’s motives for its partnering activities were to cut cost and gain scale advantages in the solar energy market. Because of the 100% focus on solar energy, partnering was a vital importance for Scheuten Solar to escape bankruptcy. This indicates a connection between subsidies, performance and the key partnerships business model element. Because of the decreasing subsidies Scheuten Solar’s overall performance decreased and Scheuten Solar started focusing on partnering. This increased focus on partnering signals an increasing focus on the key partnerships business model element. Although Scheuten Solar’s focus increased, no partnerships were found and Scheuten Solar eventually went bankrupt.
5. Findings

The next segment of this paper is based on the findings of the study. In the analysis I have studied the specific institutional pressures influencing the industry, the industry actions and the focal company actions. I will start with a short summary of the largest institutional pressures and continue with an oversight of the five industry business models influenced by these institutional pressures. Subsequently I will discuss the influence of institutional pressures on the focal companies and the current business model status of these companies. To conclude I will provide a cumulative table of the industry actions, focal company actions and the institutional pressures that influenced them.

The institutional analysis demonstrates that there are three institutional pressure segments; governmental, professional and the public and they all have an influence on the business model elements of the industry and companies in this paper. By conducting the influence analyses I was able to deduct the total of eight pressures to the three institutional pressures with the largest influence on company actions: subsidies, professionals expressing their opinion and political consumerism. With the selection of the most influential institutional pressure I am able to analyse their effect on industry actions. Furthermore the industry analysis has illustrated that five industry actions have the most influence: industry adaption, firm/industry turnover, firm industry size, degree of interconnectedness and political consumerism.

This paper studies the connection between these industry actions, the business model elements and the institutional pressures and an overall summary is illustrated in table 3. It is striking to see that subsidies have such a gigantic influence on overall industry business models. Governments have many different subsidy possibilities and each subsidy could have a different influence. Although this influence is acknowledged it is not researched in this study. Furthermore there are only two none governmental pressure that influences the overall business model: professionals expressing their opinion and political consumerism, which underlines the importance of the government on the solar energy market. Furthermore it illustrates the chances for governments to influence future development within this industry.

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<tr>
<td>Firm/industry turnover, firm/industry size</td>
<td>Revenue streams</td>
<td>Subsidies</td>
</tr>
<tr>
<td>Firm prestige / visibility</td>
<td>Channels</td>
<td>Political consumerism.</td>
</tr>
<tr>
<td>No of innovations</td>
<td>Key Resources</td>
<td>Subsidies</td>
</tr>
</tbody>
</table>

Table 3: Influence of institutional pressures on overall industry business model elements.

Now we have a clear overview of the influence of institutional pressures on the overall industry business model element I will continue with taking a closer look at the influence of focal companies. This part of the analysis is based on the influence institutional pressures have on company actions and the specific influence of these
actions on business model elements. The data from the coding scheme clearly defined which actions were performed per focal company. With the help of the connecting template in appendix 4 I am able to illustrate which actions influence which business model element, which is depicted in table 4.

<table>
<thead>
<tr>
<th>Business model elements &amp; focal company actions</th>
<th>Key Activities</th>
<th>Key Partnering</th>
<th>Value Proposition</th>
<th>Key Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companies:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta</td>
<td>New BU/Facility, Shut down BU/Facility, De-investment in internal capabilities, Introducing new business models, Shutting down new business models</td>
<td>Partnering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shell</td>
<td>New BU/Facility, Shut down BU/Facility, Investment in internal capabilities</td>
<td>Partnering</td>
<td>No of innovations</td>
<td></td>
</tr>
<tr>
<td>Nuon</td>
<td>New BU/Facility, Shut down BU/Facility, Introducing new business models, Shutting down new business models</td>
<td></td>
<td></td>
<td>No of innovations</td>
</tr>
<tr>
<td>Eneco</td>
<td>New BU/Facility, Shut down BU/Facility, Investment in internal capabilities, Introducing new business models, Shutting down new business models</td>
<td></td>
<td>Marketing of new products</td>
<td></td>
</tr>
<tr>
<td>Essent</td>
<td>New BU/Facility, Shut down BU/Facility, Introducing new business models, Shutting down new business models</td>
<td>Partnering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheuten Solar</td>
<td>New BU/Facility, Shut down BU/Facility, Introducing new business models</td>
<td>Partnering</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4: The focal companies actions and the business model canvas elements

It is interesting to see that in the total timeframe of fifteen years all focal companies have performed comparable actions, such as opening and shutting down a new business unit/facility or creating and shutting down new business models. This suggests that although the companies have a totally different focus and size they all act in a comparable fashion, although sometimes in a different timeframe. One of the explanations for these phenomena would be that all companies have to cope with the same pressures and therefore are almost obliged to act in a specific way. This stresses the importance of the institutional pressures.
S.H.A Ammerlaan (2013)  

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and their influence on business model elements. Therefore the next step is to summarize and compare the institutional pressures per business model element for the focal company.

<table>
<thead>
<tr>
<th>Companies:</th>
<th>Key Activities</th>
<th>Key Partnering</th>
<th>Value proposition</th>
<th>Key resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta</td>
<td>Subsidies &amp; Professional knowledge reports</td>
<td>Subsidies &amp; Professionals expressing their opinion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shell</td>
<td>Professional knowledge reports</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuon</td>
<td>Subsidies &amp; Professional knowledge reports</td>
<td></td>
<td></td>
<td>Subsidies</td>
</tr>
<tr>
<td>Eneco</td>
<td>Subsidies &amp; Public procurement</td>
<td></td>
<td>Professional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>expressing their opinions</td>
<td></td>
<td>expressing their opinion</td>
<td></td>
</tr>
<tr>
<td>Essent</td>
<td>Subsidies &amp; Professionals expressing their opinions</td>
<td>Subsidies &amp; Professionals expressing their opinion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheuten Solar</td>
<td>Subsidies &amp; Public procurement</td>
<td>Subsidies &amp; Professionals expressing their opinion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Influence of institutional pressures on focal companies

Table 5 illustrates that subsidies and professionals expressing their opinion pressures influence all the companies, except Shell. Although it was already known that subsidies and professionals expressing their opinion are the institutional pressures with the largest quantity of newspaper data, I can also conclude that these pressures have a large influence on the companies’ business model. Furthermore table 5 illustrates which pressure influences which particular part of the business model canvas. It is interesting to see that Shell is only influenced by professional knowledge reports, while the other institutional pressures do not have an influence. As stated before in this paper this could be explained by the size of Shell, but is it also possible that corporate culture, particular management structure or other business opportunities influence Shell’s reaction towards institutional pressures.

Now I have summarized and compared the influence of institutional pressures for the total industry and the focal companies it becomes interesting what the actual effect is of these pressures. Therefore the next step in this section is to analyse the current situation per business model element, starting with the key activities business model element. Table 6 is based on the key activities business model element and illustrates that almost all the companies stopped producing solar panels, some by choice, Shell, some by bankruptcy, Scheuten Solar. I addition it defines that Shell totally stopped their solar energy activities, while most other companies still have a minor focus on solar energy production. The only exception is Essent, who is currently investing in solar energy production. It should be noted that Scheuten Solar stopped its solar panel production activities not by a strategically choice but because of its bankruptcy and the consequences of that.

<table>
<thead>
<tr>
<th>Key activities business model element</th>
<th>Solar panel production</th>
<th>Solar energy production</th>
</tr>
</thead>
</table>
Table 6: Summary of key activities for focal companies

<table>
<thead>
<tr>
<th>Key partnerships business model element</th>
<th>Partnering status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta</td>
<td>Stopped</td>
</tr>
<tr>
<td>Shell</td>
<td>Stopped</td>
</tr>
<tr>
<td>Nuon</td>
<td>Stopped</td>
</tr>
<tr>
<td>Eneco</td>
<td>Investing</td>
</tr>
<tr>
<td>Essent</td>
<td>Not relevant</td>
</tr>
<tr>
<td>Scheuten Solar</td>
<td>Stopped</td>
</tr>
</tbody>
</table>

Table 7: Summary of key partnerships for focal companies

<table>
<thead>
<tr>
<th>Key partnerships business model element</th>
<th>Partnering status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta</td>
<td>Focus on partnering with Solland Solar and Scheuten Solar, which failed.</td>
</tr>
<tr>
<td>Shell</td>
<td>No focus on partnering</td>
</tr>
<tr>
<td>Nuon</td>
<td>Focus on partnering with Vattenfall and Helianthos</td>
</tr>
<tr>
<td>Eneco</td>
<td>Partnering via small acquisitions</td>
</tr>
<tr>
<td>Essent</td>
<td>Focus on partnering with RWE</td>
</tr>
<tr>
<td>Scheuten Solar</td>
<td>Focus on partnering with Solland Solar which failed</td>
</tr>
</tbody>
</table>

Summarizing the key resources business model element illustrates that some companies focus on innovation, while other companies do not. Table 8 summarizes the innovation status of the focal companies. Interesting is to see that the companies focussing on innovation, Delta, Nuon & Scheuten Solar, all had to decrease their solar energy activities, while the other companies invested less in innovation and stayed more or less competitive. To conclude the key resources business model elements comparison indicates that it is hard for companies to invest in solar energy innovation and to be successful.

Table 8: Summary of innovation status of focal companies

<table>
<thead>
<tr>
<th>Key resources business model element</th>
<th>Innovation status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta</td>
<td>Stopped</td>
</tr>
<tr>
<td>Shell</td>
<td>Not relevant</td>
</tr>
<tr>
<td>Nuon</td>
<td>Stopped</td>
</tr>
<tr>
<td>Eneco</td>
<td>Investing Minor focus</td>
</tr>
<tr>
<td>Essent</td>
<td>Increasing focus</td>
</tr>
<tr>
<td>Scheuten Solar</td>
<td>Not relevant</td>
</tr>
</tbody>
</table>
The next business model element is the value proposition, which is illustrated in Table 9. It is interesting to see the differences in new product marketing. Eneco is the only company that focuses on new product marketing, while all the other companies did not. This fits in the corporate strategy of Eneco that is focused on using environmental friendly energy sources as their main marketing tool. It is strange to see that all the other companies in this paper did not focus on new product marketing, or were not able to create successful new product marketing campaigns, while knowing that Eneco was reasonably successful with their campaigns.

### Table 8: Summary of key resources for focal companies

<table>
<thead>
<tr>
<th>Company</th>
<th>Focus on innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta</td>
<td>Strong focus</td>
</tr>
<tr>
<td>Shell</td>
<td>Medium focus</td>
</tr>
<tr>
<td>Nuon</td>
<td>Strong focus</td>
</tr>
<tr>
<td>Eneco</td>
<td>No focus</td>
</tr>
<tr>
<td>Essent</td>
<td>No focus</td>
</tr>
<tr>
<td>Scheuten Solar</td>
<td>Strong focus</td>
</tr>
</tbody>
</table>

### Table 9: Summary of the value proposition element for focal companies

<table>
<thead>
<tr>
<th>Value proposition business model element</th>
<th>New product marketing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shell</td>
<td>No focus on new product marketing found</td>
</tr>
<tr>
<td>Delta/ Solland solar</td>
<td>No focus on new product marketing found</td>
</tr>
<tr>
<td>Nuon/Helianthos</td>
<td>No focus on new product marketing found</td>
</tr>
<tr>
<td>Eneco</td>
<td>Focus on new product marketing.</td>
</tr>
<tr>
<td>Essent</td>
<td>No focus on new product marketing found</td>
</tr>
<tr>
<td>Scheuten Solar</td>
<td>No focus on new product marketing found</td>
</tr>
</tbody>
</table>

### 6. Conclusion

Overall this research indicates a decrease of solar energy activities in the Netherlands. It became clear that governments are the largest institutional pressures for solar energy companies, with subsidies being its most effective pressure. Although I have not investigated the precise construction of governmental subsidies it is certain that the continuously changing subsidy policy influenced company business models. This research demonstrated the negative influence changing subsidy policy has on company business models. Because of unclear policy and a changing landscape companies did not know how to act and this uncertainty lead decreasing activities and even bankruptcies. An explanation for the changing solar energy policies is the continuously adjusting governmental landscape. Elections in almost every 2-4 years made it almost impossible for governments to create straightforward plans and reduce company uncertainty. Therefore I suggest that because of the continuous changing subsidy policies un-stability was created in the solar energy market. This uncertainty made it impossible for companies to create long-term policies and survival chances are reduced. Therefore the government negatively influenced the solar energy companies in the 1995-2013 timeframe.

Knowing more about institutional pressures raises questions about the nature of these pressures and in what degree the company acts voluntarily to these pressures. It is known that subsidies and professionals expressing their opinion are the most influential pressures and both have a voluntarily fundamant. Companies
are not obliged to apply for subsidies but the subsidies can make the company’s more profitable or innovative. Which is the same for the professional expressing their opinion. Although professionals are able to influence societies, companies and institutes they do not have the coercive strength to change a company’s policy. Therefore this study characterizes professional’s institutional pressures as voluntarily.

For most of the companies in this research its solar energy activities were not a success. In the past the focal companies made large investments in solar panel production and almost all of these investments were written off by the beginning of 2013. Eneco is the exception and is continuously investing in solar panel production, on the other hand Scheuten Solar is the only company that went bankrupt. A comparable trend is spotted for solar energy production activities. While Shell stopped these activities other companies such as; Delta, Nuon and Eneco only have a minor focus on solar energy. The only company that is still investing in solar energy production is Essent. This exception could be explained by the acquisition of Essent by RWE. Because of this acquisition Essent has the possibility to use the scale advantages of this large multinational for its own sustainable policy. In addition RWE stated in its annual report that Essent is one of its sustainable guinea pigs which offers Essent the possibility to try out different business models. That sole scale advantages in some cases are not enough for a company to be successful in solar energy is proven by Shell. Shell is by far the largest company within this research but is the only one who voluntarily stopped all its solar energy activities. This comparison slightly counters the argument that scale advantages are the only reason for companies to succeed in a solar energy market but it remains that the positive effects of large-scale activities are clear. This is supported by the partnering activities of the companies in this research. The overall motivation behind these activities was to enable profitability and stability via growth in scale. Once again Shell is the large exception by only slightly focusing on partnering activities. Discussed in this research are the reasons behind Shell’s contradicting policy. The main argument is that Shell is not largely influenced by subsidies and competitors but is able to create a business model based on its internal knowledge gathered by specialists. Other companies do not have these resources and capabilities and therefore are more influenced by institutional pressures and specifically subsidies.

Overall it is a shame that most of the companies are not able to survive in the Dutch solar energy market. Expert reports demonstrate the large growth potential the solar energy market has and everyone agrees on the positive influence growth markets could have on the current Dutch economic situation. This research demonstrates the influence institutional pressures have on companies within the solar energy market. Furthermore it is illustrated that the largest institutional pressure is the governmental subsidies. To enable future growth in this market it is necessary for the government to create a long-term and stable policy towards solar energy and subsidies.

7. Discussion
The purpose of this section of the paper is to discuss the research process, findings and results and compare those with the statements and suggestions created on forehand. The focus of this study is on the influence of institutional pressures on solar energy company business models in the Netherlands. The analysis has illustrated the specific institutional pressures influencing business model elements and the amount of influence. Overall it became clear that subsidies and professionals expressing their opinion are the most influential institutional pressures. Given that I have analysed the effect of institutional pressures in practice, it is interesting to compare the structural differences between the theoretical expectations and the institutional actions and pressures in practice. The expectations are structured by four institutional pressures (competitive forces, customer demand, social environment and legal environment), three governmental actors (governments, professionals and the public) and their influence on the business model elements. In addition the pressure expectations are based on Osterwalder (2004) and are illustrated in appendix 5.

Comparing the theoretical expectations with the institutional pressures in practice, illustrated in table 3 & 5, exemplifies many differences. First all this study has demonstrated that governmental and public actions based on social pressures and professionals actions concentrated on competitive pressures do not have any influence on business model elements in the solar energy market. Although the expectations model defines various action possibilities none of them were found to have any importance in the analysis. Though this lacking of other actions is strange, this could be explained by the character of this specific research market. The solar energy market is characterized by continuous technological developments and a heavily changing landscape. There is a possibility that subsidies and experts expressing their opinion have the largest short-term influence and therefore are the only institutional actions with any effect. Furthermore the comparison between the expectations model and the practical research results illustrates that three professionals actions (knowledge reports, knowledge sharing and expressing expert opinion) based on the social environment pressure influence different business model elements. Overall this means that the professional social environment is a very important normative pressure group for the solar energy companies and has a major influence on business model innovation. In addition the analysis has demonstrated that subsidies have the largest influence on business model innovation. Subsidies are within the coercive legal pressure group, which exemplifies the importance of a stimulative legal environment for the solar energy companies. Overall it is clear that there are many differences between theoretical expectations of the institutional pressures and their effect on business model elements and the measured effect in practice.

Knowing that subsidies and experts expressing their opinion are the most important institutional actions I will continue with a short discussion of their the practicilities. Subsidies have such a large influence on company’s business model because of their financial character. Companies which receive subsidies gain financial compensation for their activities, this enables them to enter new markets, make large investments to gain scale advantages, decrease product prices and sometimes even to create profit margins. These financial rewards are beneficial for companies in a market which is under pressure and in development, such as the solar energy market. Creating financial benefits for companies within an upcoming solar energy industry could make a difference between bankruptcy and success. Therefore it is logical that subsidies have such a major influence.
on company’s business models and it explains the connection between subsidies and business model adaptions. Professionals expressing their opinion is the second institutional pressure with a large influence on company’s business models and there are several explanations for this. The first argument is based on the fact that the solar energy industry is relatively new, upcoming and continuously changing market. Because of these characteristics there is not a lot of market information available and companies are continuously searching for new data. For companies to be successful in these kind of markets extra information could be the key to success. While very large companies tend to be able to develop this knowledge in-house, small companies do not have this opportunity. This research has illustrated that because of its size Shell was able to develop their own knowledge and market information. Because of this inhouse market information Shell gained a competitive knowledge advantage and subsequently existed the market earlier than the rest. By stopping its investments in solar energy Shell was able to decrease its losses compared to other companies in this research. This example illustrates the importance of market knowledge for companies and the disadvantage for smaller companies because of lacking market information. Professional institutes tend to incorporate this knowledge via their research or academic background and by expressing their opinion provide overall market knowledge. Gaining new market information changes the company’s view on the overall market landscape and influences business model innovation. This demonstrates the connection between professionals expressing their opinion, overall market knowledge and business model innovation.

Considering the possible practical implications of this research, this paper provides a renewed scientific platform for governmental, professional and public pressures. The theoretical pressure expectations model suggested that every pressure group would have its influence on business model elements, while this research has shown that this is not the case for the solar energy market. Consider the influence on the institutions, this study provides the Dutch government more information about their influence on solar energy companies. Throughout this paper it has been demonstrated that subsidies have a positive influence on company performance and are the most effective governmental pressure for medium/small sized companies. Furthermore the influence of subsidies on a large multinational such as Shell is almost zero. To be able to have the most influence the government should focus its subsidies on medium/small sized companies. Governments can do so by offering subsidies on smaller local projects or by creating investment ceilings. To increase the effect of subsidies governments have to create a long-term subsidy policy, currently the subsidies are changing a lot which increases the uncertainty for companies. Because of this uncertainty companies are postponing their investments and could eventually exit the market. When a long-term policy is created and uncertainty decreased companies are able to be fully committed to the solar energy market which is beneficial for the overall industry. Secondly this paper demonstrates the influence of professionals expressing their opinion. Governments and companies should incorporate these professionals as much as possible, they are able to do so by investing in universities and professionals institutions. These investments would increase the total amount of research performed on solar energy and would increase the overall market information. Which subsequently is beneficial for the industry. In addition governments and companies should create cooperations and joint ventures with professional institutes. Within these cooperations knowledge and information can be shared between the
organizations and overall market knowledge would increase.

8. Future research

This research indicates many research possibilities for other studies. First of all the relationship between institutional actors would be very interesting to analyse. This study indicated a possible connection and there is a possibility that a certain governmental act will lead to other governmental responses, which is the same for the public and the professional institutional segment. This relationship will have influence on business model innovation and will be useful to predict business model innovation. Furthermore this research indicates that there could be solar energy popularity differences per time period. This study has not taken popularity into account but it signifies the possible influences of popularity. Popularity could have a direct influence on the amount and sentiment of events which could massively influence research results.

Another research point is to see if there are differences in reaction towards institutional pressures and actions in more developed markets. The solar energy market is still in its start-up stage and companies in other markets, such as the oil market, could react totally different towards these pressures. It would be interesting to see if these characteristics would direct the influence of institutional pressures on business model innovation. In addition the specific characteristics of an institutional action and pressure could have a different effect in the long and short term. This specific characteristic is not taken into account in this research, but there are possibilities that a governmental subsidy could lead to a short term advantage and a long-term disadvantage. Researching the influence over time could lead to totally different conclusions.

Concluding it should be noted that the Netherlands are only a small fraction of the total solar industry in Europe and the world. Therefore it would be even more interesting to conduct this same research in larger solar energy countries, such as Germany, Spain or China.
9. References


1 VITAE

Steven Ammerlaan is a junior researcher and M.Sc. graduate in Business Administration at the VU University Amsterdam. This working paper is based on his master thesis, which has been written within a larger research group as a collaborative project between the VU University Amsterdam and TNO.

Dr. ir. Hans Berends is an associate professor at the Knowledge, Information and Networks research group, Faculty of Economics and Business Administration, VU University Amsterdam. He is an organization scientist with a background in philosophy and industrial engineering, and received a PhD from Eindhoven University of Technology for a dissertation on knowledge sharing in industrial research. His research interests concern processes and practices of innovation, organizational learning, and interorganizational collaboration. His work has been published in leading journals including Organization Science, Organization Studies, Human Relations, and Journal of Product Innovation Management.

Dr. R.J.A. Klein Woolthuis studied business economics at the Erasmus University in Rotterdam and the Wirtschaftsuniversitat Wien. She started her PhD with joining the European Doctoral Programme for Small Business Management and Entrepreneurship at the Universita Autonoma de Barcelona (Spain) and Vaxjo University (Sweden). She finished her PhD at the University of Twente with Prof. W. During and Prof. B. Nooteboom. Her PhD was on interorganizational collaboration between high-tech firms and focused on the role of trust, contracts and dependence. After her PhD she broadened her research to include networks, clusters and innovation systems, and she broadened her horizon by also being active in policy advice in The Netherlands, UK, Denmark and for the European Commission. She currently works for the VU University Amsterdam and the TNO strategy department. She has published in various academic journals such as Organisation Studies, Technovation and Technological Forecasting and Social Change, and has published books and book-chapters on trust, clusters and collaboration. She is a reviewer for Journal of Management Studies, Technovation and the Journal of Trust Research. She has a broad experience in consulting work for regional, national and international governmental organizations. Recent assignments include work on the Competitiveness Report of the European Commission, project design for the Interdepartmental Project group for a Sustainable Built Environment, and participation in expert groups on the economic foundations of sustainability.

The core of her research interest since 1992 is how economic prosperity and growth come about through processes of innovation in the broadest sense. Since several years she explicitly includes the requirement that these innovations should also be sustainable. To examine this research question she has studied processes of collaboration, networks, clusters and other factors such as learning, public-private and industry-university partnerships, institutions, policies and system- and market characteristics that hinder or stimulate (sustainable) innovation.
0. Appendices


Appendix 2: Inter-rater reliability test with the use of Cohen’s Kappa

The first step in calculating Cohen’s Kappa and the inter-rater reliability test is to organize the coding scores of the sample into a contingency table that is depicted in table 3. The second step is to compute all the row totals and column totals of the observed frequencies. When this is done the next step is to calculate the total number of agreements that means adding up the total scores in the diagonal cells. The total number of agreements in this sample is 24.

<table>
<thead>
<tr>
<th>Inter-rater reliability test</th>
<th>CG</th>
<th>CI</th>
<th>Ccol</th>
<th>Mi</th>
<th>Mp</th>
<th>Ng</th>
<th>Ni</th>
<th>Ncol</th>
<th>Np</th>
<th>Total:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>CI</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Ccol</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>MI</td>
<td></td>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

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The subsequent step is to calculate the expected frequency for the number of agreements that would have been expected by chance for each coding category. The formula in figure 30 is used to calculate the expected frequency. The total of all the diagonal rows is $E_{6,543}$. This score is used in the second formula depicted in figure 4. Where $E_a = 24$, $E_{ef} = 6,543$ and $N = 30$, Kappa is 0.74. Now we know Kappa’s score the last step is to evaluate the Kappa score and see if there are any improvements possible. Based on the research by Landis & Koch (1977) who investigated the strength of the kappa statistic. Table 4 illustrates the strength measurements of the kappa statistic. The 0.74 score is within the substantial measurement and therefore the coding scheme is scientifically reliable.

<table>
<thead>
<tr>
<th>Kappa Statistic</th>
<th>Strength of Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.00</td>
<td>Poor</td>
</tr>
<tr>
<td>0.00-0.20</td>
<td>Slight</td>
</tr>
<tr>
<td>0.21-0.40</td>
<td>Fair</td>
</tr>
<tr>
<td>0.41-0.60</td>
<td>Moderate</td>
</tr>
<tr>
<td>0.61-0.80</td>
<td>Substantial</td>
</tr>
<tr>
<td>0.81-1.00</td>
<td>Almost Perfect.</td>
</tr>
</tbody>
</table>

Table 4: Landis & Koch (1977) strength of agreement table

Appendix 3: The coding scheme

<table>
<thead>
<tr>
<th>Governmental actions</th>
<th>Industry actions</th>
<th>Public actions</th>
<th>Professional actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>(C) Law proposal</td>
<td>(C) Contractors/suppliers boycott</td>
<td>(C) Political consumerism</td>
<td>(M) Rankings (e.g. % companies that have adopted ISO norm)</td>
</tr>
</tbody>
</table>
**Policies**
- Suing / Lawsuits
- Embargoes, Lockouts
- Training staff

**Laws / bans**
- Degree of industry adoption
- Occupation
- Spread of dominant management models

**Technology-forcing standards**
- Degree of industry interconnectedness
- Shareholder activism
- Introducing new norms and standards

**Fiscal measures**
- Change in firm / industry size (no. of employees)
- Public expresses opinion
- Knowledge developments (reports)

**Monitoring and law enforcement**
- Change in firm / industry turnover - profit
- Introducing alternative business models
- Knowledge sharing

**Subsidies**
- Change in firm prestige and visibility
- Campaigns
- Expressing expert opinions

**Reporting requirements**
- Change in no. of innovations
- Training / education

**Voluntary agreements**
- Advocacy
- Revealing information, disclosure

**Public procurement**
- Industry association membership-action
- Civil disobedience

**Awareness campaigns**
- Coalition
- NGO/Business partnership

**Political discussion**
- Self-regulation
- Lobbying

**Petition / motion**

**Certification and normalisation**

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The full coding scheme can be downloaded from:

The case protocol can be downloaded from:
http://www.stevenammerlaan.nl/thesis/caseprotocol

**Appendix 4: Template for connecting the nine business model elements and industry & company actions**

<table>
<thead>
<tr>
<th>Business model elements</th>
<th>Industry actions</th>
<th>Company actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key partners</td>
<td>Industry interconnectedness</td>
<td>(Quit) Partnering</td>
</tr>
</tbody>
</table>
### Key activities

- New/Shutdown BU/Facility, (De) Investments in internal capabilities, Shut down/introducing new business models

### Key resources

- Change in No of innovations

### Value proposition

- (Decrease) Marketing of new products

### Customer relationships

### Customer segments

- Industry adaption

### Channels

- Firm prestige/visibility

### Cost structure

- Change in firm / industry size, Change in firm/industry turnover

### Revenue streams

- Change in firm / industry size, Change in firm/industry turnover

---

**Appendix 5: Expectations framework for institutional pressures and their influence on business model elements**

<table>
<thead>
<tr>
<th>Institutional pressure</th>
<th>Government</th>
<th>Professionals</th>
<th>Public</th>
<th>Business model element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitive forces</td>
<td></td>
<td>Rankings, Training staff, Spread of models,</td>
<td></td>
<td>Key partnership, Key resources, Value proposition, Revenue streams</td>
</tr>
<tr>
<td>Customer demand</td>
<td></td>
<td>Voluntary agreements, Public procurement, Awareness campaigns, Political discussion, Petition and motion, Certification and normalisation</td>
<td></td>
<td>Key activities, Key resources, Revenue streams, Customers segments, Value proposition</td>
</tr>
<tr>
<td>Social environment</td>
<td>Voluntary agreements, public procurement, Awareness campaigns, Political discussion, Petition, Certification and normalisation</td>
<td>Introducing new norms and standards, Knowledge reports, Knowledge sharing, Expressing expert opinions, Training and education</td>
<td>Public expressing opinions, Introducing alternative business models, Campaigns, Revealing information, Civil disobedience, NGO/Business partnership, Lobbying, NGO/Governmental relations</td>
<td>Key partnerships, Key Activities, Costs streams, revenue streams, Customer segments</td>
</tr>
</tbody>
</table>
### Appendix 6: Coercive and Normative governmental pressures

#### Coercive governmental pressures

- **Political discussion**: 8%
- **Public procurement**: 31%
- **Awareness campaigns**: 61%

#### Normative governmental pressures

- **Subsidies**: 59%
- **Law proposal**: 15%
- **Policies**: 10%
- **Monitoring and Law**: 5%
- **Fiscal measures**: 3%
- **Embargoes**: 5%

### Appendix 7: Quantity of public pressures.
Appendix 8: Contributions of focal company actions to the analysis