

Understanding the success of wind energy cooperatives: A search for determinants of the success of Dutch wind cooperatives

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Highlights

- We describe the current status of Dutch wind cooperatives.
- We define and categorize determinants of success of Dutch wind energy cooperatives.
- Determinants relating to acceptance, collaboration, interaction, knowledge and expertise prove to be most important.
- We provide recommendations to strengthen the role of wind cooperatives in achieving national wind capacity objectives.

Abstract

The energy agreement for sustainable growth, includes an objective to have 6000 MW installed wind energy capacity on land in the Netherlands by 2020 and emphasizes the important role wind cooperatives can play in achieving that objective. Currently, the 25 Dutch wind cooperatives have a minor influence with the 4% wind energy capacity share they have installed. However, sufficient information on what influences their success is lacking. It is challenging to understand in what way wind cooperatives can be stimulated to play a more prominent role in achieving the objectives of the energy agreement without understanding the success of wind cooperatives. Therefore, we post the question: What are the key determinants of the success of Dutch wind cooperatives?

Based on an initial literature study, conclusions were drawn that non-scientific literature already describes a great deal of determinants perceived to influence the success of wind cooperatives. Therefore, an explorative research approach was designed, to identify what determinants are perceived to be important by actors in practice. Face-to-face interviews with wind cooperative representatives and experts, were used as data collection method. Determinants were retrieved from the empirical data, via coding global interview transcripts. Data analysis resulted in a list of 72 validated determinants. Determinants relating to collaboration, interaction with stakeholders and sharing knowledge and expertise prove to be most important.

New policy measures should focus on managing knowledge and expertise sharing, providing more specific guidelines for participation plans and raising awareness for the existence of (wind) energy cooperatives among citizens. Further research is recommended to focus on validation of the determinants and identification of the relations between them, towards a conceptual model.

Key words:

Energy agreement
Wind energy cooperative
Key Performance Indicator
Success
Determinant

1. Introduction

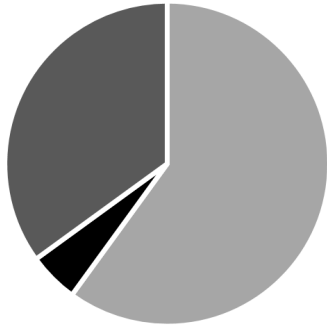
In September 2013, the energy agreement for sustainable growth, holding new sustainable energy ambitions, was signed by over 40 parties (SER, 2013). The energy agreement includes an objective to have installed 6000 MW wind energy on land in the Netherlands by 2020 (SER, 2013). Furthermore, the energy agreement emphasizes the important role cooperatives can play in achieving the objectives described in the energy agreement (SER, 2013). The question, however, is will they be able to do so and what are the factors influencing that?

In the period from 1986 to 1992, 25 Dutch wind cooperatives were founded. By 2006, nine of these cooperatives were merged and two ceased to exist (Agterbosch, 2006).

Dutch wind cooperatives currently have a small share with regard to the total wind energy capacity installed in the Netherlands. The total installed wind energy capacity on land was about 2200 MW in 2012 (CBS, 2014). About 85 MW of that volume was installed by wind cooperatives, which is about 4% of the total installed capacity on land, like visualised in Figure 2 (PBL et al., 2014). The rest of the wind energy share was developed by commercial project developers and individual local entrepreneurs (PBL et al., 2014).

Dincer (2011, p. 5153) argues that: "Wind energy is one of the most important and reliable energy sources among the renewable energy sources".

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■ Farmer ■ Cooperative ■ Corporate

Figure 2 Wind turbine ownership share per actor group, adapted from (MacArthur, 2010)

Wind energy is an economically viable investment option in combination with the SDE+ subsidy, which is the incentive scheme for sustainable energy production in the Netherlands. The scheme covers the financial gap between the costs of producing fossil fuel based and sustainable energy (Blokhuis, Advokaat, & Schaefer, 2012). The cooperative is one of the types of legal forms that has stimulated investments in wind turbines (Viardot, 2013).

Viardot (2013, p. 757) describes that “Cooperatives are autonomous associations of people who join voluntarily to meet their common economic, social, and cultural needs and aspirations through jointly owned and democratically controlled businesses. Cooperative businesses carry with them underlying social values and ethical principles”. Rijpens, Riutort, and Huybrechts (2013, p. 4) describe renewable energy source cooperatives as “groups of citizens who cooperate in the field of renewable energy and participate in the energy transition. They implement a bottom-up and collective dynamic based on the active participation of citizens and the involvement of multiple stakeholders”.

For this research, a wind cooperative is defined as follows: A group of actors that joined forces to achieve their collective objectives, has adopted a cooperative legal form and has invested in or has (had) concrete plans to invest in large-scale onshore wind energy.

According to PBL et al. (2014), currently more than 110 energy cooperatives can be identified in the Netherlands. 25 of these are wind cooperatives based on the abovementioned definition.

Energy cooperatives can be considered as part of, among others, two interrelated greater transitions. On the one hand, the ‘sustainable energy transition’, which is the transition towards a more sustainable energy supply. Frantzeskaki, Avelino, and Loorbach (2013, p. 115) even conclude that “community owned renewable initiatives operate as frontrunners of a sustainable energy transition”. On the other hand, wind cooperatives can be considered as part of the transition towards a community based society in which the government has a more facilitating role, rather than a steering one (de Roo & Voogd, 2004).

Both trends seem to connect to empowerment of communities (Seyfang, Hielscher, Hargreaves, Martiskainen, & Smith, 2013). In that sense, the energy sector, which is traditionally dominated by governments and large commercial organisations, is shifting to a more dominant and engaging role for communities (Hoffman & High-Pippert, 2010; Schwencke, 2012).

1.1. Problem

Wind cooperatives currently have a small share with regard to the total wind energy capacity installed in the Netherlands. Also large differences in the amount of installed wind energy capacity and the number of members of different wind cooperatives can be identified, as illustrated in Figure 1. It was decided to only include the wind

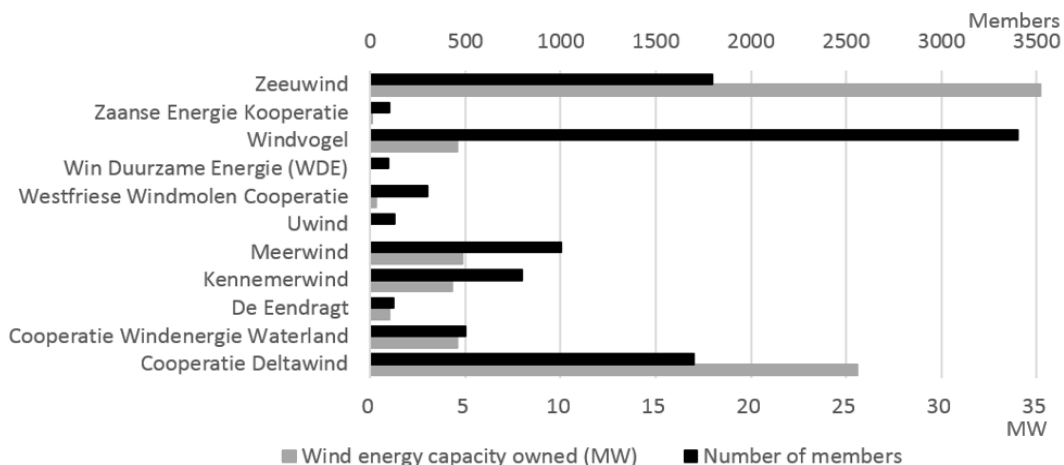


Figure 1 Wind capacity owned and number of members per wind cooperative, started before 1993 (Hermans, 2014; PBL, Schwencke, & Elzenga, 2014; REScoopNL, 2014b; Wikia, 2013; Windunie, 2014)

cooperatives started before 1993 for comparison, as they were started in about the same period and had a similar landscape during their development. Although the amount of installed capacity and the number of members are not indicators that fully reflect the degree of success of a wind cooperative, it gives an indication of the contrast between the success of wind cooperatives. So far, it is unclear what determinants caused the difference in success.

It is challenging to understand in what way wind cooperatives can be stimulated to play a more prominent role in achieving the objectives of the energy agreement without understanding the success of wind cooperatives. Therefore, we pose the question: What are the key determinants of the success of Dutch wind cooperatives?

The following section introduces the methods used for answering the research question. Section 3 presents, categorizes and describes the determinants retrieved from literature and empirical data. Based on that, Section 4 discusses the notable outcomes. Finally, Section 5 & 6 draft conclusions and provide policy recommendations.

2. Methods

This research attempts to answer the research question by defining a list of determinants. This list will be used as a basis for reflecting on possible policy measures to empower wind cooperatives.

Based on an initial literature study, conclusions were drawn, that non-scientific literature already describes a great deal of determinants possibly influencing the success of wind cooperatives. An explorative research approach, including empirical research will be adopted to identify what determinants are perceived to be important by actors in practice. For the empirical research, face-to-face interviews will be used as data collection methods.

For this research, two types of interviews can be distinguished: semi-structured case and expert interviews. The case interviews are interviews with representatives of six selected wind cooperatives, which are assumed to be a representative sample. The seven experts interviewed, do have a specific expertise in the field of wind energy and wind cooperatives. The interviewees were selected using purposive sampling. An overview of the interviewees is included in the appendix.

2.1. Key performance indicators

Based on an initial literature study, ten key performance indicators were defined, which can be used to measure the success of wind cooperatives.

Defining success is generally a challenging topic. Thissen and Twaalfhoven (2001, p. 636) describe that “actors achieving their own objectives, is a measure of the success or failure [...]”, which was used as a basis for a structured approach for defining key performance indicators.

Firstly, an initial list of objectives was compiled by assessing the objectives stated on the websites of wind cooperatives. Secondly, these objectives were validated via triangulation, by using a source that defined objectives based on the websites of and interviews with energy cooperatives (PBL et al., 2014).

Thirdly, the validated main objectives were translated into key performance indicators, which led to the following list:

- Installed (wind) energy capacity
- Number of members
- Acceptance of local (wind) energy production
- (local) knowledge and expertise available
- Dividend for members
- Funding community projects
- Amount of capital raised
- Number of local jobs created
- Energy saved by cooperative members
- Years of existence of cooperative

See for more details (Schipper, 2014).

Although the interviewees will be divided into two groups, roughly the same interview structure will be adopted. An in-depth semi-structured interview guide will be set-up to ensure a certain consistency across interviews.

The interviews will be structured using two main questions:

1. When do you consider a wind cooperative success full? (Yielding performance indicators)
2. What factors do either positively, or negatively influence that performance indicator?

The ten key performance indicators listed above, will be printed on cards and used for validation, and in some case as inspiration for the interviewees.

2.2. Data analysis

All interviews will be recorded, globally transcribed and send to the interviewees for verification.

The empirical data will be coded using Atlas.ti. The 57 determinants identified during an initial literature study were used as initial codes. In case a concept introduced in the empirical data does not fall within the concept of an existing code, a new code will be added to the code list. New codes will

be considered validated in case they are introduced by at least two interviewees.

It was decided to define the time scope from 2001 till present. The research focusses on the Netherlands, as the institutional landscape strictly depends on the country (Breukers & Wolsink, 2007). The research is approached from the perspective of already existing wind cooperatives, rather than cooperatives to be started.

3. Results

54 determinants (listed in Table 1) of the 57 determinants found during the initial literature study, were validated by the empirical data. The empirical data analysis, yielded 18 new validated determinants, as listed in Table 2.

-*Column two*: Number of interview quotes per determinant.

-*Column three and four*: Number of wind cooperative representatives and experts that introduced the determinant during the interview. van Oorschot, de Hoog, van der Steen, and van Twist (2013) introduce in their article a three pillar analytical model, consisting of the pillars: aim for change, organizing capacity and economic capacity. If either one of these pillars is weak, a cooperative is bound to run into trouble (van Oorschot et al., 2013). To assess to what extent the set of determinants is in balance, the three pillars will be used to categorize the determinants.

3.1. Important determinants, not found during literature study

Some of the new determinants turned out to be important, in comparison to determinants already found during the initial literature study.

Collaboration with commercial project developer/utility (45)

This determinant relates to a situation in which a wind cooperative and a commercial project developer collaborate in the process of developing a wind park, which in most cases leads to a shared ownership. That collaboration can lead to great benefits for both parties (Coop3; Exp3).

Nowadays, wind cooperatives have to be more open to collaboration, as land positions for (potential) wind parks become scarcer. Furthermore, especially the new generation wind cooperatives do not have the knowledge and expertise required for developing a wind park themselves, whereas commercial project developers do (Coop4; Exp4)

Professionalization of cooperative (25)

This determinant connects to a phase in which, most of the knowledge and expertise a wind cooperative needs is available within the cooperative itself (Exp2; Coop4). An example of professionalization of a cooperative, is that the cooperative establishes an operations office, which supports the cooperative board in their daily tasks (Exp2). As a result, wind cooperatives become professional project developers, in order to maintain/strengthen their position within the wind energy sector (Coop6; Exp4).

Technical and institutional challenges (25)

This determinant is an umbrella determinant of several technical and institutional challenges. Examples of technical challenges are: Disturbances of other infrastructures, such as radars and wildlife, which limit the decision space of cooperative (Exp7). Besides that, the total purchase price of wind turbines increases as the size of wind turbines increases as a result of technical developments (Coop4; Exp5).

Examples of institutional challenges are: local or national elections coming up, which increases the chance of a project being cancelled (Coop1; Exp7). The reason for that can be that political parties are less willing to take in-popular decisions during the period prior elections, as that can cost them voters (Coop1; Exp7). Another institutional challenge is retrieving public acceptance, as the increasing size of wind turbines and the scarcity of land positions for (potential) wind parks away from residential areas, make it harder to do so (Exp6).

Collaboration with other cooperative(s) (18)

Another relatively new trend is that cooperatives start collaborating more intensively, to increase their overall impact. Examples are the establishment of 'DE Unie' (Sustainable Energy Union) and 'REScoopNL' (Renewable Energy Source Cooperatives, the Netherlands) (Coop5).

'DE Unie' is a cooperative utility that obtained the necessary permits to supply electricity (and gas) to small consumers, at August 1, 2013 (ACM, 2013). In doing so, the supply chain from electricity production till electricity supply is owned by cooperatives (Coop3). A wind cooperative on its own would not be of sufficient size for obtaining these permits (Coop6).

REScoopNL was established at November 2, 2013 (REScoopNL, 2014a). REScoopNL originates from ODE (Development of Sustainable Energy) and offers cooperatives a platform to share knowledge, financial capital and power (Exp1; Coop4). In that way (wind) cooperatives can use each other's strengths (Exp4).

Table 1 Overview of validated determinants, defined based on a literature study and an empirical research. Underlined font indicates the determinants that were also introduced as key performance indicator in the methods section.

#	Name of category/ determinant	# Interview quotes	# Wind cooperatives	# Experts
	Aim for change	495		
1	Interaction with community	69	5	7
<u>2</u>	<u>Acceptance of local (wind) energy production</u>	<u>66</u>	<u>6</u>	<u>7</u>
<u>3</u>	<u>Installed (wind) energy capacity</u>	<u>59</u>	<u>6</u>	<u>7</u>
4	Amount and clarity of information shared outside cooperative	51	6	8
5	Interaction with local and national governments	48	6	7
6	Lobby for wind energy	39	5	6
7	Lobby against wind energy	30	6	7
8	Interaction with external stakeholders	23	5	5
9	Development of wind park(s)	21	2	4
10	Concrete and appealing membership	16	4	3
11	Clarity of ambition of cooperative	12	4	4
12	European and national wind energy capacity goals	12	3	4
13	Information asymmetry	12	6	3
<u>14</u>	<u>Number of local jobs created</u>	<u>12</u>	<u>4</u>	<u>5</u>
15	Energy saved by cooperative members	8	2	3
16	Availability of wind (kinetic) power	6	1	4
<u>17</u>	<u>Energy saved by individual members</u>	<u>5</u>	<u>2</u>	<u>2</u>
18	Amount of wind (electrical) power generated	3	2	0
19	Demolishing wind turbine	3	2	1
	Organizing capacity	273		
<u>20</u>	<u>(local) knowledge and expertise available</u>	<u>59</u>	<u>6</u>	<u>6</u>
<u>21</u>	<u>Number of members</u>	<u>51</u>	<u>6</u>	<u>7</u>
22	Social capital of cooperative (and members)	23	4	6
23	Actively recruiting members	17	6	3
<u>24</u>	<u>Years of existence of cooperative</u>	<u>13</u>	<u>4</u>	<u>5</u>
25	Reimbursement of active (local) members	11	5	3
26	Amount and clarity of information shared within cooperative	10	4	0
27	Clarity of entry and exit rules	10	6	0
28	Length of procedures for obtaining permits	10	4	3
29	Impact of media organisations	9	5	1
30	Number of active and experienced (local) members	9	2	2
31	Number of collective purchase deals arranged	8	5	0
32	Clarity of task division	7	5	1
33	Distance between wind park and stakeholders	6	2	3
34	Liquidation of cooperative	6	2	2
35	Merger with other cooperative (having wind capacity/ members)	6	1	1
36	Number of procedures for obtaining permits	6	2	4
37	Stability of policy regime	5	1	4
38	Monitoring the performance of the cooperative	3	3	0
39	Clarity of property rights	2	1	1
40	Conflicts within cooperative	2	1	1
	Economic capacity	183		
<u>41</u>	<u>Amount of capital raised</u>	<u>27</u>	<u>3</u>	<u>7</u>
<u>42</u>	<u>Funding community projects (not necessarily wind related)</u>	<u>23</u>	<u>4</u>	<u>6</u>
43	Capital raised by members	21	3	5
44	Financial participation possibility for local stakeholders	21	4	5
<u>45</u>	<u>Dividend for members</u>	<u>20</u>	<u>6</u>	<u>6</u>
46	Subsidy capital	14	5	4
47	Capital raised by external actors	12	1	6
48	Costs per KW installed wind energy capacity	11	3	3
49	Working capital of cooperative	8	2	5
50	Financial involvement of cooperative in wind park	7	2	3
51	Turnover of cooperative	7	3	1
52	Technical soundness and economic viability projects	6	2	3
53	Economic value per MW	3	2	1
54	Tax advantages	3	2	1

Table 2 Overview of validated determinants merely defined based on empirical data

#	Name of category/ determinant	# Interview quotes	# Wind cooperatives	# Experts
	Aim for change	17		
1	Other activities executed by cooperative	10	3	2
2	Importance of the wind development plans for the community	4	1	2
3	Shares purchased of already existing wind park(s)	3	2	0
	Organizing capacity	184		
4	Collaboration with commercial project developer/ utility	45	6	7
5	Professionalization of cooperative	25	6	5
6	Technical and institutional challenges	25	5	7
7	Collaboration with other cooperative(s)	18	6	5
8	Acceptance of cooperative by community	15	1	6
9	Availability of land positions for (potential) wind park(s)	14	5	4
10	Ability to retrieve the right knowledge and expertise	11	3	4
11	Length of period until the next local elections	11	4	4
12	Availability of volunteering members	7	3	2
13	Time availability of experienced (local) members	7	1	5
14	Social capital of local government	3	1	0
15	Understanding needs and drivers of (potential) members	3	2	1
	Economic capacity	18		
16	Amount of electricity purchased by members and customers	8	4	0
17	Price of land positions for (potential) wind park(s)	5	3	1
18	Spreading risks	5	1	3

Acceptance of cooperative by community (15)

It is not only about the 'acceptance of local (wind) energy production', but also about the 'acceptance of cooperative by community'. It is not guaranteed that a cooperative will be accepted by a community, even though it is initiated by citizens (Coop2; Exp6).

Availability and price of land positions for a (potential) wind park (14)

This determinant relates to a large demand for land positions by several actors operating in the wind energy sector. Most land positions for (potential) wind parks are already taken by large players (Exp2). In some cases, between 10 and 20 parties are interested in one wind location, which makes that the price raises majorly (Coop5). So, if a wind cooperative does not have land positions yet, it is hard to retrieve them (Coop3; Coop4).

3.2. Determinants mostly introduced by one of the interviewee groups

The number of times a determinant was introduced by either a wind cooperative representative or an expert differed greatly in some cases. As a sample of wind cooperative representatives and experts was interviewed, the differences do not necessarily reflect the real life situation, but it gives at least an indication.

Impact of media organisations (Cooperatives: 5, Experts: 1)

The cooperatives described their experiences with media organisations impacting their wind development activities either positively, or negatively. On the one hand, wind cooperatives can use media for their 'lobby for wind energy' (Coop2; Coop6). Wind cooperative NDSM Energie communicates, for instance, very openly about their wind developments plans via a local newspaper (Coop2).

On the other hand, media organisation tend to prefer negative stories over positive stories (Coop1; Coop4). In that way, opposition towards a wind park can be much more publicized, than a large number of solar projects a cooperative has realized in the same period (Coop1).

The expert that introduced this determinant, described that some larger players in the wind energy sector initiated a collective campaign for enhancing the acceptance of wind energy (Exp3).

Number of collective purchase deals arranged (Cooperatives: 5, Experts: 0)

This determinant refers to wind cooperatives arranging collective purchase deals in the field of energy savings and collective solar panel purchases. Wind cooperatives NDSM Energie and Energie-U provide free energy scans to their members, in collaboration with the local government (Coop1; Coop2). Wind cooperatives Energie-U, Windunie, Windvogel and Zeeuwind collectively purchase

solar panels for their (potential) members (Coop1; Coop4; Coop5; Coop6).

Amount of capital raised (Cooperatives: 3, Experts: 7)

The cooperative representatives that introduced this determinant describe that it is generally not a problem to raise sufficient capital for projects they develop (Coop2; Coop3; Coop5). That does possibly explain this determinant was not introduced by other wind cooperative representatives.

Two interviewees concluded that raising sufficient capital can become more challenging in the future, as wind turbines increase in size, which increases the total investment (Coop3; Exp4).

Capital raised by external actors (Cooperatives: 1, Experts: 6)

This determinant is a sub-determinant of the 'amount of capital raised' determinant, which was described above. The determinant refers to financial capital raised by for instance banks, private investors and commercial project developers, to finance part of the wind project development plans of a wind cooperative.

Generally, the initial stages of a wind development project are very risky, as the plans can be aborted because of various reasons (PBL et al., 2014). Therefore, (risk bearing) pre-finance by an external actor can be a major determinant for a successful realization of the wind development plans of a cooperative (Exp5).

The only wind cooperative introducing the determinant was 'Windunie', a wind cooperative specifically focusing on wind turbine owners. The cooperative experiences that banks became less willing to provide loans, as a result of the crisis (Coop6).

Acceptance of cooperative by community (Cooperatives: 1, Experts: 6)

Much more experts than wind cooperative representatives have introduced this determinant. The only wind cooperative introducing this determinant as important factor was wind cooperative NDSM Energie, which is a cooperative part of the new generation, merely focusing on entrepreneurs as members (Coop2). They organize sessions with both opponents and proponents of their wind development plans and maintain strong social ties with actors at local and national level, to enhance the acceptance of the cooperative (Coop2).

It is interesting to note that NDSM Energie also emphasizes the importance of a 'lobby for wind energy' (Coop2), whereas other wind cooperatives argue it is better not to actively answer the 'lobby

against wind energy' as that is likely to fuel the fire (Coop1; Coop3).

In conclusion, the empirical data suggests that the experts are more aware of the importance of the acceptance of a cooperative by the community, than the wind cooperatives itself.

3.3. Categorization of determinants

Although a cooperative does suit part of the characteristics of all better-known organizational forms, such as public organizations, civil organizations and commercial companies, it does not directly fit all characteristics of one specific organizational form (van Oorschot et al., 2013). Consequently, a cooperative cannot be judged merely on either its organizing, economic or change capacity, as it combines all three capacities (van Oorschot et al., 2013).

Therefore, we will evaluate to what extent the determinants in Table 1 and 2 form a coherent set of determinants of the success of wind cooperatives, based on the distribution of the determinants and interview quotes, over the three foundational pillars.

When looking at Table 1, which includes the determinants defined based on both the literature and empirical research, the distribution of the determinants is relatively even. Aim for change has 19 determinants, organizational capacity 21 and economic capacity 14.

However, when looking at the total number of interview quotes per foundational pillar, aim for change has a more dominant position than the others. Aim for change has 495 interview quotes, whereas organizational capacity and economic capacity have 273 and 182 quotes.

Based on Table 2, which lists the determinants defined based on merely the empirical data, it can be concluded that the foundational pillar organizational capacity is dominant, considering both the number of determinants and interview quotes.

4. Discussion

The research resulted in a couple of determinants, which were already expected to be important. That can be concluded, based on the fact that 54 of the 57 determinants defined during the initial literature study were validated based on the empirical data.

Also surprising outcomes, in the sense that they were not identified during the literature study, but were perceived to be important by the interviewees. In total, 18 new validated determinants were defined. The most important determinants relate to collaboration with other

actors and professionalization of wind cooperatives.

Two determinants relating to collaboration, with a large number of quotes, are 'collaboration with a commercial project developer/ utility' and 'collaboration with other cooperative(s)'.

One of the reasons that 'collaboration with commercial project developer/ utility' is not included in scientific literature can be that wind cooperatives were not very open to collaboration with a commercial project developer, as they wanted citizens to reap all of the benefits of a wind park (Coop4). That led to a mismatch of interests, as commercial project developers need a certain amount of turnover to keep their business running (Exp3).

This potential mismatch can be supported by reflecting it on neoclassical economic and social entrepreneurship theory. On the one hand, according to neoclassical economic theory, enterprises seek to maximise profit. On the other hand, according to social entrepreneurship theory, enterprises seek to maximize both economic and social impact. In case of a collaboration between a wind cooperative and a commercial project developer it is essential to align the expectations.

Wind cooperatives are also incentivized to be more open to collaboration nowadays, because land positions for (potential) wind parks are becoming scarcer. This determinant seems to be underexplored, which can possibly be explained by the fact that the Netherlands is a relatively densely populated country. Availability of land positions might be a less important problem in less densely populated countries, which can explain its marginal role in literature.

Furthermore, especially the new generation wind cooperatives do not have the knowledge and expertise required for developing a wind park themselves, whereas commercial project developers have that resources (Coop4; Exp4).

Another option for retrieving knowledge and expertise, is collaborating with another wind cooperative. It seems like collaborating on national level is a relatively new phenomenon in the field of wind cooperatives, as REScoopNL an initiative started to facilitate collaboration was established in November 2013 (REScoopNL, 2014a). That can be the reason that this determinant is not described extensively, in literature.

Collaboration with another party is not the only way wind cooperatives can acquire sufficient knowledge and expertise, as cooperatives can also decide to professionalize. The fact that this determinant was not found during the literature research, can possibly be explained by the fact that need for it has

increased over the recent years, because of the increasing size of wind parks and wind turbines.

Interaction with stakeholder groups is essential for the acceptance of local wind energy production.

When a wind cooperative seeks for acceptance for its wind development plans, it depends on other actors in the actor network they are embedded in. In the list with determinants, these actors were categorized as: the community, the local and national government and external stakeholders.

These actors have either different or similar: views, interests, resources and relations (De Bruijn & ten Heuvelhof, 2008). Different views, underlying interests and relations can lead to the community, local or national government, or external stakeholders opposing wind development plans of a wind cooperative.

On the one hand, a wind cooperative can seek to align these views and underlying interests. On the other hand, a cooperative can decide to compensate the opposing actors by fulfilling other interests. That can be done by, for instance, offering to transfer part of the profit of the wind park to a wind fund. For doing so, it is essential to be aware of underlying interests of an opposing actor group (De Bruijn & ten Heuvelhof, 2008).

The categorization of determinants in the previous section led to conclusions on the distribution of the determinants and interview quotes over the foundational pillars of a wind cooperative.

In Table 1, listing the determinants defined based on both literature and empirical data, the economic capacity foundational pillar has a smaller number of determinants when comparing it to the other foundational pillars. That can possibly be explained by the fact that wind cooperatives might find their (ideological) aim for change more important than profit (van Loenen, 2003). That assumption is underpinned by the dominance of the aim for change pillar in Table 1, based on the number of interview quotes.

At the same time, wind cooperatives need a strong financial basis for contingency of the organisation (van Oorschot et al., 2013). That possibly explains the relative strong presence of the economic capacity pillar in Table 1, although it is not the main objective.

It is hard to say what makes that the organizational pillar so dominant in Table 2, which lists the determinants defined based on merely empirical data. We can, however, share some ideas.

The determinants included under the organizing capacity foundational pillar seem to connect to developments in the Dutch wind energy sector.

Wind turbines increase in size as a result of technical developments. The Dutch national government encourages developing wind parks with multiple wind turbines, rather than developing solitary wind turbines (IM & EZ, 2014). Land positions for wind parks become scarcer (Coop3, Coop4, Coop5; Exp2; Exp3).

Dealing with negotiations on land positions, larger and more costly wind turbines and wind parks lead to larger challenges and require a greater organizational capacity. Determinants on topics such as collaboration, professionalization, technical and institutional challenges and availability of land positions seem verify that assumption.

As these developments are still relatively recent, it can be an explanation for the fact that the determinants connected to it, are not described extensively in scientific literature so far.

5. Conclusions

We started with the question: What are the key determinants of the success of Dutch wind cooperatives?

Three main groups of determinants seem to influence to what extent a wind cooperative can utilize its wind development plans.

Firstly, the 'Acceptance of local wind energy production' by the community and local government. Interaction with stakeholders (community, local and national government and external stakeholders) is key in retrieving that acceptance.

Secondly, the determinants 'lobby for and lobby against wind energy' do, among other determinants, influence the acceptance of wind energy. However, wind cooperatives seem to disagree on the effectiveness of the determinant 'Lobby for wind energy'. One the one hand, some cooperatives argue that it is better not to actively lobby for wind energy, as that fuels the fire of the lobby against wind energy. On the other hand, other cooperatives argue that lobbying for wind energy is essential for successful developing a wind park.

Thirdly, collaboration is a key term when considering determinants that influence the success of cooperatives. Sharing (local) knowledge and expertise is perceived to be one of the main reasons for collaboration. In some cases collaborations are started to share financial capital or to increase power.

Based on the results of this research, the question whether cooperatives can significantly contribute to the objective of having installed 6000 MW wind energy on land by 2020, cannot be answered.

However, as the determinants perceived to influence the success of wind cooperative were identified, these can be used as a basis for policy recommendations, which can increase the likeliness of cooperatives significantly contributing.

6. Recommendations and future research

Umbrella organisations play an important role in the process of sharing knowledge and expertise. Energy cooperatives also seem to have recognized that, as they started umbrella cooperative REScoopNL, in which they share knowledge, expertise, financial resources and power. REScoopNL can, therefore be seen as a representative of a large proportion of the Dutch wind cooperatives. Consequently, it is a relevant party for governmental organisations to discuss what role wind cooperatives can play to contribute to the 6000 MW installed wind energy on land objective and what measures are necessary to materialize that.

As among REScoopNL many other umbrella organisations for sharing knowledge and expertise within the (wind) energy sector do exist, it does not seem necessary to establish a new organization, supporting the interests of the sector. It is supposedly more effective to empower the existing ones.

The government selecting potential land positions for wind parks to reach the 6000 MW wind energy on land by 2020 objective, led to a run for this land positions. In practice large players in the wind energy sector appropriated these positions, which decreased the likelihood that wind cooperatives will get a change to get hold of such a land position. If the government aims to let wind cooperatives play a more dominant role, the government should think of measures to make land positions available for cooperatives.

The obligation for wind project developers, to present a participation plan, is already a step in the right direction, as that is likely to enhance the role of wind cooperatives. The weakness of that obligation is, however, that the participation plan does not have to comply with a minimum share available for participation. The code of conduct for acceptance and participation Onshore Wind', that was signed in September 2014, is already a step in the right direction.

It is recommended set minimum requirements, as that makes that wind developers know what to expect beforehand. Furthermore, greater participation requirements may increase the need for commercial project developers, to collaborate with a wind cooperative.

Less than 1% of the Dutch households are a member of a wind cooperative. Wind cooperatives indicated that they do not have the expertise and financial resources to actively create awareness of their existence among potential members. The Dutch government is recommended to think of measures, such as a subsidy for a promotional campaign, to enhance the awareness of the existence of (wind) energy cooperatives among citizens.

Negative social capital of a local government, elections on local and national level and an unstable policy regime can negatively influence the acceptance of wind energy development plans of wind cooperatives.

The energy agreement for sustainable growth already is a step in the right direction, as that is likely to make the policy regime for sustainable energy more stable and possibly even resilient throughout elections. Besides that, local governments should be aware that their actions in other events can influence the acceptance of wind development plans of a wind cooperative indirectly.

In some cases, (Wind) energy cooperatives have more knowledge and expertise regarding developments in the sustainable energy sector than local governments. It might be interesting for local governments to leverage that knowledge to create policies that stimulate sustainable energy generation on a local scale.

Further research is recommended to focus on validation of the determinants and identification of the relations between them, towards a conceptual model, via a more in-depth descriptive research. That model can be used to develop more specific and accurate policy measure to increase the success of (Dutch) wind cooperatives.

Furthermore, further research can focus on assessing what policy measure are suitable to empower wind cooperatives, based on the determinants defined in this research.

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Appendix: Overview of interviewees

The two tables below give an overview of the interviewees consulted during the empirical research. The interviews were executed from May 6th until June 5th 2014.

The in total six wind cooperatives representatives interviewed got assigned 'Coop#' as reference. The higher the number, the higher installed wind energy capacity. The seven experts interviewed got assigned 'Exp#' as reference. The number was chosen randomly.

Table 3 Interviewees wind cooperative representative interviews

#	Name	Cooperative and Year of establishment	Occupation(s)	Reference code
1	Felix Olthuis	Kennemerwind (1986) REScoopNL	Chair	Coop3
2	Martijn Pater Keijen van Eijk	NWEA NDSM Energie (2012)	Board member Chair	Coop2
3	Rense van Dijk	Windunie (2001) DE Unie	CEO Board member	Coop6
4	Simone Maase	Energie-U (2010)	Board member wind	Coop1
5	Siward Zomer	Windvogel (1991) REScoopEU REScoopNL	Chair Secretary Board member	Coop4
6	Trees Janssens	Zeeuwind (1987) NWEA	CEO Board member	Coop5

Table 4 Interviewees expert interviews

#	Name	Organisation(s)	Occupation(s)	Reference code
1	Albert Jansen	RESCoopNL Windvogel (wind coop)	Secretary Project development	Exp1
2	Anne Marieke Schwencke	AS I-Search	Researcher	Exp2
3	Arthur Vermeulen	Raedthuys Holding	Managing Director Wind Energy Board member	Exp3
4	Jurgen van der Heijden	NWEA AT Osborne Calorie (energy coop)	Senior Consultant General board member	Exp4
5	Philip Boontje	Stech	Analyst	Exp5
6	Ruud de Bruijne	Agentschap NL e-Decentraal	Expert Renewable Energy Secretary	Exp6
7	Ton Hirdes	NWEA	CEO	Exp7