



**Building an empirically grounded conceptual frame for
business networking as a mechanism for pro-environmental
business growth**

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Abstract:	<p>Whilst there is a growing body of evidence relating to the environmental capabilities, eco innovation, sustainable supply chains and green skills of individual SMEs (small and medium-sized enterprises), much less attention has been paid to networked approaches to pro-environmental SME support. The empirical studies that do exist mostly take a firm centric approach. This study takes a network centric view to describe hitherto under-explored features of network functionality based on case analysis of a single business support network in the East Midlands of the UK. The resulting conceptual framework offers an analytical tool that can be used to study network functionality for pro-environmental SME development more widely.</p> <p>Empirical data for this case analysis of a single regional low-carbon business network is drawn from interviews with 25 stakeholders, analysis of programme level data and documentation, 'insider' observation of network activity and evidence from both independent and internal evaluations. The study charts key aspects of network provision and its impact upon SMEs and wider stakeholders. The paper then presents a conceptual model of pro-environmental business networking that identifies key internal features of network activity as well as various external drivers of multi-stakeholder engagement in the shift to a more sustainable local economy.</p>

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Abstract

Whilst there is a growing body of evidence relating to the environmental capabilities, eco innovation, sustainable supply chains and green skills of individual SMEs (small and medium-sized enterprises), much less attention has been paid to networked approaches to pro-environmental and sustainable SME support. The empirical studies that do exist mostly take a firm centric approach. This study takes a network centric view to describe hitherto under-explored features of network functionality based on case analysis of a single business support network in the East Midlands of the UK. The resulting conceptual framework offers an analytical tool that can be used to study network functionality in the service of pro-environmental SME development more widely.

Empirical data for this case analysis of a regional 'low carbon' business network is drawn from interviews with 25 stakeholders, analysis of programme level data and documentation, 'insider' observation of network activity and evidence from both independent and internal evaluations. The study charts key aspects of network provision and its impact upon SMEs and wider stakeholders. The paper then presents a conceptual model of pro-environmental business networking that identifies key internal features of network activity as well as various external drivers of multi-stakeholder engagement in the shift to a more sustainable local economy.

Keywords: de-carbonisation; pro-environmental; business network; transition; clean growth, sustainable economy; small to medium-sized enterprises; case study; UK.

Paper type: Feature article

Introduction

The importance of networks in developing SMEs' capabilities is well documented by literature (OECD, 2017) but whilst there is a growing body of evidence relating to the environmental capabilities, eco innovation, sustainable supply chains and green skills of individual SMEs (small and medium-sized enterprises), much less attention has been paid to networked approaches to pro-environmental and sustainable SME support (Paterson et al., 2022), and the empirical literature that does exist is small and largely takes a firm centric approach (Jämsä et al., 2011; Ryan et al., 2012). This paper is rooted in research into a business support programme located in the East Midlands of the UK that has successfully delivered pro-environmental benefits to SMEs over several years. Using empirical evidence drawn from the Project and a review of emerging literature, the paper develops a practical conceptual framework that can be used as an analytical tool to study network functionality in the service of pro-environmental SME development more widely.

The remainder of this paper is structured as follows; following a brief review of relevant literature, we describe the various data collection and analytical methods used in drawing together the diverse data and evidence associated with the case in question. Findings are separated into empirical evidence that describe the growth and effectiveness of the Network in question between January 2017 and March 2020, followed by an analysis of qualitative data pertaining to the functioning of the Network from a variety of stakeholders. The paper sets out a thematic framework, drawn from the literature (in a deductive manner) which is validated by qualitative data drawn from the case analysis. This 'Framework for Action' on pro-environmental business networking identifies four key internal features of network activity as well as four foundational features of multi-stakeholder engagement that together support the shift to a more sustainable local economy. In the final discussion section, we link key Network features with Russell & Smorodinskaya's (2018) four levels of network maturity, in order to propose a new maturity model of pro-environmental enterprise support.

Definitions of 'sustainable business' commonly link economic, social and environmental considerations; with these three elements reciprocally reinforcing each other and underpinning economic growth, environmental concerns and social well-being (Wagner and Svensson, 2014). This is commonly referred to as business driven by a 'triple bottom line' (Elkington, J., 1998, Savitz, A. W. and Weber, K., 2007). To avoid the overlapping definitions and confusion inherent in the terms 'low carbon', 'green', 'net-zero' and 'sustainable' business; this paper refers to 'pro-environmental' business as a broad definition that describes any firm that is explicitly shifting its internal practices to reflect environmental values, as well those that supply clean technology and other Low Carbon and Environmental Goods and Services (LCEGS). Following the Green Growth Knowledge Platform (2015, p.8), we define a pro-environmental business as one that "explicitly focus their efforts on solving environmental challenges by reducing negative environmental impacts, increasing resilience against environmental impacts, or by providing a more efficient and responsible use of natural resources. Through their products and services, they contribute to the protection of the environment, the climate, biodiversity and natural ecosystems." Although not the focus here, these environmental values are commonly and (some say) intrinsically linked with the social values of the 'triple bottom line'.

Geels (2012, p.472) argues that pro-environmental innovation commonly emerges in niches such as R&D laboratories, subsidised demonstration projects or small market niches where users have special demands and are willing to support emerging innovations. Geels (ibid.)

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3 argues that these niches are crucial for transitions, because they provide the seeds for wider
4 regime and systemic change, and distinguishes three social processes that support innovation
5 within these niches:

- 6 1) Learning about imperfections of technology and how they may be overcome, issues of
7 organisation, market demand, user behaviour, infrastructure requirements, policy instruments
8 and symbolic meanings.
9
10 2) The articulation (and adjustment) of expectations or visions, which on the one hand
11 provide guidance and direction to the internal innovation activities, and on the other hand aim
12 to attract attention and funding from external actors.
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14 3) The building of social networks and the enrolment of more actors, which expand the social
15 and resource base of niche-innovations.
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17 Geels (ibid. p.472) contends that niches are often driven by “*experimental or demonstration*
18 *projects, which allow niche actors to learn about innovations in real-life circumstances.*
19 *Niches gain momentum if visions (and expectations) become more precise and more broadly*
20 *accepted, if the alignment of various learning processes results in a stable configuration*
21 *(‘dominant design’), and if social networks become bigger (especially the participation of*
22 *powerful actors may add legitimacy and bring more resources into niches)’”.*

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25 The context for this case study is a funded programme that aimed (and succeeded) at
26 supporting regional SME decarbonisation. This paper explores the role that facilitated pro-
27 environmental business networking played in this provision, broadening Geels’ conception of
28 resource-based niches and deepening our understanding by describing SME level and
29 leadership level network features that support productive social processes.
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32 Studies examining sustainability at the network level are rare (Wilding et al., 2012). For the
33 purpose of this study, like Spanikova *et al* (2014), we subscribe to a broad definition of a
34 business network as:
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36 “... a form of inter-firm cooperation that allows companies, ... to
37 collaborate together on a basis of common development objectives expressed
38 in a cooperation agreement/contract. The companies decide to join their
39 strengths, share information and create synergies to become more innovative
40 and competitive on the domestic and international markets, while keeping
41 their autonomy, not creating a separate legal entity. This cooperation model
42 is suitable for any kind of business activity and sector.”
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45 This contrasts with sustainable supply chains/networks, industrial supply networks, business
46 clusters, alliances and joint ventures which have much narrower definitions. For our
47 purposes, business networks are not necessarily co-located and commonly preserve their
48 autonomy without recourse to any new legal entity. In a business network, companies can
49 collaborate voluntarily to create opportunities and expand their individual business interests.
50 Our review of the literature pertaining to pro-environmental business networks mirrors the
51 findings of Jämsä *et al* (2011), who argue that although interest in sustainable business has a
52 long history and the structure and nature of SME networks are also well researched, linking
53 sustainability to SME networking is much less common. The table below summarises themes
54 emerging from the review of literature that relate directly to business networking for pro-
55 environmental SMEs. The analysis highlights two distinct levels. The first level relates to the
56 function of the network for SMEs – i.e. how a network can benefit firms. The second level
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3 relates to the infrastructure, orchestration (after Planko *et al.*, 2016) and leadership of the
4 network itself.
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For Peer Review

Network Functions at SME Level

Theme	References to literature
<p>Network as a source of value co-creation Learning in (and through) the network as a key process through which enterprises and their network evolve. Co-creating economic as well as environmental value. Networks support testing new technologies, applications and markets; knowledge development; knowledge exchange; co-creation of products and services; co-creation of commercially viable products and services; feedback loops with user groups; new business models; creation of temporarily protected niche markets. SMEs gain different benefits at each phase of development as pro-environmental firms interact in different ways at the boundaries of each level.</p>	<p>Jamsa <i>et al</i> (2011) Romero & Molina (2011) Ryan <i>et al</i> (2012) Planko (2016) Baranova & Meadows (2017) Baldassarre <i>et al</i> (2019)</p>
<p>Network as a source of opportunities and resources New contacts and networking with like-minded business colleagues, information on new market opportunities, support to gain accreditations, marketing insight and decision making, collaboration on product development and market research.</p>	<p>Conway (2014b) Jamsa <i>et al</i> (2011) Petruzzelli <i>et al.</i> (2011)</p>
<p>Network as a site of SME capacity building Importance of firms developing dialogic, learning and partnering skills. New skills and knowledge exchange; knowledge of business models; knowledge of new legislation and funding opportunities. Networking skills; collaborative learning for sustainability; 'ecological literacy'; partnerships that create new market realities.</p>	<p>Ryan <i>et al</i> (2012) Planko (2016) Baldassarre <i>et al</i> (2019) Mellett <i>et al</i> (2018)</p>
<p>Network as a platform of relationships. Dyad relationships as central mechanism of value creation. Importance of interaction between individual 'boundary-spanners'. Recognition that network interaction is complex. For example, weak ties with multiple suppliers and with suppliers that bridge structural holes are more likely to lead to radical eco-innovations than strong ties with strategic suppliers.</p>	<p>Jamsa <i>et al</i> (2011) Geels (2012) Planko (2016) Ryan <i>et al</i> (2012) Shapira <i>et al</i> (2014) Russell & Smorodinskaya (2018) Roscoe, Cousins, & Lamming (2016)</p>

Table 1. Network functions at SME level

Network Leadership

Theme	Ref in literature
<p>Network vision, architecture, orchestration and facilitation High functioning networks feature: value co-creation strategy definition, co-creator targeting, collaborative networked organisation creation, customer community creation, trust building, interaction channel building, capabilities provisioning, rewarding mechanisms, product development, multi-stakeholder interface, infrastructure management and financial management.</p>	<p>Planko (2016) Geels (2012) Ryan <i>et al</i> (2012) Mellett <i>et al</i> (2018)</p>
<p>Network culture Stakeholder goals related to wider system. Knowledge exchange. Product and service co-creation and testing. Eco-preneurial learning. Facilitating collaboration between firms Variation in the strength of ties with stakeholders.</p>	<p>Ryan <i>et al</i> (2012) Planko (2016) Jamsa <i>et al</i> (2011) Roscoe, Cousins, & Lamming (2016)</p>
<p>Network capacity building Proactively build and widen skills for: futures visioning, network orchestration, partnering for system change and relationship portfolio management. Supporting the development of new collaboration and pro-environmental skills. Developing triple-helix collaboration between business, HEI & local govt. Network learning – evidence and data about Network performance collected and shared. Creation of feedback loops – for product/service users, regional data and network performance.</p>	<p>Planko (2016) Russell & Smorodinskaya, 2018 Geels (2012)</p>

Network platform

Network functions and capabilities interact with and are mediated by the ‘socio-technical landscape’ and the ‘socio-technical regime’.

Recognition of varying network needs in different phases/ development over time

Recognition that needs and modes of interaction between SMEs and regional agencies vary at different phases and at phase boundaries.

Market creation by raising user/customer awareness and deliberate demand adaptation by promoting new business models and protected niche markets.

Russell & Smorodinskaya, 2018
Geels *et al.* (2011, 2017, 2018)
Planko (2016)
Baranova & Meadows (2017)

Table 2. Network leadership

Methodology

The research question driving this study was ‘What are the key features of pro-environmental business networking from the perspective of multiple stakeholders?’

The study aimed to develop a deeper understanding in a practice rich environment where perspectives of multiple stakeholders all have relevance; and thus a qualitative case approach was deemed appropriate (Huberman and Miles, 2012). As noted above, the literature on networked approaches to pro-environmental business development is meagre and conceptual and theoretical understanding is still emerging. This research follows a case study approach in line with Yin (2003), who advocates the use of case studies in the early phase of theory development.

In order to triangulate findings, following Huberman & Miles (2012) and Yin (2003), both primary and secondary data were collected from a variety of sources that included a review of literature, interviews with 25 stakeholders, analysis of programme level data and documentation, ‘insider’ observation of Network activity and evidence drawn from both independent and internal evaluation of the aforementioned Network.

As Yin (2003, p. 43) notes, the “one rationale for using a single case approach is the importance of the case”. The business support network in question is significant because, at the time of research, it supported one of only a handful of business development programmes across the UK that provided multi-strand business support for pro-environmental SMEs. The case in focus offered energy and resource efficiency audits, grants for CO₂ reducing installations, bespoke research and development consultancy, product development and prototyping, plus business growth support focused on low carbon and environmental goods and services (LCEGS). The credibility of the provision is further demonstrated by the positive user feedback, local and national recognition (see Research context below).

This study takes a network centric view to describe hitherto under-explored features of network functionality. Like Ryan, Kajzer-Mitchell, & Daskou (2012), this study is rooted in an ‘interactions and network approach’ (INA) to business change for sustainability, in which firms are viewed as interdependent actors within complex networks which they shape through market practices. This means that firms are “*in a position to both create change, and create stability in response to change, both internally and externally generated. This constructivist view on change allows for actor level agency while recognizing the impact of the system itself*” (Ryan, Kajzer-Mitchell, & Daskou, 2012 p.581). This theoretical position supports a constructivist approach to analysis that goes beyond a firm-centric view to one that supports a whole network analysis and a focus on eco-entrepreneurial learning, collaborative action and pro-environmental transformation.

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3 Respondents were chosen to reflect a range of perspectives on the nature of Network activity
4 and utility.

- 5 • 5 Project Partners (colleagues from local councils and other University faculty
6 involved in the wider Low Carbon Project)
 - 7 • 4 Regional stakeholders (Chamber of Commerce, Local Enterprise Partnership)
 - 8 • 16 Network members (SME owners and managers – O/Ms).
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11 Semi-structured interviews with fifteen Network stakeholders were conducted by two senior
12 academic staff between September 2019 and February 2020. This included twelve SME
13 Network members and three representatives from regional organisations that supported or
14 collaborated with the Network activity. Interviews lasting between 30-90 mins were
15 undertaken with research respondents, following University ethical protocols. Documentary
16 and interview analyses were undertaken using a thematic analysis approach; defined by
17 Braun & Clarke (2006) as an appropriate method for identifying, analysing and reporting
18 patterns (themes) within data. Its application is deemed to be valuable in gaining insights into
19 people's experiences and in enabling the construction of 'particular phenomena in particular
20 contexts' (Braun & Clarke, 2013, p.121). In this approach to data analysis, the stages of
21 thematic analysis were followed; data review, data coding, themes development and finally
22 refinement of the key themes (Braun and Clarke, 2006). NVivo, a qualitative data software
23 tool, was used to facilitate the organisation and analysis with first order coding of data
24 referencing the high-level themes identified in the literature (See Tables 1 & 2 above). Once
25 collated, this data was then reviewed by two researchers to establish sub-themes and establish
26 their relationship with the existing knowledge base. All data was coded in iterative cycles
27 that moved between thematic analysis and engagement with the existing literature, Thematic
28 saturation was agreed by cross researcher validation once additional data added no further
29 explanation of the themes in focus (Huberman and Miles, 2012).

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34 The validity of the study is enhanced by theoretical triangulation (Yin, 2003), by making use
35 of several theoretical approaches to develop the theoretical frame described in Tables 1 and 2
36 above. The construct validity was supported by internal research review by non-participating
37 researchers and presentation to external researchers and practitioners at a dedicated
38 conference in 2020. In a parallel study of the features of pro-environmental business support
39 (Paterson et al., 2022), expert respondents rated the importance of multi-stakeholder
40 engagement with a strong (81%) level of consensus.

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44 *Research context*

45 Based in the East Midlands of the UK, the enterprise support project in focus is part-funded
46 by the European Regional Development Fund - as part of the European Structural and
47 Investment Funds growth programme 2014-2020. The project ran between 2016-2022 and
48 won regional and national recognition as winner of the Derbyshire Environmental Impact
49 Award 2021, a commendation from the East Midlands Energy Efficiency Awards 2022 and
50 as a finalist in the UK Green Gown Awards 2022. The Project has three strands: an energy
51 efficiency grants programme, low carbon product development and the business Network
52 which is the specific focus for this particular case study. All three strands are configured
53 around principles of shared learning and capability-building.

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57 Between November 2017 and October 2019, the Network element of the Project provided
58 548 hours of dedicated business support to 33 eligible SMEs in one region of the East
59 Midlands, with turnover ranging between £4,000 and £5,000,000. These interventions
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3 included specialist support for environmental accreditation, pro-environmental value
4 mapping, green marketing as well as ‘Green Growth Accelerator’ workshops and a ‘Green
5 Dragon’s Den’ experience that allowed business leaders to rehearse their ‘sustainable
6 business’ pitch with procurement managers from larger demand side organisations, such as
7 public and commercial sector buyers. The business Network also provided a range of open
8 access opportunities to a wider membership of over 140 organisations from across the region
9 and beyond (rising to 250 organisations by November 2022). These activities included a
10 regional Sustainability Summit, Green Market-Place events, specialist workshops (e.g. on
11 Circularity for SMEs) and quarterly low-carbon networking sessions, plus social media, web-
12 based information and online learning resources. Network members represented stakeholders
13 from the government, business and civic community thus confirming the tripartite/ triple
14 helix nature of the network (Roloff, 2008; Russell and Smorodinskaya, 2018).
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Network members – Oct 2019	Number
Local Councils	5
HE and FE providers	7
Chamber of Commerce	2
Community Interest Groups	4
LEP and the Growth Hub	2
SMEs, including	
Micro	71
Medium	14
Small	28
Large companies	6
Total	144

Table 3 Pro-environmental network: member analysis

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As such, members fell into five overlapping strands of interest. SMEs interested in improving their own energy and resource efficiency; SME suppliers of low carbon and environmental goods and services (LCEGS); SMEs seeking to enter the green marketplace with new (to-firm) eco-innovations; plus a small number of regional supporting agencies and up-stream corporate supply chain organisations. A centre piece of the Network’s communication strategy was provision of a searchable network map that allowed Network members to connect with one another and with larger organisations in the region.

A variety of quantitative data relating to the Network were collected as part of ongoing Network activity which are used below to describe its features, impact and growth. The Network team also conducted an online survey of all Network members using Google Forms between February and April 2020. The survey attracted 29 responses from the Network membership, achieving 19% survey response. 86% of the responses came from micro

businesses and the rest came from three small businesses and one large organisation. 76% of the survey respondents had engaged with face-to-face activities.

The survey indicated that the regular networking events were the most popular activity of the range of face to face and online activities, with 59% of respondents; followed by conference-type events including sustainability summits and shift leadership events attracting 41% of the survey responses. Accessing the network website for information and resources and attendance of the market-place events either as an exhibitor or a guest were also in the top five engagement activities.

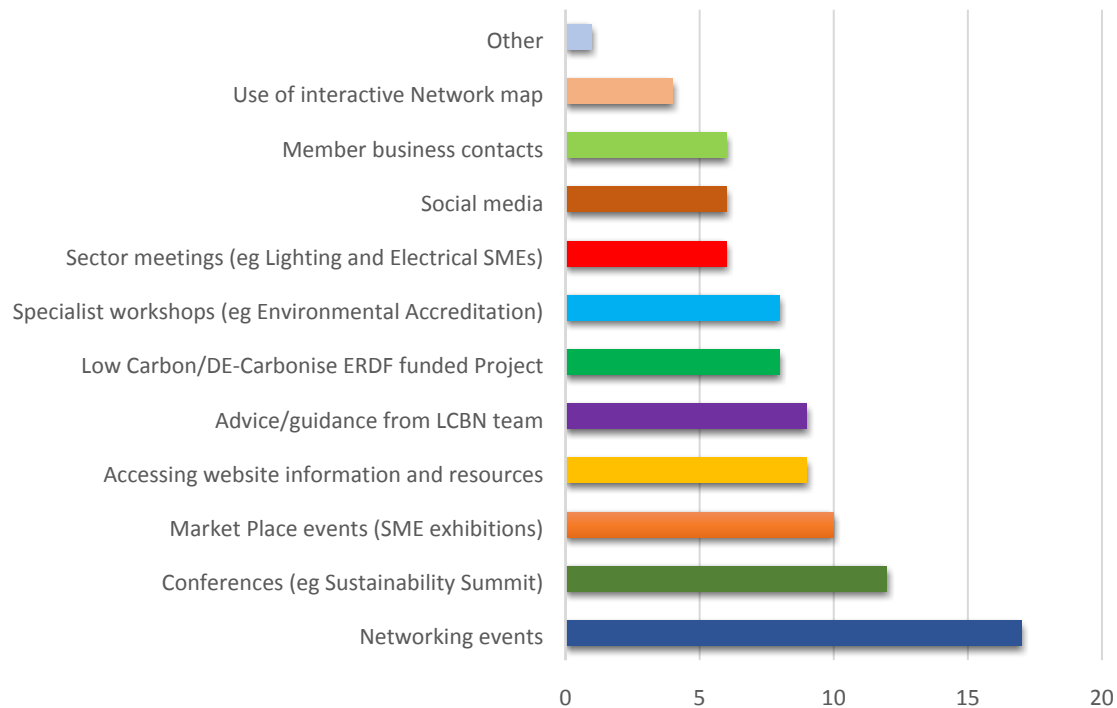


Table 4. Engagement with Network activities

Impact of the Network

An Independent Evaluation (Carney Green, 2019) acknowledged a range of specific benefits for individual SMEs created through their engagement with the wider ERDF funded Project. These included: better understanding of energy usage and resource use; identifying measures to improve energy efficiency; reduced operating costs; reduced carbon emissions (through advice on carbon reductions associated with specific equipment, use of raw materials, waste, recycling, transport, and employee behaviour change); implementing energy efficiency improvements (using the grant scheme); identifying financial cases for making energy efficiency improvements; improved working conditions resulting in enhanced workforce wellbeing and productivity; access to specialist support; production of working prototypes. The Project Summative Assessment (Shaw et al., 2022) presents evidence that over its six-year lifespan the Project delivered over 30,000 tonnes CO₂e reductions and in excess of £450,000 p.a. energy savings to 273 SMEs. It adds that the Network events programme added real value to the wider aims of the Project by bringing SMEs together, allowing them to share experience and expertise, such that SMEs began demonstrating their achievements to one another, leading to better access to specialist equipment, knowledge and expertise, and enabling more SMEs to progress eco-innovations (ibid., p.24).

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3 A range of additional benefits were linked specifically with Network activities by Impact
4 Survey respondents, who declared benefits, as follows:
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- 7 • Raised awareness of pro-environmental business opportunities in the region: 82.8% of
8 the survey respondents agreed that the network opened up new business opportunities
9 in green market niches.
- 10 • Raised awareness about the support available for pro-environmental businesses in the
11 region. 69% of respondents agreed that participation in the network made them more
12 aware of such support with 17.2% of respondents strongly agreeing.
- 13 • The platform of relationships that connected SMEs with various business support
14 providers. 79.3% of survey respondents stated that they had made contact with
15 regional supporting agencies including councils, universities, Local Enterprise
16 Partnership (LEP) and various NGOs as a result of their Network activities.
- 17 • 31% of the survey respondents said Network membership provided reputational
18 benefits.
- 19 • 24% of the survey respondents felt that their business had grown or became more
20 resilient since becoming a Network member and the same number of respondents
21 commented they had set up new business collaborations as a result of the network
22 activity.
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26 More than two thirds (67%) of Impact Survey respondents reported having a better
27 knowledge of energy and resource efficiency measures and half of the respondents said they
28 were more confident in implementing these measures in the workplace. This data confirms
29 the role of the Network in consolidating decarbonisation (and cost saving) outcomes and
30 demonstrates the practical business value created for individual SMEs (green business
31 opportunities, growth, reputation and resilience. There were many SMEs in the Network that
32 created environmental and social benefits beyond green growth, greater energy, reduced
33 emissions and cost savings for themselves and others. This included firms that employed and
34 supported vulnerable people in delivering environmental goods and services; and others that
35 provided direct environmental services such as land reclamation and recycling, for example.
36 Given the emissions reduction aims of the wider project, the impact of the Network on these
37 core/pre-existing environmental and social purposes was not monitored or measured. In
38 hindsight and with the greater contemporary attention to social value, this was an omission.
39 The analysis that follows explores comments of individual business leaders and wider
40 stakeholders in relation to themes identified by the review of literature.
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45 Study findings

46 As we move into this analytical section it is important to recognise the symbiotic relationship
47 between the three key elements of the wider Project business support provision: energy
48 efficiency grants, R&D support and business growth support and the business network. This
49 was a wholly deliberate strategy, in that the Network was designed as a channel to attract
50 SMEs to the funded provision which represented the learning-centred core of the Network. It
51 was difficult, therefore, for Network members that also benefited from the dedicated business
52 support to differentiate between the two. From an analytical perspective, it is important to
53 view the Network as a context for pro-environmental business learning and development
54 delivered by experienced University staff and industry experts in addition to a wider range of
55 more general networking, information, inspiration and guidance.
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The Network as a source of opportunity, resource and reputation building

The review of literature showed that for smaller, entrepreneurial businesses, the facilitation of new contacts and networking with like-minded business colleagues was one of the most valued outcomes of sustainability focused support provision. Studies show that the ensuing connections with other pro-environmental SMEs commonly result in new business opportunities, partnerships and the development of additional skills (Conway, 2014b; Jämsä *et al.*, 2011; Petruzzelli *et al.*, 2011).

This was confirmed by members of the Network. Interview respondents noted the benefits of information and knowledge shared within the Network (for example about grant funding), access to leading edge thinkers through keynote presentations, workshops by industry specialists and direct interaction with university staff. Equally valued, however, was interaction with 'like-minded' businesspeople, the opportunity to 'sound off' to people who understood their circumstances and get practical advice about the most mundane of business challenges (taxes, staffing and suppliers). For example, one environmentally orientated video illustrator talked about the reassurance provided by meeting business owners who believed that business has a responsibility to the environmental as well as profit making.

A variety of firms from diverse sectors (such as wood re-cycling, environmental accreditation, hospitality, engineering, electrical distributors and transport companies) also acknowledged the Network as a source of new business - either from other Network members or from attendees at conferences or market-place events. Business partnerships were also formed. For example, one electrical distributor developed partnerships with LED manufacturers in the Network that resulted in a more attractive business proposition and access to a substantial new market. The MD commenting that the Network had "...helped us become more engaged with other companies – and work with other potential suppliers. [As a result] we are now also working a lot with electric vehicle charging companies and run training courses for those companies who want to look at installation of EV charge points".

Finally, association with 'a university network' was deemed to offer reputational advantage, with Network members requesting permission to use the Network logo on their own websites to demonstrate environmental credibility and various interview respondents referring to the kudos gained from providing informal and formal contributions at Network events, as well as promotional opportunities presented by having their case studies published on the Network and University web pages.

The Network as a source of value co-creation

As Mellett *et al.* (2018) found, engagement with the Network was sustained where members secured tangible value from the time invested. Whilst we found little evidence of the more sophisticated strategic foundations for collaborative value creation described by Romero & Molina (2011), pragmatic value was reported in the collaborative testing of new technologies, applications and markets, knowledge development and exchange, plus the co-creation of products and services, following elements of Planko *et al.*'s (2016) strategic framework. Like many funded programmes of support for pro-environmental SMEs, a key feature of the wider Project was grant awards for energy efficiency measures. As the independent evaluation noted (Carney Green 2019), this direct value creation was achieved by helping SMEs overcome barriers to implementing energy efficiency measures, by identifying the financial case for implementing energy efficiency measures and providing a solution to financial barriers in the form of the grant scheme.

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4 Unlike the majority of similar programmes in the UK that retained a singular focus on energy
5 efficiency measures, the wider Project also focused on pro-environmental product R&D and
6 business growth. The Network contributed to the value creation of these aims by helping
7 firms source finance and funding (in addition to the energy efficiency grants), develop their
8 investment readiness and supplier credibility to win new pro-environmental business.
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11 Sourcing additional funds for business development is commonly prominent in SMEs'
12 strategic aims. One business owner described how insight and support following a workshop
13 on 'funding and finance for green businesses' resulted in a six-figure sum being reclaimed
14 through R&D tax credits; although other respondents wanted even greater support for grant
15 and funding applications that were considered 'difficult and time-consuming'.
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19 Alongside association with the broader aims of promoting pro-environmental business, one of
20 the key reasons SMEs join any network is to generate leads and new business and this was
21 also true here. As the Network impact survey indicated, one of the more popular Network
22 activities were Market Place events during which firms could present their offer to attendees
23 and engage with one another. These connections were deemed to be some of the most
24 important benefits of Network membership.
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27 *"We now have work from a particular company that is within the network*
28 *and that was solely given to us in a way because we are in the network and*
29 *the fact that we are all working together to make it a greener [City] and*
30 *greener planet etc". Wood re-cycling company Director.*
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32 33 *Network as site of SME capacity building*

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35 Our analysis indicates that a network can facilitate two types of capacity building. The first
36 relates to the individual capacity of business leaders and staff, whilst the second form of
37 capacity relates to capacity beyond the business that supports business development or
38 growth.
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41 With very small teams, micro businesses often have a very limited set of capabilities to draw
42 on. As noted elsewhere in the literature (Mellett *et al.*, 2018; Jämsä *et al.*, 2011), this
43 Network effectively replicated the capacity provided by corporate functions. In this case, the
44 Network helped SMEs access expertise that might exist in the R&D, marketing, human
45 relations or finance departments of larger firms. For example, like several other Network
46 members, one hospitality company MD described how the University Network staff and
47 SME members of the Network acted to extend the expertise her own small team.
48

49
50 *"I felt able to approach all members of the team, at any given time, about*
51 *any subject...it's been like having an extension to my team."*
52

53
54 In addition to regular network events described above, the core University team also
55 delivered a Green Growth Acceleration programme culminating in a popular 'Dragon's Den'
56 style simulation, whilst industry experts provided tailored workshops on subjects like
57 circularity and funding and finance for green SMEs; plus one to one business development
58 consultancy that provided strategic marketing insight and support for SMEs to attain a
59 suitable environmental management accreditation. In another example, an experienced MD of
60 an energy saving software company gathered together a group of Network members to

1
2
3 practise his pitch prior to presenting his software offer to the IT director and a panel of senior
4 decision makers of a major international aerospace company. Others talked about developing
5 the language to engage with suppliers and clients and new ways of thinking about their
6 business. Furthermore, 45% of the Impact Survey respondents linked Network activity with
7 strengthening a broad range of the green skills including green business case delivery, carbon
8 foot-printing, value mapping, and environmental management.
9

10 11 *Network as a platform of relationships*

12 Like Conway (2014b) and Petruzzelli *et al.* (2011), SMEs in the Network valued making new
13 contacts, networking with like-minded business colleagues, and seeking new business
14 opportunities and partnerships. Respondents often mentioned the value of engaging with
15 other businesspeople who shared a similar ethos. One pro-environmental animator said,
16

17
18 *"It's nice to meet other businesses that care about sustainability and that*
19 *believe that you can be profitable while being green and sustainable".*
20

21
22 Similarly, a hospitality company MD commented,
23

24 *"the network ... has the most value if I am honest because of the*
25 *introductions, because of the people that you come across that I wouldn't*
26 *have come across in any other situation, you know. They are people that*
27 *are like-minded and very open and willing to share within the network,*
28 *which you don't come across naturally in other environments, you just*
29 *don't, because you deal with your own small area".*
30
31

32 The Network took an exhibition stand at a major national sustainability exhibition and invited
33 a dozen Network members to exhibit. These SMEs explained that they might never have
34 attended this type of high-profile exhibition, never mind, present their business offer - with
35 several making useful business contacts. One owner manager explained that the Network
36 helped...
37

38 *" keep us at the front of the game. And your support gives us that*
39 *knowledge and the desire to do better, you know and the opportunity to find*
40 *out things. You know, being at the show and speaking to those people... I*
41 *would never have been to that show before" (Hospitality outlet MD).*
42
43

44 Members also began to engage their own suppliers in improving the sustainability of their
45 goods and others referred to positive outcomes from social media posts by other firms in the
46 Network. One Network member who ran an environmental accreditation network talked
47 about the multiplier effect of network-to-network collaboration in which knowledge was
48 shared two ways and benefitted from access to hundreds of additional firms beyond the
49 originating network. The same respondent also talked about how involvement with the
50 University led network 'opened doors' that had previously been closed.
51

52
53 *"So, it's definitely opened doors that perhaps may have been closed*
54 *previously, so that's very valuable the kind of face-to-face meeting has*
55 *been exceptionally valuable".*
56
57

58 The Network ran three 'Green Market Place' events between 2018-2020 that provided
59 businesses with opportunity to network with other businesses looking to run more
60 sustainable, efficient and resilient businesses, showcase their goods and services, engage with

1
2
3 renewable energy experts and enabled businesses that had never previously engaged with a
4 university to access specialist academic support (Carney Green, 2019 p.25). The independent
5 evaluation (Carney Green 2019) noted that,
6

7
8 *“The marketplace events brought SMEs together from the different strands*
9 *of the [wider] Project. This approach demonstrated the benefits of partners*
10 *delivering joint events (e.g. maximising engagement with the sector and*
11 *providing SMEs with access to different elements of support) and*
12 *promoting the support mechanisms to potential beneficiaries” (p.7).*
13

14 Thus, the Network aimed to connect member SMEs with useful contacts at every level. This
15 included international corporate businesses, national companies and local agencies. The
16 independent evaluation (Carney Green 2019) also acknowledged that there had also been
17 connection between SMEs and the wider University, resulting in research collaborations
18 between businesses and academics, research papers, funding bids and opportunities for
19 student placements. SME connections with the University were not only academic
20 collaborations, with one wood-recycling Network member establishing a contract to take
21 away wooden pallets from the University estate as a result of connections made through the
22 Network.
23
24

25
26 The Network also forged a close relationship with various other local councils and the
27 Chamber of Commerce. Three 'high profile' regional sustainability summits, attracting
28 approximately 450 businesses, plus a number of sector forums and themed events focusing on
29 construction, manufacturing, rail, procurement, logistics and transportation, engaging a
30 further 400 businesses were jointly organised between 2016-2019; with one interviewee also
31 noting a change in focus and emphasis of these meetings, saying that the collaboration with
32 the University had 'raised the quality of contributors' and delegate experience at these events.
33
34

35 *Network Leadership*

36
37 As the independent evaluation notes, pre-existing and trusting relationships between Project
38 Partners had been forged through previous research collaboration between the Council and
39 University teams. This provided a springboard to set common strategic goals and facilitated
40 the design and ongoing delivery of the business support programme. *“The partners had prior*
41 *experience of working with one another and had a collective interest in reducing the carbon*
42 *footprint of SMEs through their membership on the LEP's Low Carbon SME reference group*
43 *“(Carney Green, 2019 p.30). Furthermore, following Planko et al. (2016, p.2339) and Ryan et*
44 *al (ibid. pp584-5) our analysis acknowledges the importance of building network capabilities*
45 *for system building and coordination; in particular, network visioning, network orchestration,*
46 *partnering for system change and relationship portfolio management.*
47
48

49
50 Establishing need is an important first step for any long-term support initiative. The
51 independent evaluation noted that the local skills strategy had identified a lack of support
52 mechanisms to encourage the uptake of renewable energy, a lack of capacity in the
53 environmental services sector to support uptake; and a lack of awareness and understanding
54 of costs and benefits of energy and resource efficiency amongst the business base. Project
55 Partners also conducted their own primary research to identify the need for the Project which,
56 amongst other things, identified that in 2016 three quarters (77%) of local SMEs lacked
57 awareness of the support available for pro-environmental business development.
58
59
60

1
2
3 The wider Project was designed with a networking function at its heart in order to connect the
4 different interests of Project Partners, ‘regular’ SMEs interested in energy and resource
5 efficiency measures, suppliers of those innovations, SMEs that are suppliers of low carbon
6 and environmental goods and services (LCEGS) more broadly and the range of regional
7 agencies and corporate organisations with an interest in LCEGS supply and Corporate Social
8 Responsibility. In this respect, the Network had a clear purpose and vision, and its continued
9 growth over a five-year period is testament to its success in creating a platform for these
10 ambitions. The Network’s success in attracting SMEs must be tempered, however, by the
11 recognition that very few corporate businesses were attracted to become more than
12 superficially involved – in keynote presentations at annual conferences, for example.
13 In addition to its clear aims, it is important to acknowledge that as well as events and
14 activities being facilitated by the Network team, ongoing interaction with Network members
15 helped ascertain SME needs and interests, with sessions provided in response to these needs.
16 In doing this the Network took a deliberately learning-centred approach that encouraged
17 Network members to take up opportunities for business development and personal learning,
18 whether through funded business support, workshops, dialogue with peers and industry
19 experts or self-service online learning.
20
21
22

23
24 Over a five-year period, the Network team also built strong and trusted relationships with
25 representatives of the regional Chamber of Commerce and the Local Enterprise Partnership.
26 The regional Growth Hub Partnership Manager stating,
27

28 *“Working closely with [the Project] has allowed us to offer clear*
29 *messaging and direction to businesses that has resulted in a number of*
30 *positive impacts and results for businesses in [the region... The project*
31 *provided a blueprint for... successful enterprise interventions that allowed*
32 *SMEs to improve their business growth performance, strengthen their*
33 *environmental management competences and improve environmental*
34 *performance”.*
35

36 As noted above, the partnership between the Network team and Chamber of Commerce led to
37 collaboratively designed and delivered events and a longitudinal research project that tracked
38 SME awareness, engagement and investment in pro-environmental practice, resource
39 efficiency, supply chains and returns across the low carbon and environmental goods and
40 services (LCEGS) sector in the East Midlands region. The ensuing co-created research
41 outputs being of significant value for the region’s policy making agencies. For example, the
42 Chair of the Local Enterprise Partnership Energy Strategy acknowledged that,
43
44

45 *"In developing strategic plans, it became apparent that there was a lack of*
46 *vital regional data relating to the business uptake of pro-environmental*
47 *practices and growth of the Low Carbon and Environmental Goods and*
48 *Services (LCEGS) sector. The research collaboration the University have*
49 *forged with the East Midlands Chamber and the analysis provided by the*
50 *Sustainable Business team has provided invaluable evidence of growth in*
51 *the Low Carbon Economy (LCE) across the D2N2 region, as well as*
52 *informing the development of the D2N2 Energy Strategy 2019-30”.*
53
54

55 Trusting relationships provided a positive, facilitating environment for collecting and
56 analysing data from multiple organisations to understand the emerging needs of local pro-
57 environmental business; when co-created provision needed to be promoted; when events
58 were being planned and delivered cooperatively and when SMEs needed support from
59 multiple agencies. These regional collaborations provided a helpful foundation for the
60

Network and the wider aims of supporting pro-environmental business growth across the region. At the time, the Project Team were unaware of any other programmes providing longitudinal data for regional agencies and policy-makers. As the Chamber of Commerce Sector Forum and Representation Manager noted

"The work the project delivered should not be underestimated, particularly in the area of understanding the wider business benefits of moving towards a more sustainable, environmentally friendly business model. The impact it is having on the region is becoming felt and we feel we are starting to edge ahead of other regions, moving towards becoming an exemplar in this area of business support and growth".

Whilst these stakeholders recognised the (potentially) unique benefits of multi-stakeholder research and knowledge sharing, this is not meant to imply that pro-environmental provision was perfectly configured in the East Midlands of the UK. It was clear that more could be done to coordinate provision in a strategic way and much better economic data and analysis is certainly required to facilitate this. Such insight would support much more effective orchestration of Network activity in order to reflect, not only the presenting needs of the highest profile SMEs, but also the very many micro-SMEs that rarely feature in regional analysis because their very many voices are difficult to corral and therefore rarely engaged effectively.

Discussion

Russell & Smorodinskaya (2018) define highly functioning networks as those rooted in collaboration between independent actors representing at least one business sector, the knowledge generating sector (universities, research institutes, other R&D centres) and the public sector (government bodies or agencies). Evidence presented above shows that the Network in focus complies with this view of a 'triple-helix' support ecosystem.

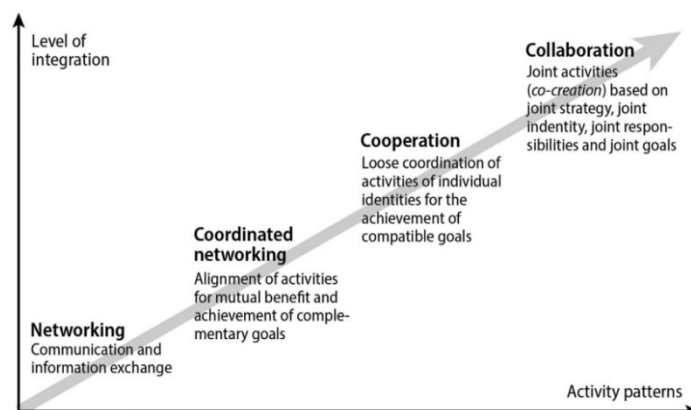


Figure 1. Russell & Smorodinskaya (2018) The growing complexity of interactions and integration of activities from networking to collaboration

Russell & Smorodinskaya (2018) go on to describe a pathway of increasing maturity (Fig. 1) for networks of firms that moves from simple communication and information exchange (networking) to 'collaboration' on joint strategy, identity, responsibility, goals and activities. Our analysis deepens this model by referencing key elements relating to multi-stakeholder collaboration at different scales i.e. between SMEs, regional agencies and corporate organisations. By implication, any network may be performing at more mature levels in some aspects of its activities, whilst functioning at lower levels in other areas.

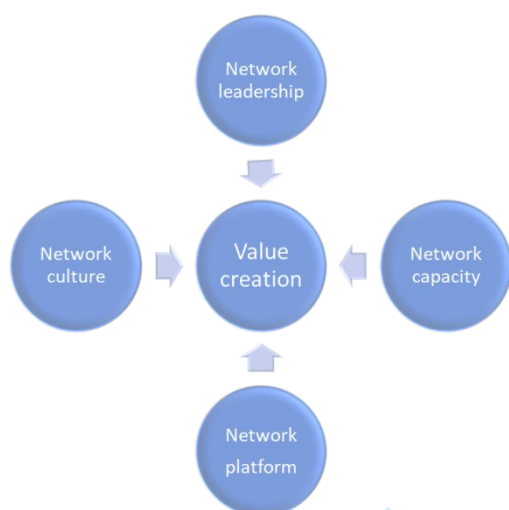


Figure 2. Network conceptual model

Based on our analysis, we offer the following conceptual model that will require further research to validate. This model proposes that the degree to which a network develops value for individual network members and the network as a whole, depends on four key factors: leadership of the network, including the clarity of its purposes and effectiveness of its orchestration; the culture that develops between members of the network at all scales; the inherent and developed capacity that sustains collaborative actions plus the technical capacity (skills and systems) needed to achieve this; and finally the infrastructure that supports the platform of relationships needed to support pro-environmental innovation and network purposes.

In the context of the transition to a sustainable economy, this last factor must also reflect the requirement for demand adaptation as well as supply innovation.

Network as a source of value co-creation

Like most funded initiatives, the wider Project was driven by a number of targets to ensure delivery of carbon reduction aims and business support coverage – which were substantially exceeded, in this case. However, in addition to the tangible benefits delivered for individual owner managers (knowledge, awareness, support, skills) and their firms (energy grants, new products, accreditations, marketing strategy), the case analysis above has shown that the Network activity also supported SMEs to co-create value through new business partnerships, co-created products and services and practitioner knowledge exchange. The Network was also instrumental in developing partnership with the local Chamber that resulted in regional business intelligence that supported LEP level strategy development (Paterson & Baranova, 2018). Whilst this might place the Network in focus somewhere between Russell & Smorodinskaya's 'coordinated' and 'cooperative' levels of network performance, the evidenced activity does not match the more strategic level of regional activity that might be reflected in, for example: 'collaborative' cross-organisational delivery of impartial user group feedback loops; propagation of new business models; or the creation of temporarily protected niche markets. This might be seen, for example, in focused network activity supporting a cross regional initiative to provide incentives and development of skills and capabilities amongst SMEs and larger construction companies to radically increase the number of zero carbon homes built; in an effort to respond to the regional drive to meet national carbon reduction targets. At the highest level, value co-creation would relate, therefore, to both demand adaptation (influencing market desire for affordable but carbon neutral homes, in this example) and supply innovation (for example, offsite manufacture of Passiv house standard homes, in this scenario).

Network leadership

In common with other commentators on leadership for sustainability (Hooper et al., n.d.; Parkin, 2010; Paterson, 2017), leadership of the Network activity was a significant factor in the value created in this case. Comments from the Chamber of Commerce respondent, LEP

1
2
3 Growth Hub Partnership Manager and others demonstrate a strong ‘triple helix’ collaboration
4 between business, HEI and local government. Whilst positive ‘cooperation’ was apparent
5 between a number of the regional stakeholders, this was not the case amongst all and cannot
6 imply ‘collaborative’ strategic leadership reflecting the multiple aims and ambitions of
7 stakeholders across the region as a whole. Although the University provided capability and
8 capacity to orchestrate Network activity which was broadly welcomed by SME stakeholders,
9 this capacity was not sufficient to develop collaborative management of the Network or
10 strategic intent across all stakeholder groups, in particular local corporate organisations that
11 might directly benefit from greening their supply chains by engaging with the increasing pool
12 of LCEGS suppliers.
13
14

15 16 *Network culture*

17 Like (Mellett et al., 2018) the analysis showed that learning in (and through) the network was
18 a key process through which SMEs developed pro-environmental practices and the network
19 evolved into a significant landmark in the local pro-environmental business landscape.
20 Although the strength of ties between regional agencies varied, bilateral relationships
21 between the University and Councils and the University and Chamber of Commerce played
22 significant roles in boosting knowledge exchange at a regional level, as well as offering value
23 to individual SME stakeholders.
24
25

26
27 At the level of inter-firm engagement within the Network, new contacts and networking with
28 like-minded business colleagues, information on new market opportunities, support to gain
29 accreditations, marketing insight and decision making, collaboration on product development
30 and market research demonstrate the impact that a culture of mutual support brought to
31 individual firms. This was most powerfully demonstrated by the example of business leaders
32 pulling together to support one business owner to prepare his pitch to a key potential
33 customer. Thus, exemplifying a ‘cooperative’ network culture at work.

34 Nascent ‘collaborative’ culture at a whole system level could be seen in the LEP
35 commissioning a study into the skills needs of the local LCEGS sector from the University
36 team. This example remains nascent in the sense that strategic planning and response to the
37 study’s findings is yet to emerge.
38
39

40 41 *Network capacity building*

42 Over a three-year period, the Network team set out to build a network infrastructure that
43 could be sustained beyond the period of ERDF funding. In addition to basic functions like an
44 informative website, social media channels, an effective stakeholder database, records of
45 event attendance and relationships built with a range of hospitality suppliers, the Network
46 team created an interactive Network map that allowed Network members to view and
47 communicate directly with one another; self-service online learning modules as well as
48 setting the expectation that SMEs would host regular networking events. As the Network has
49 become an established feature in the local business landscape with minimal infrastructure
50 expenses, there is a strong likelihood that its activity will be sustained once its initial funding
51 ends.
52
53

54
55 Whilst the wider Project helped to build capacity in SMEs, for example with new skills and
56 knowledge exchange; knowledge of business models; knowledge of new legislation and
57 funding opportunities, like Mellett *et al.*, (2018), the Network team also recognised the value
58 of business leaders developing capabilities in dialogic and collaborative learning, networking
59 and partnering skills and ‘ecological literacy’. Research by Boiral, Baron, & Gunlaugsson
60

(2014) suggests that these 'system skills' are rare amongst SME owner managers but if we are aiming to radically accelerate the shift to sustainable economic practices it will become increasingly important to address this need for system skills and raise the level of environmental consciousness amongst both SME and large organisation leaders. In this case, similar issues also applied to regional organisations. Although trusting relationships were developed through Network involvement, the aspiration to work with regional stakeholders to develop systems thinking and leadership skills was less successful. Even though there was common consensus that this would be valuable in accelerating the shift to a more sustainable economy, the offer to provide such development opportunities by the University was not taken up.

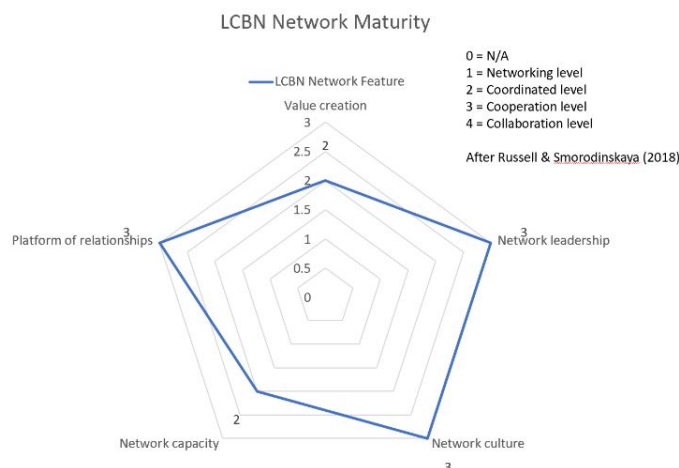
Finally, in any system, feedback loops are a fundamental mechanism to support system vitality (Draper, 2013; Gaziulusoy and Brezet, 2015; Planko et al., 2016). In this case, the collaboration with the regional Chamber of Commerce to develop trends analysis of pro-environmental business activity provided an important and valued feedback loop to both SMEs and regional organisations alike.

Network as a platform of relationships

In the findings above, we noted the value that SME leaders ascribed to the simple act of engaging with 'like-minded' (pro-environmental) people from different business settings and the encouragement this provided to spread their pro-environmental practices to others (for example, suppliers, current and potential customers). This confirms the importance of multiple informal contacts (weak ties; Roscoe *et al.*, 2016), dyad relationships and interaction between individual 'boundary spanners' (Ryan et al., 2012) as central mechanisms of value creation.

The value of networking networks is not a significant feature of the literature reviewed but as noted in the previous section and elsewhere in these findings, the Network deliberately set out to establish links with other networks. These links have proved to be some of the most fruitful aspects of its platform of relationships. Where mutual interests were established, these relationships significantly amplified the reach of collaborating partners; whether in promoting events and activities, sharing knowledge and information or developing new or improved services.

In presenting these five network features with reference to Russell & Smorodinskaya's (2018)



levels of integration, we anticipate further research activity exploring the merits of taking a maturity approach to analysing pro-environmental (and more general) business networking. Figure 3 shows a provisional maturity self-assessment undertaken by the Network team of its own network performance. Of course, such an approach would benefit from the involvement of other stakeholders and validation procedures. It is offered here to indicate the potential for collaborative research and improvement initiatives with other pro-

1
2
3 environmental networks in the UK and abroad.

4 *Figure 3. Network maturity self-assessment example*

5 6 7 8 **Conclusions**

9 This paper builds on existing knowledge by making its contribution to our conceptual
10 understanding of the key features of pro-environmental business networks. Its novelty lies in
11 taking a network centric view of these features and its main utility is in presenting an
12 accessible approach by which networks in different contexts and with different purposes
13 might be compared in future research. In addition to framing how such a maturity approach
14 might be developed in practice, this study also raises questions about the nature of value
15 created by network interaction and its relationship with more formal or direct forms of
16 business support and development in relation to pro-environmental aims; with the case in
17 focus presenting a compelling example of the added benefits that a networking approach
18 offers to a standard grant giving programme. The study also raises questions about the nature
19 and construction of platforms that support a diversity of stakeholders with discrete needs,
20 ambitions and modes of operation. In this respect, our study emphasises both the importance
21 of informal interactions between business leaders and the potential that network to network
22 interactions offer for pro-environmental outcomes.

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24
25
26 This field of study would benefit from further research into different international contexts, as
27 well as into the nature of new pro-environmental business paradigms that support much
28 greater parity between the interests and perspectives of SMEs and large corporate entities
29 which require stakeholders to develop what Adams *et al.* (2016) have described as the
30 ‘ambidextrous’ skills needed for system capability building. To achieve this ambidexterity,
31 firms need to simultaneously maintain existing business models whilst experimenting with
32 and learning from multiple new approaches to sustainability, whilst at the same time
33 collaborating with other system actors to redefine products and services; and restructure
34 practices and organization that integrate foresight and strategic intent towards radical
35 sustainability innovation (Adams *et al* *ibid*, p. 193).

36 37 38 39 **Limitations**

40 As with all research, this study has certain limitations. No matter how well selected, any case
41 study can only generalise to theory, rather than a population. In presenting the conceptual
42 model above, the authors recognise this limitation and anticipate further validating research
43 in other locations. Another significant limit to the reliability of this study is the ‘insider’
44 status of the authors. Whilst this adds to the authenticity and rich perspective of analysis, it
45 also leaves questions about the level of criticality offered.

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