Dynamic Capabilities and Network Benefits

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Abstract

The number of publicly funded initiatives to establish or strengthen networks and clusters, in order to enhance innovation, has been increasing. Returns on such investments vary, and the aim of this study is to explore to what extent the variation in benefits for firms participating in networks or clusters can be explained by their dynamic capabilities (DC). Based on survey data from five Norwegian networks, the results suggest that firms with higher DC are more successful in harvesting the potential benefits of being member of a network.

Keywords: *innovation networks; Regional Innovation Network Organizations (RINOs); network benefits; network events; innovation; dynamic capabilities.*

INTRODUCTION

Over the last decades, there has been a significant increase in the number and size of publicly funded initiatives aiming to strengthen networks and clusters, with the purpose of enhancing innovation and value creation (Ferreira, Raposo, Rutten & Varga, 2013). Inspired by e.g. cluster theory or innovation system theory, these initiatives are built on the recognition that innovation emerges more *between* actors, or through the productive interplay of actors, than through the endeavour of individual actors alone, whether the actors are individuals, firms, universities, research institutions or other relevant entities. Central concepts in this respect are knowledge flows or knowledge sharing, learning and collaboration (Asheim, Arne, Moodysson & Markku, 2011; Berg Jensen, Johnson, Lorenz & Lundvall, 2007; Pai, Chang & City, 2013; Toedtling, Asheim & Boschma, 2013).

Despite the number and size of such publicly funded initiatives, and the fact that they have appropriated an extensive amount of private and public

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resources, returns on these investments vary. For instance, not all firms benefit from being part of such an initiative, or benefit to the same degree, and there is also variation between networks and clusters (Gausdal, Svare & Möllering, 2016). There exists an extensive literature discussing such variation and its causes. While some studies focus on how networks are managed or orchestrated (Batterink, Wubben, Klerkx & Omta, 2010; Busquets, 2010; Gausdal & Nilsen, 2011), others concentrate on the presence and function of intermediaries (Dalziel & Parjanen, 2012; Gassmann, Daiber & Enkel, 2011; Howells, 2006), on social capital (Johnsen, 2012; Rutten & Boekema, 2007), on the composition of the clusters or networks, or on other structural features (Capaldo, 2007; Olsen, Elvekrok, Gausdal, Nilsen & Scholderer, 2013). Typical of these explanatory endeavors is that they focus on the network or the cluster as a whole, and in this sense, they consider factors that are common for all the members of the network or cluster. Consequently, they may be able to explain why some networks or clusters succeed better than others. This approach, however, is less appropriate for explaining variation *between* firms within a network or a cluster. In this study, we focus on the latter issue, exploring how firms' dynamic capabilities (DC) may explain such variation. Moreover, our focus is firms within what we denote as *regional innovation network organizations* (RINOs), i.e. regional networks with a formal organization structure. This structure includes a strategic, operative and coordinating governance form at the network level (Provan & Kenis, 2008). Five such RINOs in Southeast Norway constitute the empirical part of this study.

The DC concept was originally introduced to account for the competitiveness of firms in a general sense. A presupposition of the present study is that firms' dynamic capabilities are also significant in RINOs. If we consider the essence of DC as the ability to detect, grasp and realize potential benefits (D. J. Teece, Pisano, & Shuen, 1997), firms with higher levels of DC should be expected to be more successful in harvesting the potential benefits that a RINO membership opens up for.

The original contribution of this paper is twofold. Firstly, it bridges two research discourses, on networks and DC, which, to the best of our knowledge, have not been previously conjoined. Although forming alliances is discussed in the DC literature, this does not mean that a systematic discussion of how DC affects firms in network organizations like RINOs has been undertaken. Secondly, it contributes to extending the application of DC theory to very small firms, i.e. firms with less than ten employees, since so far most of the DC literature has concentrated on larger firms (D'Annunzio, Carattoli & Dupleix, 2015; Danneels, 2000; Deeds, DeCarolis & Coombs, 2000;

Majumdar, 2000). In the present study, more than half of the firms have ten employees or less.

The paper is structured as follows: First, a theoretical background presenting the main concepts of the study, leading up to the hypotheses to be tested. Then, the main body constituted by sections about the method and the findings, followed by a discussion and a conclusion.

LITERATURE REVIEW

Theories of industrial districts (Marshall, 1920) and clusters (Porter, 1998a; Porter, 1998b) primarily described non-intentional, spontaneous dynamics emerging within specific industries and geographical areas, resulting in heightened frequencies of innovation and increasing value creation. Other theoretical approaches present similar views, like national-, regional-, or sectorial innovation system theory and triple helix theory (Asheim & Isaksen, 2002; Asheim, Smith & Oughton, 2011; Balland, Boschma & Frenken, 2015; Cooke, 2001; Etzkowitz & Leydesdorff, 2000; Freeman, 1993; Leydesdorff, 2012; Lundvall, 2010). Common to all these approaches is the view that innovation is a distributed and interactive process, involving a multitude of actors embedded within dynamic systems that no individual member of the system controls alone. Further, knowledge flows, and knowledge management and learning, are seen as essential drivers of innovation, both within the firm, and across the larger system (Arundel, Lorenz, Lundvall & Valeyre, 2007; Jensen et al., 2007; Lorenz, Lundvall, Valeyre & Holm, 2010).

In light of these theories, regional and national governments as well as other developmental agents have for a long time taken initiatives to *deliberately* establish, develop or enhance systems that copy or mimic those described in the original theories, or to strengthen already existing systems. In this way they aim to promote innovation and value creation (Belussi & Sammarra, 2010). Often, such initiatives involve the establishment of more formal network organizations. In this paper, we address RINOs as one such type of organization. RINOs recruit firms from one industry, or a related set of industries, along with relevant R&D institutions and universities, NGOs, NPOs and service providers. Most RINOs are defined by regional boundaries, or have a regional foundation, and their formal governance is ensured by an elected board and one or more full-time employees. They are often initiated by national or regional governments, or – alternatively – by industry representatives, and their funding is typically covered from both national and regional programs and membership fees (Underthun & Svare, 2015). RINOs may have different goals in addition to innovation, and firms joining

a RINO may do it for different reasons depending on their individual needs or ambitions (Barney, 1991; Contractor & Lorange, 1988; Dyer & Singh, 1998; Pittaway, Robertson, Munir, Denyer & Neely, 2004; Williamson, 1991). Besides innovation, the motives are typically related to costs and risks (Sydow, Schüßler & Müller-Seitz, 2016). However, as a rule, when a firm joins a RINO it expects a return in the form of benefits.

There is variation between RINOs with respect to how well they achieve their aims. In addition, firms within RINOs harvest benefits from their RINO membership to a varying degree. In this study, we ask how this latter variation may be explained. Even if our attention is directed mainly at the individual firm, the answer to this question may also have implications for why some RINOs are regarded as more successful than others: The more benefits the individual members harvest, the more satisfied they are likely to be with their RINO, and the more it will be considered a success.

Although several theoretical contributions have been proposed to explain variation between RINOs, or why some succeed better than others, not all of them explore network organizations conforming to our definition of a RINO. Some study more loosely coupled business networks, other more mature clusters; others again use a version of innovation system theory as their analytical framework. Still, many of these theoretical contributions are also relevant for explaining variation in RINOs. This applies for instance to those looking at structural features, such as the horizontal or vertical structure of a network or cluster. While a vertical structure implies that the whole value chain is represented within the network or cluster, a horizontal structure implies that the main part of the member firms are located at the same level in this chain, which may be associated with a more competitive atmosphere (Olsen et al., 2013). Explanatory approaches looking at the mix between larger or smaller firms (Carlsson & Stankiewitz, 1991), and the presence and engagement of universities and R&D institutions (Mitra & Formica, 1997) may also be relevant to RINOs, as may those approaches focusing on trust or social capital (Johnsen, 2012; Rutten & Boekema, 2007). Finally, we have the explanatory approaches focusing on network orchestration (Batterink et al., 2010; Busquets, 2010; Gausdal & Nilsen, 2011), and on the existence and function of intermediaries (Dalziel & Parjanen, 2012; Gassmann et al., 2011; Howells, 2006). Typical of these explanatory factors is that they attend more to the network, cluster or RINO as a whole, than to individual members. Consequently, few of them have much potential to explain variation in RINO benefits between RINO members. As an alternative explanatory approach, bringing this latter variation to the foreground, we introduce the dynamic capability (DC) theory. The assumption is that firms with higher levels of

DC are more successful in harvesting the potential benefits that a RINO membership represent.

Dynamic capabilities

In the original formulation of DC theory, DC is discussed in relation to the firm's competitive advantage or wealth creation in general (Teece et al., 1997, p. 509). High DC firms are generally considered able to spot opportunities and draw benefits from them, in any area. In an early, and still much referred-to contribution, Teece, Pisano, and Shuen (1997, p. 516) define dynamic capabilities as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (cf. also D. Teece & Leih, 2016). There is, however, no consensus in the literature regarding how the notion of DC should be further specified, nor which capabilities should be included under the heading. At a general level, DC is seen as the firms' capacity to change and adapt to a changing environment. Compared to other firms, High DC firms are characterized by a certain agility in this respect. DC theory also frequently distinguishes between so-called zero and higher-level capabilities. Zero-level capabilities correspond to "ordinary" capabilities, i.e. those allowing a firm to "make a living" in the short term (Winter, 2003). In contrast, DC are seen as "higher-level" capabilities that operate to change ordinary capabilities (Barreto, 2010; Winter, 2003; Zahra, Sapienza & Davidsson, 2006). Teece (2007) suggests three classes, or clusters, of dynamic capabilities, associated with the functions of sensing, seizing and reconfiguring. In other contexts, the latter is also referred to as adaption (Augier & Teece, 2009) or continued renewal (Teece, 2011). In this paper, we use Teece's three-fold DC concept from 2007 as our starting-point.

As for the distinction between zero- and higher-level capabilities, we find the distinction acceptable if by zero-order capabilities is understood mainly those capabilities involved in the daily operation of the firm's current business model. If, however, the concept is extended to include any capability exercised on a daily basis, some challenges arise. Sensing threats and opportunities, for instance, could well be a daily, ongoing activity, and still, in our view, count as a DC. Therefore, the defining character of DC, as we see it, depends not so much on whether they are "higher" or "lower", but on whether they enable productive or innovative changes in a firm's business model. As we see it, this is also the idea underlying Teece's (2007) three-fold concept of DC.

Sensing, seizing and reconfiguration

Sensing, in Teece's terminology, involves being observant towards opportunities and threats (Teece, 2007, p. 1324). This includes constantly scanning, searching and exploring technologies and markets, both locally and further away. It also entails investment in research activity as well as the probing and re-probing of customer needs and technological possibilities. Moreover, it involves understanding the latent demand and structural evolution of industries and markets, and likely supplier and competitor responses (Teece, 2007, p. 1322). Merely collecting information, thus, is not enough: sensing includes learning and interpretation.

Once a new (technological or market) opportunity is sensed, it must be addressed (or "*seized*") through new products, processes or services, which usually requires investments in development and commercialization (Teece, 2007, p. 1326). Timing is also relevant here. The firm, moreover, must define a business model for its commercialization strategy and investment priorities; in fact, business success depends as much on the design of business models, as it does on the selection of physical technology (Teece, 2007, p. 1327).

A key to sustained profitable growth is the ability to recombine and to *reconfigure* assets and organizational structures as the firm grows, or as markets and technologies change. This may require the re-organization of tasks and resources (Helfat & Peteraf, 2009; Iansiti & Clark, 1994; Teece, 2007), as well as the ability to orchestrate and deploy tasks, resources, and activities in new ways. Since a potential tension exists between stability and evolution, reconfiguration also requires that firms face and overcome at least two constraints – cognitive limitations and framing biases arising from established assets (Teece, 2007).

In discussing sensing, seizing and reconfiguration, Teece et al. (1997) refer to them as "clusters" of dynamic capabilities, each with their own set of micro-foundations. Rather than talking about clusters, we suggest that sensing, seizing and reconfiguration should be regarded as three general DC functions that may be present within a firm to a higher or lower degree. These functions can then be realized by a multitude of various micro-foundations, such as organizational routines, technical infrastructure, and individual skills and so on – or, as Helfat and Peteraf (2015) argue, by managerial skills or competencies, or even their psychological underpinnings.

An ongoing discussion within the DC literature concerns commonality, i.e. whether DC display some common features across firms, or whether they are unique to the firm. Even if studies of DC in SMEs do exist (see e.g. Borch & Madsen, 2007; Carlos, 2011; Døving & Gooderham, 2008), there is a tendency in DC theory to use larger firms as cases for the focus of attention. When DC are claimed to be founded in underlying organizational routines, for instance, and when we look at how these routines are described, they

are such that they can only exist in larger firms (Deeds, Decarolis & Coombs, 2000; Majumdar, 2000; Danneels, 2011; D'Annunzio, Carattoli & Dupleix, 2015). By assuming that DC – understood as the three general functions referred to above – may be found to a larger or lesser degree in any firm, and that the micro-foundations underlying them may involve also individual skills (Helfat & Peteraf, 2009; Helfat & Peteraf, 2015), we envisage the possibility that even firms with only very few employees may be analysed using DC theory as a theoretical framework.

Hypotheses

As already suggested, the basic assumption of this study is that firms with higher levels of DC are more successful in spotting the opportunities for value creation that a RINO membership may provide. They are better at generating ideas based on their discoveries, better at bringing these ideas back home, and better at doing what is necessary to actually generate value from them. Based on this assumption, we propose four hypotheses. The first hypothesis is based on the idea that the full opportunities present within a RINO can only be discovered by actually attending RINO meetings and events. It is true that some information distributed within the RINO may come in the form of newsletters or may be found on websites; still, the most valuable opportunities, or the information leading to them, can be seized only by being present at meetings, talking to other RINO members or to others invited into the RINO, such as researchers, investors or representatives of major customers, endowed with relevant and potentially valuable resources. We assume that higher DC RINO members realize this necessity, hence the first hypothesis:

H1: Higher DC RINO firms take a more active part in RINO meetings and events.

The second hypothesis relates to the ability to achieve valuable outcomes from the opportunities spotted. As we have seen, DC theory posits that firms high in DC are better at transforming resource input (potential value) into actual value (Teece, 2014; Teece et al., 1997). While the original theory stated this at a general level, the assumption of the present study involves that this is also valid for resources made available through a RINO membership more specifically. This leads to the second hypothesis:

H2. Higher DC RINO firms harvest more benefits from their RINO participation.

A benefit that merits particular interest is innovation, not least because an essential aim of a RINO is to stimulate its members to become more innovative, or to innovate more. We assume that this is also an essential aim for higher DC firms that join a RINO, and – as part of their generally more developed capacity for harvesting RINO benefits – they also become more actively involved with innovation. The third hypothesis is therefore:

H3. Higher DC RINO firms benefit from their RINO participation by becoming more actively involved in innovation.

Most firms today have learned from the contemporary innovation discourse that entering into productive interactions with others may enhance future innovation. However, a lack of cognitive and cultural proximity due to differences in backgrounds or knowledge bases may be a challenge in such interaction (Knoben & Oerlemans, 2006). We assume that higher DC firms, as part of their generally more developed capacity for spotting and seizing opportunities, are also better at overcoming such challenges, for instance by displaying more developed communicative skills. A potential outcome is that they collaborate not only with other firms similar to themselves, but also with other RINO member categories such as universities, customers, consultants, etc. This leads to the fourth hypothesis:

H4. Higher DC RINO firms collaborate more for innovation across different RINO member categories.

It must be kept in mind that the validity range of all these hypotheses is restricted to RINO firms only. This is due to the data, collected through a survey in five RINOs, against which the hypotheses will be tested. Given the particular nature of these data, we cannot infer to which extent non-RINO firms conform to the findings.

We also wish to add to our hypotheses a research question, relating to the more specific dimensions underlying the DC notion. As we have seen, the concept of DC employed in this paper may be analysed into three sub-dimensions. The research question asks whether some of these dimensions are more significant than others in explaining the potential effect of DC, as stated in the above hypotheses. The research question is:

R1: Which of the underlying dimensions of the DC concept, if any, are involved in explaining the potential effects implied by H1-H4?

RESEARCH METHOD

Data, survey and sample

In testing these hypotheses, the paper draws on data from a survey sent to core firms of five RINOs in Southeast Norway. Each RINO organizes firms pertaining to either one single industry, or to a set of related industries. Core firms are those firms which operate within the industry(ies) specific to the RINO. Prior to the survey distribution, therefore, firms who did not meet this criterion were removed from the distribution list, for instance generic service providers and non-firm RINO members such as universities, NPOs and NGOs.

The survey was designed and administered by the authors, while data were supplemented with information from Statistics Norway on firm size and firm age. For some firms, i.e. the smaller ones, or those that had recently been established or restructured, Statistics Norway possessed no data. In these cases, data on firm size and firm age was collected by contacting the firms themselves, or looking at their websites. The survey was distributed in June 2015 to the persons that the firms had registered as their main RINO contacts. In the smaller firms, this was typically the manager.

Table 1. RINO and sample characteristics

RINO	Founded	No of members 1.6.15	No of core members 1.6.15	No of responses	Response rate %	% of total sample
Oslo Renewable Energy Cluster (OREEC)	2006	60	43	13	30	10
OSLO Medtech (Medtech)	2009	179	124	62	50	47
Norwegian Centre of Expertise – Micro and Nano technology (NCE-MNT)	2003	46	43	20	47	15
Clean Water Norway (CWN)	2007	70	52	27	52	20
Vestfold Film Forum (VFF)	2009	20	20	11	55	8
Total sample		375	282	133	47	100

Source: RINO member lists and survey.

In the larger firms, the contact person could also be an employee with the role of managing the contact between the RINO and the firm. The survey remained open for two months, but most of the respondents answered during the first few days; those who did not, received a maximum of two

reminders. In total, the survey was sent to 282 firms, of which about half responded. By manually comparing the responding firms to the distribution list as a whole, we were not able to discover any particular pattern among the respondents relative to the non-respondents. Table 1 gives an overview of the RINOs and the response pattern.

The majority of the sample firms are small and medium-sized – more than half of the firms have less than 10 employees, and only a few have more than a hundred. The majority of the firms, moreover, are younger than 20 years, and almost half of them are younger than ten years. Table 2 shows the distribution of the sample firms according to size measured by employee numbers.

Table 2. Descriptive statistics. Sample firms distributed according to size for each RINO and the total sample (%)

Number of employees	Medtech	NCE-MNT	OREEC	CWN	VF	Total sample
1	29	15	39	15	82	29
2-5	19	20	15	19		17
6-10	13	15	23	15	9	14
11-20	16	5		11	9	11
21-50	15	15	15	25		16
51-100	3	20		15		8
>100	5	10	8			5

Source: survey, N=133.

Measuring dynamic capabilities

Several instruments have been designed to measure the DC of firms. Janssen, Castaldi and Alexiev (2016) have developed a measurement adapted to service innovation (*measure a*), while an instrument adapted to product development units in larger enterprises (*measure b*) has been offered by Pavlou and Sawy (2011).

Measure a consists of 18 items: four under the heading of *sensing*, four under the heading of *conceptualizing* (which roughly corresponds to what in this paper is called seizing), three under the heading of *coproducing and orchestrating*, and five under *scaling and stretching*. Measure b consists of 20 items: four under the heading of *sensing capability*, four under *learning capability*, five under *integrating capability*, five under *coordinating capability* and two under *reconfiguration capability*.

In setting up our measure of DC, we have consulted both of these instruments. However, none of them really fitted our needs. Measure a, for

instance, was too specialized towards the service sector, and the last group of items measuring *scaling and stretching* focussed on DC functions which are not included in our DC concept. Measure B, on the other hand, had a number of items referring to the specific conditions characterizing product development units within larger enterprises, which were of little relevance to most of the firms in our sample as they are too small to have separate R&D units. We also reacted to the wordings of some of the items, which we judged to involve unnecessarily complex phrasing and use of technical terms.

We consequently decided to design our own instrument. It consists of five statements along the three dimensions/functions of sensing, seizing and reconfiguration. Response scores are distributed along a five-point Likert scale ranging from "Totally disagree" to "Totally agree". The statements are:

- We closely monitor the needs/demands of our customers (SENS1).
- We continuously seek knowledge and ideas that may be used in the development of new products and/or services (SENS2).
- Our employees are good at using the knowledge and ideas that we bring back to the company as a basis for developing new products and/or services (SEIZ).
- We do not limit the company's work with innovation to only a few employees, everyone has the opportunity to contribute (ORG1)
- Sometimes we reorganize our work with innovation based on earlier experience from such processes (ORG2).

Statement 1 and 2 relate to sensing, 3 relates to seizing, while 4 and 5 relate to reconfiguration.

The motivation behind the design was to arrive at a measure that, based on our knowledge of the firms, used a language that would be easily understood. Thus, we tried to use plain language, avoiding technical terms. In addition, the statements constituting the items should be as general as possible, and not refer to specific conditions that would exclude any of the firms. We included only items directly related to the three dimension of DC included in the DC definition used in this study. The number of items was also of relevance. The measures were to be integrated into a survey with a significant number of other items, and in testing the survey before the final distribution, it was criticised for being too long. Although we did benefit from consulting both of the measures that were mentioned above, we needed one with fewer items. Statement 1 in our measure may be seen as a modified version of the following statement from measure a: "We systematically observe and evaluate the needs of our customers." Statement 2 may be seen as a modified version of the following statement from measure b: "We have effective routines to identify, value, and import new information and knowledge." Statement 3 is inspired by the following statement from measure b: "We are effective in utilizing knowledge into new products."

Statement 4 was added as we predicted that a potential characteristic of higher DC firm is their involvement of most of, or all their employees in the innovation process (Høyrup Pedersen, 2012; Svare, 2016). Statement 5 may be seen as a modified version of this statement from measure b: "We often engage in resource recombination to better match our product-market areas and our assets."

Tested on the survey data, the scale has a medium level of internal consistency, as determined by a Cronbach's alpha of 0.62, based on 117 valid cases out of 133 (88%). In most standard textbooks, the recommended value of Cronbach's alpha is 0.7 or higher. However, Cortina (1993) warns that such general guidelines need to be used with some caution, and that values lower than 0.7 are sometimes also acceptable, especially when a scale only has few items, as is the case in this study. Few items give proportionally lower Cronbach's alpha values if everything else is equal.

Table 3 shows the distribution within the variables representing the five dimensions of DC, as well as the merged DC variable.

Table 3. Descriptive statistics. Distribution of values within each of the DC variables and the merged DC variable (%)

	DC	SENS1	SENS2	SEIZ	ORG1	ORG2
1 (Low)		1	1	1	3	1
2	3	2	2	3	7	5
3	4	5	8	18	16	18
4	50	21	26	26	22	33
5(High)	74	72	64	51	52	44

Source: survey, N=122-133.

Table 4 shows the mean levels of DC in the total sample distributed according to firm size (measured by employee numbers). The DC scale runs from 1-5, where 1 represent "a very low level", 5 represent "a very high level", and 3 the medium level.

As we can see from Table 4, the mean DC value varies little in relation to firm size, except for slightly lower values in larger firms. There is almost no variation in DC measured against firm age, and consequently, firm age was not included in the further analysis.

Table 4. Descriptive statistics. Mean DC levels versus firm size

No. of employees	Mean DC	N	SD	Minimum	Maximum
1	4.37	38	.819	2	5
2-5	4.61	23	.499	4	5
6-10	4.63	19	.597	3	5
11-20	4.64	14	.842	2	5
21-50	4.67	21	.483	4	5
51-100	4.10	10	.316	4	5
>100	4.00	6	.632	3	5
Total	4.49	131	.672	2	5

Source: survey, N=131.

Other measures

To test H1 we used a survey variable measuring the number of RINO-events at which some representative of the firm had participated during the last year, or the same number in average for the last three years (FREQ). Table 5 shows the share of the firms within each RINO who placed themselves under the various response categories of this variable, and for the total sample.

Table 5. Average number of RINO-events attended yearly for each RINO and the total sample (%)

Number of events attended	Medtech	NCE-MNT	OREEC	CWN	VF	Total sample
1	16	10		15	27	15
2	7		17	19	27	11
3	49	20	67	56	27	46
4	21	25	17	7	18	18
5	7	45		4		11

Source: survey, N=130.

H2 was tested against the merged variable *total benefit* (TOTBEN), summarizing 12 specific RINO benefits measured in the survey. Each of the items was introduced by the following question: "To what extent has [the name of the RINO] contributed to the following for your firm?" Among the benefits specified, were social benefits (increased knowledge of, or better relations with, relevant potential collaboration partners inside or outside of the RINO), better access to customers or markets, better access to financing, etc. Included were also a set of questions where the respondents were asked

to evaluate the benefits derived from RINO services such as websites or counselling services. The answers were distributed along a five-point Likert scale from "To a very small degree" to "To a very high degree". Table 6 shows the distribution of the firms along the variable values in per cent within each RINO, and the same for the total sample.

Table 6. Total RINO benefit (TOTBEN) for each RINO and the total sample (%)

Total benefit level	Medtech	NCE-MNT	OREEC	CWN	VF	Total sample
1 (Low)	20		46	19	33	20
2	34	37	18	31	33	32
3 (Medium)	20	16	18	23		19
4	15	26	18	19	33	19
5 (High)	10	21		8		10

Source: survey, N=130.

H3 was tested against a variable summarizing the answers to the following three survey items:

"To what extent has [the name of the RINO] contributed to the following for your firm?"

- A more systematic effort within the firm to innovate.
- Increased collaboration with others for innovation.
- Innovations that would not have taken place, had the firm not been member of the network.

Response to each of the items was distributed along a five-point Likert scale from "To a small degree" to "To a high degree". The resulting variable is *innovation benefit* (INNOBEN). Table 7 shows the distribution of the firms along the variable values in per cent within each RINO, and the same for the total sample.

Table 7. Innovation benefit (INNOBEN) for each RINO and the total sample (%)

Innovation benefit level	Medtech	NCE-MNT	OREEC	CWN	VF	Total sample
Low	36	16	64	31	45	35
Medium	44	42	27	50	33	43
High	20	42	9	19	22	22

Source: own survey, N=130.

H4 was tested against a variable constructed as follows: those who reported of having collaborated with others within their RINO during an innovation process, were also asked with whom this collaboration had taken place, or more specifically, whether it had involved a firm "similar to yours", a customer, a supplier, a university, some other research institution, or a consultant. By using the COUNT command in SPSS, a new variable was constructed, where collaboration with one such partner type produced the value 1, collaboration with two such types of partners produced the value 2, etc. The resulting variable is called *plural collaboration* (PLURCOLL). Table 8 shows the distribution of the firms along the variable values in per cent within each RINO, and the same for the total sample.

Table 8. Collaboration across RINO member categories (PLURCOLL) for each RINO and the total sample (%)

Number of member categories involved in collaboration	Medtech	NCE-MNT	OREEC	CWN	VF	Total sample
1	37	26	50	29	40	34
2	17	37	25	33		25
3	31	16	12	24	60	26
4-6	15	21	13	14		15

Source: own survey, N=130.

Controls

We also introduced a set of control variables. Based on previous research (Fitjar & Rodríguez-Pose, 2011), the controls include the size of firms measured by the number of employees (EMPL). Size is seen as potentially relevant, because large firms have more resources to invest in collaboration, and therefore could perhaps be expected to harvest more benefits from such collaboration, also in RINOs. Alternatively, one could argue that smaller firms have more to gain from collaborating with others and therefore would both engage themselves more actively in such collaborations and harvest more benefits from them. Exactly how firm size affects the dependent variables, however, is not our main concern here: merely that it may have a potential relevance. How long a firm has been a member of a RINO may function in the same way: With more years as a RINO member, a firm has had more opportunities to establish productive collaborations with other RINO members, and to harvest RINO benefits. *Length of RINO membership* (MEMB) was thus added as a control variable.

A fourth control variable is trust (TRUST), specified as the trust of a firm toward the other members in their RINO. Trust was included as a control as

it has been proven in earlier studies to significantly influence the quality of communication within collaborations, as well as the propensity to collaborate in the first place (Abrams, Cross, Lesser & Levin, 2003; Anderson, Steinerte & Russell, 2010; Büchel, Nieminen, Armbruster-Domeyer & Denison, 2013; Gausdal, 2012). Trust was measured by a set of three questions/statements. The set was introduced by the following question:

"To what degree do you think that the following statements fit as descriptions of the other members of the network?"

- They act honestly and uprightly.
- They are capable and competent in their fields.
- They value their own interests over others' (reversed).

These statements measure trust between RINO members indirectly, by tapping into the respondents' perceptions of the other RINO members' trustworthiness, specified according to Mayer et al.'s (1995) three dimensions of trustworthiness; integrity, ability and benevolence. Response was again distributed along a five-point Likert scale from "To a small degree" to "To a high degree". The variable TRUST was constructed by summarizing the three underlying variables.

Tested on the survey data, the trust scale has a medium level of internal consistency, as determined by a Cronbach's alpha of 0.62, based on 117 valid cases of 137 (85%).

Table 9 gives an overview of the variables included in the analysis with their properties.

Table 9. Descriptive statistics. Characteristics of variables included in the analysis

	FREQ	TOTBEN	INNOBEN	PLURCOLL	DC	SENS1	SENS2	SEIZ	ORG1	ORG2	EMPL	MEMB	TRUST
N	131	129	124	88	131	131	129	125	128	125	133	133	122
Mean	3.10	3.02	2.66	2.22	4.49	4.61	4.49	4.24	4.13	4.14	3.08	2.02	4.11
Std. Error of Mean	0.09	0.10	0.11	0.11	0.06	0.06	0.07	0.08	0.10	0.08	0.16	0.06	0.07
Std. Deviation	1.00	1.16	1.27	1.08	0.67	0.73	0.80	0.92	1.11	0.93	1.87	0.69	0.76
Variance	1.00	1.34	1.61	1.16	0.45	0.53	0.64	0.85	1.23	0.87	3.51	0.48	0.58
Skewness	0.17	0.06	0.35	0.29	-1.42	-2.27	-1.77	-1.00	-1.14	-0.90	0.46	-0.03	-0.99

	FREQ	TOTBEN	INNOBEN	PLURCOLL	DC	SENS1	SENS2	SEIZ	ORG1	ORG2	EMPL	MEMB	TRUST
Std. Error of Skewness	0.21	0.21	0.22	0.26	0.21	0.21	0.21	0.22	0.21	0.22	0.21	0.21	0.22
Kurtosis	-0.20	-0.72	-0.98	-1.22	2.56	5.93	3.27	0.32	0.41	0.22	-1.00	-0.88	2.07
Std. Error of Kurtosis	0.42	0.42	0.43	0.51	0.42	0.42	0.42	0.43	0.43	0.43	0.42	0.42	0.44
Range	4.00	4.00	4.00	3.00	3.00	4.00	4.00	4.00	4.00	4.00	6.00	2.00	4.00
Minimum	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Maximum	5.00	5.00	5.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00	7.00	3.00	5.00

Finally, we added a dummy variable for the RINOs, to be able to control the possibility that systematic differences between the RINOs were influencing the outcome.

ANALYSIS

H 1-4 were tested through ordinary least squares (OLS) regression analysis. The model takes on the following form:

$$Yi = \alpha + \beta\ DC + \gamma 2\ Controlsi + \epsilon i, \quad (1)$$

where Y refers to the independent variables and β is the coefficient for the variable representing DC (the merged variable *and* the five underlying variables), and ϵ depicts the error term. The independent variables are FREQ, PLURCOLL, TOTBEN and INNOBEN. For each independent variable, the model was run two times, one for the merged DC variable, and then one time for the underlying five variables (SENS1, SENS2, SEIZ, ORG1 and ORG2). VIF tests were conducted, with no multicollinearity problems detected. Table 10 gives an overview of the variables' bivariate correlations.

DC satisfy the assumption of linearity relative to all the dependent variables. The same applies to EMPL relative to the two benefit variables (TOTBEN and INNOBEN).

Table 11-12 present the results of the regressions. For all tables, the first number in each row denotes the coefficient, followed by the standard error in the parenthesis, then by the standardized coefficient after the parenthesis. R2 represents the adjusted R square.

Table 10. Bivariate correlations

	FREQ	TOTBEN	INNOBEN	PLURCOLL	DC	SENS1	SENS2	SEIZ	ORG1	ORG2	EMPL	MEMB	TRUST
FREQ	1	.513**	.521**	.241*	.188*	.164	.130	.170	-.085	.050	.014	.241**	.298**
TOTBEN	.513**	1	.692**	.264*	.285**	.048	.238**	.161	.069	.281**	-.233**	.019	.258**
INNOBEN	.521**	.692**	1	.260*	.297**	.091	.132	.203*	.033	.187*	-.174	.127	.346**
PLURCOLL	.241*	.264*	.260*	1	.198	.125	.279**	-.055	.018	.201	.083	.333**	.099
DC	.188*	.285**	.297**	.198	1	.391**	.562**	.494**	.566**	.536**	-.045	.083	.168
SENS1	.164	.048	.091	.125	.391**	1	.365**	.211*	.077	.138	.091	.104	.287**
SENS2	.130	.238**	.132	.279**	.562**	.365**	1	.490**	.192*	.293**	-.030	.050	.231*
SEIZ	.170	.161	.203*	-.055	.494**	.211*	.490**	1	.304**	.253**	-.076	.078	.292**
ORG1	-.085	.069	.033	.018	.566**	.077	.192*	.304**	1	.406**	-.137	-.076	.071
ORG2	.050	.281**	.187*	.201	.536**	.138	.293**	.253**	.406**	1	-.212*	-.082	.049
EMPL	.014	-.233**	-.174	.083	-.045	.091	-.030	-.076	-.137	-.212*	1	.327**	-.054
MEMB	.241**	.019	.127	.333**	.083	.104	.050	.078	-.076	-.082	.327**	1	.138
TRUST	.298**	.258**	.346**	.099	.168	.287**	.231*	.292**	.071	.049	-.054	.138	1

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Table 11. OLS estimation of the empirical model – DC

	FREQ	PLURCOLL	TOTBEN	INNOBEN
DC	.19(.13).13	.26(.18).16	.42(.15).24***	.43(.17).23**
EMPL	-.07(.05)-.13	-.01(.07)-.02	-.16(.06)-.26***	-.18(.06)-.26***
MEMB	.35(.13).24***	.49(.18).32***	.03(.15).02	.23(.17).13
TRUST	.22(.11).17**	.04(.16).03	.28(.13).18***	.41(.15).25***
RINO_d1	.94(.24).34***	.08(.35).03	.75(.30).23**	.81(.32).23**
RINO_d2	.05(.29).02	-.13(.42)-.04	-.50(.35)-.13	-.37(.38)-.09
RINO_d3	-.24(.22)-.10	-.01(.31).00	.15(.26).05	.23(.28).07
RINO_d4	-.43(.32)-.12	.00(.47).00	.16(.39).04	-.23(.42)-.05
Constant	.77(.71)	-.6(1,03)	.32(.86)	-1,00(.95)
R2	.24***	.05	.19***	.23***
N	122-133	88-133	122-133	122-133

*P < 0.1; **P < 0.05; ***P < 0.01.

Table 12. OLS estimation of the empirical model – the five underlying DC variables

	FREQ	PLURCOLL	TOTBEN	INNOBEN
SENS1	.03(.14).02	-.07(.18)-.05	-.22(.16)-.14	-.18(.18)-.10
SENS2	.01(.13).01	.47(.16).35***	.25(.15).18*	-.01(.16)-.01
SEIZ	.03(.11).02	-.40(.15)-.34***	-.10(.13)-.08	.04(.15).03
ORG1	-.13(.09)-.14	-.02(.11)-.02	-.05(.10)-.05	-.08(.11)-.07
ORG2	.11(.11).10	.26(.14).22*	.30(.12).24**	.27(.14).20**
EMPL	-.07(.05)-.14	-.02(.07)-.03	-.16(.06)-.26***	-.18(.07)-.26***
MEMB	.37(.13).25***	.57(.17).36***	.11(.16).07	.31(.17).17*
TRUST	.23(.12).18*	.08(.16).06	.34(.14).22**	.49(.16).29***
RINO_d1	.82(.26).30***	.11(.34).04	.72(.30).22**	.72(.33).20**
RINO_d2	-.03(.30)-.01	-.20(.39)-.06	-.59(.36)-.15	-.50(.39)-.12
RINO_d3	-.33(.23)-.13	-.04(.30)-.02	.18(.27).06	.23(.30).07
RINO_d4	-.60(.36)-.17*	-.34(.47)-.09	-.31(.42)-.07	-.71(.47)-.15
Constant	1.39(.82)*	-.26(1.06)	1.07(.96)	.44(1.06)
R2	.22***	.17**	.19***	.19***
N	122-133	88-133	122-133	122-133

*P < 0.10; **P < 0.05; ***P < 0.01.

As can be seen from Table 11, the hypotheses H2 and H3 received confirmation. H1 and H4 did not receive confirmation. Although the effect is not very strong, the result confirms that RINO firms with higher DC harvest more RINO benefits in general, including innovation benefits. Addressing R1 (cf. Table 12), we see that ORG2 correlates significantly with both of the two benefit variables (TOTBEN and INNOBEN) while SENS2 does so even with TOTBEN. While DC did not yield significant findings relative to PLURCOLL (Table 12), in Table 14, SENS2 and ORG2 did turn up positive coefficients. In addition, SEIZ turns up a negative coefficient, however, this variable fails to live up to the assumption of linearity relative to its dependent variable, and is therefore disregarded in the further discussion. The other significant coefficients are associated with variables that have a linear relation to their corresponding dependent variables.

Due to the significance of EMPL as a control variable, we transformed it into a dummy and ran a set of extra regressions on the dependent variables relative to which EMPL failed to meet the assumption of linearity, with no significant change in the outcome.

DISCUSSION

Typically, a RINO is established with the aim to benefit the participating firms. However, earlier research (e.g. Gausdal, Svare & Möllering, 2016) along with the present study (cf. Table 6 and 7) show that there is variation regarding the extent to which this aim is realized, both when we compare RINOs and when we compare firms within a RINO. The literature points to a number of factors that may explain this variation, such as network structure, network composition, network orchestration, trust, social capital, etc. In this paper we focus on the variation between firms, and we explore whether variation in achieved benefits from being part of a RINO may be explained by variation in firms' DC.

More specifically, we started out with the assumption that successful RINO firms are more active in identifying and attending RINO meetings and events where opportunies may be spotted, they are better at seizing these opportunities, also by initiating collaborations with others, and at realizing the value inherent in them. How does this assumption measure up to our findings?

Firstly, and perhaps most importantly, the regressions confim that firms with higher levels of DC harvest more benefits from their RINO membership. This includes both the general benefit as measured by TOTBEN and, more specifically, increased activity in the field of innovation as measured by INNOBEN. We interpret this as a confirmation of the core assumption that we started out with in this study, namely that higher DC RINO firms are better at identifying opportunies made available through their RINO, they are better at seizing these opportunities, and at realizing the value inherent in them.

Our findings seem to dismiss the idea of a connection between higher DC and more frequent participation in RINO meetings and events. A possible explanation may be that the RINO benefits explored in this paper derive not so much from the frequency of RINO participation, as from the way the firms utilize the opportunities that such participation opens up for. It may even be that the capacity to prioritize participation at certain meetings or events rather than others is an aspect of the skills that higher DC firm exercise (as part of its *sensing*), or more specifically the capability to distinguish between more or less relevant sources of information.

Our findings also seem to dismiss the idea of a connection between higher DC and more collaboration across various member categories within the RINO. As we will see below, however, when we proceed to look at the regressions involving the five variables underlying the merged DC variable, this conclusion may need to be slightly revised.

Turning to these five variables, and focussing again on the two benefit measures included in our study, we see that one variable is involved in explaining the variation in both of them. This is the variable that is based on the response to the statement: "Sometimes we reorganize our work with innovation based on earlier experience from this kind of task." (ORG2). Those who have high scores on this variable, also score highly on the two benefits variables.

A possible interpretation of this result follows from reflecting on what skills such a reconfiguration requires. Not only does it presuppose that the firm is already involved in innovation. It also implies a certain ability for critical reflection and learning, combined with an understanding of the nuts and bolts of the organization itself. Finally, and just as importantly, it involves the ability and energy to act on this understanding. As innovation typically involves collaboration, it also implies the presence of communicative skills and practices. High scores on this variable (ORG2), thus, are likely to be associated with both highly developed cognitive, pragmatic and communicative skills. This may explain why higher scores on this variable are connected to higher levels of RINO benefits. An additional point, is that this variable, or what it measures, lies very close to the dynamic core of how the DC discourse originally conceptualized dynamical capabilities as a higher-level capability, having to do with the firm's ability to change appropriately relative to a changing environment (Barreto, 2010; David J Teece, 2011; Winter, 2003; Zahra et al., 2006). Only those firms who score high on this variable, thus, deserve to be called dynamic in the sense that DC theory defines.

Another of the five variables involved in explaining variation in the variable measuring RINO benefits in general (TOTBEN), is the one based on the response to the following statement: "We continuously seek knowledge and ideas that may be used in the development of new products and/or services" (SENS2). Surprisingly, no association was found between this variable and the variable measuring innovation benefits. Still, it makes sense that, employees who are active in "seeking knowledge and ideas" to innovate, would also be good at identifying promising opportunities more generally within the field of opportunities that a RINO may be said to represent.

Notice that this latter variable (SENS2) is also involved in explaining variation in another of the dependent variables, namely collaboration across member categories within the RINO (PLURCOLL). This also makes sense, as the skills implied in those who are "seeking knowledge and ideas" may also easily be imagined to involve the ability and energy to scan different *sources of information* and to overcome the cognitive distance involved in understanding and appreciation them – for example when a firm communicates with researchers at a RINO event.

A question that may be raised relative to the findings reported in Table 12 concerns the variables that did *not* yield any significant findings. This question may invite a rather extensive discussion. However, let us focus at the variable based on the response to the following question: "We do not limit the company's work with innovation to only a few employees; everyone has the opportunity to contribute" (ORG1). Many of the firms in our sample are small and young. Typically, they have been founded by an entrepreneur with a special talent for innovation, and even if the firm has since then hired more employees, the founder is still in control of the strategic decisions. Often, he/she also manages the firm's external relations. In some of the larger firms, on the other hand, work is divided between a smaller development department and a larger production department, whose employees may not be involved in either the generation of new ideas or in strategic decision processes. We may assume that in neither of these groups of firms would employee participation stand out as relevant for the respondents when being asked to respond to the question in 4. This may explain the lack of significant findings related to this variable. In hindsight, we may also ask whether the construct measured by this variable should be included as a dimension in DC at all. Even if it addresses an aspect of the internal organization of a firm, and as such, has some potential relevance to the dimension of reconfiguration, it may be said to lie somewhat outside the field that the DC discourse addresses.

One aspect worth noticing in our study is the small size of most of the firms involved: the majority have ten employees or less. However, the merged DC variable, and more specifically ORG2, contribute to explaining variation in both of the two RINO benefit variables included in the study, even when controlling for firm size. We see this as evidence that DC are relevant in explaining why some smaller firms also succeed better than others in realizing the values opened up for them by their RINO participation. Although previous DC studies including smaller firms do exist, the majority focus on larger firms; moreover, the way in which the dimensions of DC are typically conceptualized seems to imply that the construct is more relevant to larger firms – that is, firms large enough to establish organizational routines with a certain independence to specific employees.

The original contribution of this paper, thus, proceeds along two lines. The first relates to the RINO context; to the best of our knowledge, this study is the first to assess the significance of DC to firms within a RINO in their pursuit of RINO-derived benefits. The second line relates to firm size: this study demonstrates that DC are a relevant explanatory factor even for very small firms.

A question that deserves further discussion, is how the DC of smaller firms, including firms with ten employees or less, are grounded in underlying

micro-foundations. This question is based on our earlier suggestion that sensing, seizing and reconfiguration should be regarded as three general DC functions that may be present within a firm to a higher or lower degree. In turn, these functions can be realized by a multitude of various micro-foundations, such as organizational routines, technical infrastructure, and individual skills and so on – or, as Helfat and Peteraf (2015) argue, by managerial skills or competencies, or even by their psychological underpinnings.

Our assumption is that, in smaller firms, more of these micro-foundations relate to individual skills than to organizational routines or technical infrastructure. The present research seems to confirm this, for instance by confirming a positive association between employees' "seeking knowledge and ideas" and RINO benefits. Another skill highlighted by the study, which is probably best seen as exerted by individual firm employees, or managers, is the cognitive, pragmatic and communicative capacities associated with successful reorganization of an enterprise to better accommodate future innovation. As we have argued, this involves a certain ability for critical reflection and learning, combined with an understanding of the nuts and bolts of one's own organization, as well as the ability and energy to act on this understanding. As innovation typically involves collaboration, it also implies the presence of communicative skills and practices. If this is right, the significance of these skills seems, in our study, to be no smaller in larger firms, and so let us not exclude the significance of individual skills in larger firms. Our point is only that they are no less important in smaller firms, and probably more.

This study also has practical implications. Most significantly, when entering a RINO, new members should be informed that their own DC would most probably influence the benefits they will achieve in return. Even though a RINO may be described as an attempt to form a concentrated "field of opportunities", in order to benefit from such opportunities it is not enough to merely be a member. This is true even if the RINO membership opens up for a privileged access to these opportunities that non-member firms' lack. As with every other opportunity, they have to be spotted and identified as such. In addition, the potential value that they offer has to be actively seized and developed.

Emphasizing this to new RINO firms may help them to more realistically scale their expectations regarding what benefits they might achieve, and what they need to do themselves in order to achieve them. This may both prevent disappointment and criticism at a later stage and, it may help the firms act more strategically in their interaction within the RINO. The latter point also relates to the question of whether a firm may take deliberate action to develop or enhance their DC, and if so, how this may be done. The present study

does not explicitly address this point; however, in distinguishing between DC and their underlying micro-foundations, our theory implies that the DC of firms may be enhanced by strategically addressing their micro-foundations, especially in the form of cognitive, pragmatic and communicative skills. Our advice, thus, is that RINOs would do well in putting such strategic development on their agendas, and help and support member firms to develop their DC.

The study has some limitations, the main one being the low number of firms included in the data set, and also that the firms were included on the basis of their RINO membership in five specific RINOs, each representing specific technologies and value chains, which may have produced a bias in the analysis that is hard to detect from the cross-sectional analysis. It should also be noted that the fit of the regression models represented by the adjusted R square is moderate or small. The small sample size, moreover, may have led to an under-identification of potential significant relationships between variables, especially in the models involving the five variables underlying the merged DC variable. Also, cross-sectional data should not uncritically be used to give evidence of causal relationships. This is why we emphasise that we only purport to explore systematic variation within our sample, representing firms who are already RINO-members. We do think, however, that the systematic variation that we find, may be used to support more general claims related to how dynamic capabilites influence firms in such RINOs, as we have argued above.

CONCLUSION

In this study, the following hypotheses were tested:

H1. Higher DC RINO firms take a more active part in RINO meetings and events.

H2. Higher DC RINO firms harvest more benefits from their RINO participation.

H3. Higher DC RINO firms benefit from their RINO participation by becoming more actively involved in innovation.

H4. Higher DC RINO firms collaborate more across different RINO member categories for innovation.

Whereas H2 and H3 were confirmed, H1 and H4 were not. This study, thus, concludes that firms with higher DC are more successful in harvesting the potential benefits of being members of a network. They are better at seeking out potentially useful resources made available through their RINO,

and at transforming them into actual benefits. While the majority of previous studies have had a main emphasis on larger firms, we found DC to be of relevance also to smaller firms.

Exploring the five individual variables underlying the merged DC variable used in this study, we found that employees "seeking knowledge and ideas" and the cognitive, pragmatic and communicative capacities associated with successful *reconfiguring* of an enterprise to better accommodate future innovation, may be seen as dynamical capabilities with a positive influence on the success of a firm within a RINO. This relates both to the two forms of benefits measured in the study, and collaboration bridging various types of RINO members. Reconfiguring, also, lies close to the dynamic core of how the DC discourse originally conceptualized dynamical capabilities as a higher-level capability: as reconfiguring is about the firm's ability to change appropriately relative to a changing environment. A pragmatic implication of these findings is that firms entering RINOs may become more aware of how their own skills and capabilities are likely to influence what they will get out of their membership. This is also a point that the RINO management should address.

Acknowledgements

This work was supported by the Norwegian Research Council's VRI program (project 238968).

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Abstract (in Polish)

Istnieje coraz większa jest liczba inicjatyw finansowanych ze środków publicznych w celu ustanowienia lub wzmocnienia sieci i klastrów dla zwiększenia innowacyjności. Zwroty dotyczące takich inwestycji różnią się, a celem tego artykułu jest zbadanie, w jakim stopniu różnice w korzyściach dla firm uczestniczących w sieciach lub klastrach mogą być wyjaśnione przez ich dynamiczne zdolności (DC). Na podstawie danych z pięciu sieci norweskich wynika, że firmy z wyższym DC są bardziej skuteczne w zbieraniu potencjalnych korzyści płynących z członkostwa w sieci.

***Słowa kluczowe**: sieci innowacji; regionalne organizacje innowacji (RINO); korzyści sieciowe; wydarzenie sieciowe; innowacje; dynamiczne możliwości.*

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