Knowledge exchange in SMEs service innovation with design thinking

Abstract

Purpose

This study, adopting a knowledge perspective, aims to explore how Small and Medium-sized Enterprises (SMEs) engage in service innovation by implementing design thinking.

Design/methodology/approach

A qualitative research methodology and a multiple case study strategy were adopted on account of the exploratory nature of this study. Three cases based in Scotland have been selected. Data were collected from staff, managers and researchers who participated in Create Cultures of Innovation (CCoI), a project sponsored by the Scottish government.

Findings

The research shows that SMEs can be enabled, through design-led interventions, to think collaboratively and leverage knowledge to achieve service innovation.

Research Implications

This research contributes to the service innovation literature by theorising an integrated research framework of 'Knowledge exchange in SMEs service innovation with design thinking'. Further, this study enriches the extant understanding of service innovation in the traditional sector (manufacturing and hospitality) and redefines the roles and relations of the dimensions of service innovation.

Practical Implications

This study addresses the call on tools and methods for servitisation, suggesting that changing the culture and mindsets of both the top management and the staff are critical for the success of servitisation and the implementation of design thinking. In addition, this research suggests the need to embed design thinking within the leadership prior to rolling it out to the wider public. Support from the top management should focus on both the engagement of staff and the changing of vision from product to service-focused.

Originality/Value

This paper gets together service innovation, design thinking, and knowledge exchange in the context of manufacturing SMEs offering novel insights into how to succeed in servitisation with the implementation of design thinking.

Key words: Service innovation; Design Thinking; Knowledge Exchange; Servitisation; SME

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1. Introduction

Innovation is regarded as a key to success in today's turbulent macro-environment (Laforet, 2011; Wymenga et al., 2012). Recent studies show the importance of innovation in generating sustainable growth (Wymenga et al., 2012; Rhodes, 2018). Studies also have revealed the potential for innovation within Small and Medium-sized Enterprises (SMEs) (Kumar et al., 2012; Madrid-Guijarro et al., 2013; Rhodes, 2018). They have specifically mentioned the limitations of insufficient physical resources, leadership, competencies, and technology (Laforet and Tann, 2006; Laforet, 2011; Cohen, 2012; Naqshbandi & Tabche, 2018; Corral de Zubielqui *et al.*, 2019; Ferreira et al., 2020; Rigg et al., 2021). This in turn negates the benefits accrued from their proximity to the market and stakeholders (Laforet and Tann, 2006; Laforet, 2009, 2011).

The Goods-Dominant Logic (GDL) paradigm has historically dominated innovation research, which has resulted in a propensity to ignore the service sector or innovation via service (Mele et al., 2014). Service-Dominant Logic (SDL) endeavours to address this issue, suggesting that economic exchange can be attributed to service, rather than the balancing of production and demand (Lusch and Vargo, 2008; Vargo and Lusch, 2016; Wilden et al., 2017). Indeed, SMEs performance can be linked to the adoption of principles similar to those underpinning SDL (Paton and McLaughlin, 2008; Wymenga et al., 2012). Recent servitisation literature calls for research on the best organisational management strategies for the transition from product- to service-centric mindsets (Salonen, 2011; Zhang and Banerji, 2017).

SDL promotes the co-creation of value among multiple actors (Lusch and Nambisan, 2015; Wilden et al., 2017). It not only offers a reinterpretation of marketing and other business practices, but also grounds this realignment within the context of service innovation. Utilising operant resources, particularly knowledge, is a component of innovation according to SDL (Lusch and Vargo, 2008; Vargo and Lusch, 2016). There are calls for more clarification on the nature of the link between collaborative knowledge exchange and service innovation, especially in the context of SMEs, as empirical research has trailed behind the phenomenon of services considerably (Drejer, 2004; Droege et al., 2009; Durst and Edvardsson, 2012; Durst et al., 2015). SDL researchers have also called for further exploration of how value co-creation impacts innovation (Vargo and Lusch, 2016).

A paradigm created by Lusch and Nambisan (2015) acknowledges Information and Communication Technologies (ICT) as a facilitator of knowledge sharing that supports service innovation. However, traditional SMEs may struggle to harness ICTs benefits due to financial and institutional constraints (Adebanjo and Michaelides, 2010; Ashcroft *et al.*, 2019; Casalino *et al.*, 2019). According to Dijksterhuis and Silvius (2017), design thinking places a strong emphasis on users' needs, desires, and experiences, particularly their emotional ones. This is consistent with that of Lusch and Nambisan (2015), who claimed that the success of service innovation was due to the development of an ecosystem (culture) for value co-creation. They also suggest that the institutional framework for value co-creation is crucial, and that the connection between the two calls for investigation (Vargo and Lusch, 2016). Therefore, design thinking may

be able to unleash, support, and enhance the potential of service innovation. This calls for further investigation.

The findings of this research addressed how design thinking enables SMEs to exchange knowledge and stimulate and capitalise on service innovation. First, from an SDL perspective, service innovation, knowledge exchange and design thinking were considered. Further, the research acknowledged that design thinking can unlock the innovative and service potential within SMEs. Last, design thinking, the associated methodologies, leadership, and culture, provided an ecosystem that engages actors in collaborative knowledge exchange, accommodates and eventually stimulates service innovation.

The contribution of this study is threefold. First, this research contributes to the service innovation literature by theorising an integrated research framework of 'Knowledge exchange in SMEs service innovation with design thinking' (see Figure 3). Second, this study addresses the call of literature on tools and methods for servitisation (Nudurupati et al., 2016; Bustinza et al., 2017). It concludes that changing the culture and mindsets of both the top management and the staff are critical for the success of servitisation and the implementation of design thinking. Last, this research suggests the need to embed design thinking within the leadership prior to rolling it out to the rest of the organisation. Support from the top management should focus on both the engagement of staff and the changing of vision from product to service focused.

The remainder of the paper is organised as follows. The theoretical background of this study from the perspectives of innovation in SMEs, service innovation, and

knowledge exchange is articulated, followed by a detailed illustration of the adopted methodology. Findings are presented with the development of an integrated research framework. Contributions, limitations, and directions for future research conclude the paper.

2. Theoretical Background

2.1 Innovation in SMEs

The classical school of social economy recognises innovation as a critical contributor to productivity and efficiency. They further argued that man's ingenuity and creativity as reflected in new methods of production and new commodities are also an important part of innovation (Kurz, 2012). Innovation has traditionally been linked to large businesses with ample financial resources and varied risk profiles (Gupta et al., 2006; Laforet, 2009). However, innovation is beneficial not only to large companies but also to the survival and growth of SMEs (Laforet, 2009; Laforet, 2011; Wymenga et al., 2012).

Regardless of their weak financial power and inadequate physical resources, SMEs have been thriving through a commitment to innovation in services and products (de Jong and Marsili, 2006). Research shows no significant relationship between size and innovation capability (Laforet, 2009). Heimonen (2012) discovers that innovation in fast-growing SMEs is not significantly related to size, age, or location. Innovation is recognised to be critical to SME survival and development (Klewitz and Hansen, 2014).

The fast evolution of technology has had the effect of dramatically shortening the lifecycle of innovative products (Kenney, 2001). As a result, the need for physical

resources, or “hardware”, to maintain competitiveness is declining and will continue to decline; in contrast, the need for services, or “software”, offers a more sustainable future (Kenney, 2001). However, innovation traditionally is treated as an “output” of resources (Mele et al., 2014). In the early twenty-first century, attempts are made to develop new logic as a replacement for GDL (Mele et al., 2014) to address the increasing importance of service. The service perspective opens a door to new business opportunities, especially for SMEs undertaking innovation (Svensson and Barfod, 2002). The efficient service-based solution may thus be attributed more to efficient knowledge and information management for value co-creation than to production.

2.2 Service Innovation and Knowledge Exchange

From a GDL perspective, service innovation research can be seen as a continuum, starting with the technologist perspective (Barras, 1986), moving on to the demarcation framework (Drejer, 2004), independent perspective (Droege et al., 2009), and more recently, the synthesis perspective (Carlborg et al., 2014), which notes that service innovation is no longer limited to addressing the service sector but has now also extended to the manufacturing sector. Thus, “servitization”, which is defined as the shift in manufacturing from the provision of products to the provision of integrated, customer-focused solutions, is given attention (Zhang and Banerji, 2017). The resource-based perspectives moved the focus to the optimisation of internal and external resources (Mele et al., 2014). Such viewpoints have drawn criticism for seeing service innovation as an outcome of products, technologies, leadership, or other physical or intangible resources (Mele et al., 2014; Lusch and Vargo, 2016; Ahmed et al., 2018).

SDL by contrast blurs the boundary between product and service, physical and intangible resources, and provider and user, by focusing on the co-creation of value, resource integration, and engagement (Mele et al., 2014; Lusch and Nambisan, 2015; Vargo and Lusch, 2016). Despite the efforts of contemporary researchers studying service innovation, an independent definition, taxonomy, and theories of service innovation have not yet crystallised (Droege et al., 2009).

Many have linked service innovation to operant resources, such as customer co-produced knowledge (Blazevic and Lievens, 2008; Vargo and Lusch, 2016), cooperation and management (Hsu et al., 2013), values, brands, service systems (Aal et al., 2016), and institutional arrangements (Vargo and Lusch, 2016). SDL conceptualises service innovation as a new and useful process of specialised competences, such as knowledge and skills through deeds, processes, and performance for the benefit of another entity or the entity itself (Vargo and Lusch, 2004). Therefore, the SDL perspective regards value as being created collaboratively through knowledge (Edvardsson and Tronvoll, 2013). This notion of collaborative knowledge exchange forms the basis of this paper's engagement with service innovation.

Surprisingly, there is limited literature addressing service innovation from a knowledge perspective (Droege et al., 2009). Exceptions include the research of Oke (2007) which is conducted in the context of the Knowledge Intensive Service (KIS), e.g., IT, telecommunication, and financial sector. The non-knowledge intensive SMEs, such as those in the manufacturing and conventional service industries, are still understudied (Droege et al., 2009). It is argued that less knowledge-intensive conditions

'will benefit more from documentation and knowledge sharing for their knowledge creation purposes, and ultimately innovation' (Andreeva and Kianto, 2011, p.1028). As such, knowledge creation is essential for innovation, and both explicit and tacit knowledge should be highlighted (Andreeva and Kianto, 2011). Research has tended to contextualised SDL within the service sector (Hsu *et al.*, 2013; Aal *et al.*, 2016) or marketing (Fidel *et al.*, 2016). Recent service innovation research note the need for clarity on the potential exploitation of both tangible and intangible resources (Aal *et al.*, 2016), and the ramifications for the manufacturing sector (Rubalcaba *et al*., 2012).

2.3 Knowledge Exchange and Design Thinking

In contrast to researchers who describe service innovation with a uniform definition, den Hertog et al. (2010) interpret service innovation as an entity of multiple dimensions that depend on context, subdividing service innovation into six dimensions. Following the SDL, innovation is regarded as a process of value co-creation instead of an output of technology, collaboration, or resources (Mele et al., 2014). Knowledge can be leveraged to create value and innovation. SMEs may use connections to seize chances and improve sustainability (Laforet and Tann, 2006; Laforet, 2009, 2011, 2012). Considering the collaborative nature of service innovation, Paton and McLaughlin (2008) believe that the potential of businesses for innovation cannot be released until following questions are properly addressed: 1) How best to support the knowledge worker? 2) How best to engage with the knowledge worker? 3) How best to align interests?

Vargo *et al.* (2008) emphasise that value-in-use and in-context are essential for

SDL, with knowledge being core. They further encourage researchers to investigate approaches for exploring and utilising knowledge from SDL. Fidel *et al.* (2015) note that customers play a critical role; and, Blazevic and Lievens (2008) address the customer's role in co-producing knowledge. However, while it is not enough to simply look to customers, an integrated business network is critical (Lusch and Vargo, 2008). According to Lusch and Vargo (2006), 'solution offerings are co-produced' when they involve shared inventiveness, problem solving, co-design, or shared implementation with network partners. Moreover, to establish multiple networks, a collaborative and integrated management approach are required (Hakanen and Jaakkola, 2012). They further identified five dimensions of SDL, highlighting the importance of institutional arrangement, ecosystems of value co-creation process, engaged actors, integrated resources, and service exchange (Vargo and Lusch, 2016). They urge further exploration of the relationship between SDL institutionalisation and innovation (Vargo and Lusch, 2016). Lusch and Nambisan (2010) attributed the success of service innovation to ICT in creating an ecosystem. However, ICT may not offer 'affordable' solutions to SMEs, particularly those from traditional non-knowledge intensive industries (Adebanjo and Michaelides, 2010).

Businesses must decrease the complexity of innovation in both goods and services if they are to unleash their inventive potential (Kolko, 2015). Design thinking, a remedy that David Kelly first tried in 1991 and quickly made famous, gains increasing attention (Geissdoerfer et al., 2016). Employing design thinking empowers businesses to involve important stakeholders, map and co-create value, and ultimately innovate via service

(Andreassen et al., 2015). This perspective of service innovation blurs the division between product and service innovation (Hydle et al., 2016). To assure value in use, the servitization of manufacturing and the shift from selling things to offering integrated solutions both call for unorthodox methods of innovation (Zhang and Banerji, 2017). Additionally, Lusch and Nambisan (2015) discuss the relevance of design in establishing service platforms and ecosystems and facilitating value co-creation. Design thinking may provide a strategy for organising efforts to address the challenge in relation to the previously mentioned calls for further study into the servitization of manufacturing, which concerns the shift from product- to service-centric business models (Zhang and Banerji, 2017). According to Dijksterhuis and Silvius (2017), design thinking focuses on the requirements, desires, and experiences of users, notably their emotional ones. Such culture echoes Lusch and Nambisan (2015) who ascribe the success of service innovation to the creation of an ecosystem (culture) (Naqshbandi et al., 2015; Naqshbandi & Kamel, 2017) and a service platform that facilitate (design thinking) the integration of resources. Design thinking therefore could unleash, support, and enhance the potential of service innovation.

Design thinking, with its network mapping, value co-creation and actor enabled credentials (Andreassen et al., 2015), combined with its prototyping, design studio and solutions driven mentality (Geissdoerfer et al., 2016), offers an alternative of service innovation. Implementation of design thinking in enterprises enables them to identify key actors and the users of service (Andreassen et al., 2015) to conceptualise, prototype, and develop solutions, and to enhance communications (Geissdoerfer et al., 2016).

Since the majority of research in this field has so far been done in the service industry, neither manufacturing nor highly focused features of knowledge exploitation have been taken into account. Design thinking, which has been shown to be successful at mapping value, involving key actors, and creating solutions (Geissdoerfer et al., 2016), may provide an enabling means of co-creating value and service innovation given that servitization calls for the development and delivery of integrated solutions, which in turn requires orchestrated collaboration (Carlborg et al., 2014).

This study aims to explore from a knowledge perspective how SMEs engage in service innovation with the implementation of design thinking. Based on what has been discussed in the extant literature, three research questions have been raised:

RQ 1: How do SMEs initiate, develop, and implement service innovation?

RQ 2: How do the key actors exchange knowledge to enable service innovation in SMEs?

RQ 3: How does design thinking in SMEs promote knowledge exchange and service innovation?

3. Method

3.1 Empirical Setting and Case Selection

This study adopts a qualitative multi-case study approach in responding to how questions and explores the process of knowledge exchange for service innovation in non-technology-intensive SMEs. Multiple case studies, based on various sources of evidence including primary data collected from interviews and focus groups, and secondary data, were employed. The multiple case study approach is adopted from Yin

(2014) (see Figure 1).

[Insert Figure 1 here]

This research is contextualised by Create Cultures of Innovation (CCoI), research supported by Scottish Government; and, prompted by the desire to evaluate the potential of design thinking to enable enterprises to innovate in service. The intent was to enhance the creativity, productivity, and performance of the participant companies by implementing design thinking. CCoI conducted design-led interventions between 2010 and 2016 with mainly Scottish SMEs, from various sectors (Lockwood et al., 2012). Interventions first identified, drawn from across all facets and levels of the enterprise, a group volunteers as the entity to deliver and promote design thinking. They were encouraged and facilitated by CCoI to collaborate and address issues relating to performance, employing techniques and protocols associated with design thinking. CCoI encouraged and enabled SMEs to innovate through leveraging knowledge potential through design led interventions.

Research cases were selected across three criteria: they were from the manufacturing sector, were SMEs, and participated in the CCoI project. We adhere to Henry (2012)'s definition of SMEs: *"A small company is defined as one that has a turnover of not more than £6.5 million, a balance sheet total of not more than £3.26 million, and not more than fifty employees. A medium-sized company has a turnover of not more than £25.9 million, a balance sheet total of not more than £12.9 million, and not more than 250 employees."*

Three organisations, anonymised as STAR, MOON and GALAXY, met the

selection criteria. Profiles of the participant companies are given in Table 1. Case studies were conducted, following the qualitative paradigm, in pursuit of in-depth knowledge and understanding. A case study protocol was developed. Validity of the research was further strengthened by multiple sources of evidence, including audio records, reports about CCoI, websites of the participant companies and photographic recordings of CCoI interventions.

[Insert Table 1 here]

3.2 Data Collection

The primary data for this research was collected through interviews and focus groups. The interview was selected because of the explorative nature of the research, requiring in-depth knowledge of the process of service innovation. Moreover, focus groups were also organised to collect primary data, because of the epistemological position of this research, which requires an interactive and interpretive method for coming to know the world (Lincoln et al., 2011, p.107). Involving all participants and the researchers, the focus group puts the author in the middle space (Denzin and Lincoln, 2011) to collect empirical evidence. Moreover, the focus group also mitigates the disadvantages of interviews and observations, for example, bias, time consumption, and costs (Yin, 2014) by engaging in dialogues with participants and observing their interactions. Staff from participant companies were invited across departments and layers of management to form a group in which members were encouraged to collaborate in decision making and solution finding, following protocols developed by reflecting upon design thinking and innovative culture. The participant profile can be found in Table 2.

[Insert Table 2 here]

Secondary sources such as profiles of these companies that can be accurately represented in their documentation and archival records, including internal reports and published documents in relation to this project, are used as sources to understand how this project is conducted in the targeted companies and what the results are. For this reason, documentation and archival records are treated as not only sources of case selection and participant recruitment, but also as evidence for validation. The process of data collection, the adopted approach, and the sources are demonstrated in Figure 2.

[Insert Figure 2 here]

3.3 Data Analysis

Data analytics should be coherent with the research intent, paradigm, and propositions (Yin, 2014, p. 136). The researcher adopted an inductive approach to the research questions (Bryman, 2012). Yin (2014, pp. 143-165) recommends five techniques for analysing case study evidence: pattern matching or congruence, analytics, time-series analysis, logic models and cross-cases synthesis. The last two, which are more suitable for building organisational-level and programme-level logics (Bryman, 2012), were adopted by this research. The organisational-level logic model is adopted as the research is related to design thinking, knowledge exchange and service innovation within organisations. Secondly, the program-level logic model is also adopted because the research investigates the effect of design thinking on the knowledge exchange and service innovation. Given the multi-case study nature of this research, the cross-case synthesis technique is adopted to aggregate the data collected.

The authors followed the case study protocol (Yin, 2014). Questions were based on the research intent: service innovation/SDL perspective, knowledge exchange and design thinking. Recorded data from interviews/focus group were transcribed, coded, analysed and configured to allow patterns and logics to emerge (Lincoln et al., 2011). In addition, to aid reliability, a case study database was developed during and after the data collection. The internal validity is further guaranteed by constructing consensus among the participants, interviewed independently from each other, by juxtaposing collected data with the assistance of the analytical software NVivo.

Since the data was collected over several stages, the researchers need to use labels to identify the cases before integrating all data. Service innovation and knowledge exchange are labelled by acronyms of NS (New Service) and KE (Knowledge Exchange). Acronyms of S, M, and G are therefore applied to representing STAR, MOON, and GALAXY. For example, data collected from both the focus group and the interview were coded NSS denoting new service in STAR, and KES denoting knowledge exchange in STAR. They were put in numeral order according to the time sequence, i.e., NSS1-16 and KES1-7. As such, data from different sources were synergised to address the themes case by case. Both tier 1 and tier 2 codes and their links are presented in Table 3.

[Insert Table 3 here]

3.4 Case Profile

STAR is an industrial textile manufacturer based in the East of Scotland. Moon, based in the lowlands of Scotland, operates across four locations to service its own

brands, international fashion brands, textile agents, and transportation providers. STAR and MOON participated in CCoI for 10 and 12 months, respectively. Both companies have joined this project to diagnose problems, develop solutions, promote creative culture, and engage other staff across functional departments. Significant enhancement in the operational performance, by 20 to 30 per cent, resulted from the interventions in both companies. The third case, GALAXY, a network of tourism-related businesses in the North of Scotland, has been intervened to 'support ambitious Highland businesses [and] to make more of resources and assets through collaborating to deliver a high-quality visitor experience' (McNally, 2010). The project initially involved 12 businesses, they, as a result of the intervention, formed the GALAXY network, which over time expanded to 70 enterprises. As one of the original enterprises, Hotel A, has been selected to examine in the CCoI intervention. Detailed case descriptions can be found in the Appendix I.

4. Findings

4.1 Service Innovation

Addressing the main research question, the manner in which service innovation materialised varied across the cases. Table 4 provides an illustration of findings of service innovation. The manufacturing SMEs, MOON and STAR, tended to rely on internal knowledge exchange to develop and provide service innovation. In STAR, the intervention resulted in the creation of POD; which supported product/client clusters in studio-like space. POD managers engaged with staff and customers in developing solutions and new opportunities. Ideas and solutions generated within a POD are then

prototyped and matched against the criteria in order to filter the most efficient options. The intervention and implementation of design thinking in MOON impacted participants, in so much as the group employed and deployed design thinking towards solutions to service/business issues. However, the intervention remained embedded within the group without engaging the wider organisation.

[Insert Table 4 here]

On the other hand, in the service sector of the GALAXY case, there was more evidence that the enterprises looked externally to inform their service innovation activities. The cases suggest that the design-led interventions can stimulate both internal and external knowledge exchange which in turn leads to service innovation. Moreover, in terms of service innovation delivery, all three cases suggest that SMEs rely more on their organisational attributes, for example, internal connectivity and closeness to the customer, than technology for service innovation. SMEs, enabled by design thinking, conduct service innovation by engaging both internal members and external partners for knowledge exchange.

4.2 CCoI Intervention: Design Thinking

In STAR, the CCoI intervention apparently changed the situation by engaging representatives from all departments with an equal and open platform and giving the participants an opportunity explicitly to express their opinions. As stated by the Marketing Director and POD Manager of STAR, the pilot project fused the staff from different departments into a multi-functional team. The relationships formed in the project eventually led to the incidental creation of POD (KES6):

'Marketing Director: There were 12 individuals selected from these organisations, they went off-site, two days a month for six, nine months. ... From that, for me, what became evident quite quickly was that we had individuals within these groups, some of which I didn't know particularly well, you (turning to POD Manager) was quite new as well so you didn't really (POD Manager: Yes) know many either. But we did get along with each of them quickly.

POD Manager: We did, yes. That was a part of the process because it was such an obscure mix of people, there were some of relationships formed which I think helped the transition of moving, from (previous organisation of STAR) to the POD system, so that was great contribution from everybody there across the board because there were some really good strong relationships formed.' (KES6)

CCoI implementation in MOON followed the same process and principles as in STAR: a workshop was organised engaging participants from across the organisation (KEM4). The CCoI intervention and implementation of design thinking in MOON produced impact within the participating group, in so much as the group employed and deployed design thinking towards generating innovatory solutions to service/business issues. However, the intervention remained embedded within the group and did not develop beyond the wider organisation.

'CCoI Researcher 2: At workshops, (there) was a chosen slice of the company, from the factory floor to the management level and all middle management between. So it started off with 14 members, I can't remember it exactly, and month by month that would change once we had it low as 8 or 9, but generally there was all attendance. And we

would deliver design methods. The two designers worked, with my support, to help design them.' (KEM4)

The intervention in GALAXY differed from that of STAR and MOON. Participants drawn from tourism are enterprises (owners and managers) rather than employees. As a cluster engaging local businesses in initiating, developing, and undertaking events with integrated services and products, GALAXY works as a service delivery system that results from CCoI (NSG9). Design thinking was introduced and implemented in GALAXY to explore internal opportunities, identify potentials and combine the capabilities of all members in providing state-of-the-art services (NSG10), "

'Chairperson of GALAXY: We have quarterly meetings with local tourism organisation…one of the people was involved in that. That meeting actually includes other tourism organisations in the area. We are just about to have a meeting on (an event) so what we want to do is to work with them to run events about (name of the event is not displayed there)' (NSG9)

CCoI was tailored to different participants, but the underpinning process remained the same (Johnson, 2015). With regards to research questions 2 and 3, findings from all three cases, framed by the enablers of knowledge creation according to Krogh et al. (2000) suggest that the interventions, enabled by the design thinking, created, aligned to knowledge exchange, a vision, conversation, and impetus to those involved. This vision, created by the participants themselves, can be either operational or service oriented. The practice of design thinking was contained within the pilot group in MOON by a vision that was limited to operational efficiencies. STAR, led by a service-

oriented vision, managed to embed design thinking throughout the organisation. This finding is further validated by GALAXY, in which design thinking stimulated collective, inter-enterprise, change.

4.3 Knowledge Exchange

In the case of STAR, POD works as an incubator of solutions, a hub of communication, a milieu for internal knowledge exchange, and a laboratory to prototype and test new ideas. The process of knowledge exchange that led to the creation of POD took place in the CCoI pilot. Several workshops were conducted in the pilot group before the creation of POD. For instance, the 'Marble Run' was conducted to diagnose problems hidden in the company; the NOW was formed as an identity for the pilot group as an example of an innovative culture. Design tools were applied to externalise the implicit knowledge of the participants and enable them to exchange knowledge collaboratively.

The process of knowledge exchange in the pilot group was initiated and organised by following the principles of design thinking. Staff from different departments and layers of management engaged through an open, equal, and collaborative platform to express and exchange ideas. Each participant, regardless of her/his position in the company, was treated equally in a friendly and informal environment. Design tools developed by the GSA were applied to help them visualise their ideas. The pilot group led directly to four consequences: 1) one of the most remarkable outcomes of the pilot group is POD, which is recognised as a new service delivery system. The design thinking that had been practised in the pilot group materialised into POD, which

transformed the company into an open, solution-focused, and collaborative organisation; 2) Tools for knowledge exchange. The design tools introduced by CCoI were applied and adapted per the characteristics of the company and were inherited as a part of POD; 3) New customer interaction as a dimension of service innovation; 4) The emergence of management awareness that service is a new direction for innovation.

As noted by the Production Director of MOON and Director of MOON, knowledge is exchanged between the design team and clients of Branches 1, 3, and 4. Specifically, they interact with their clients' designers to meet their requirements (NSM12). The discussion on the dimensions of service innovation in MOON suggests that, as the collaboration was at best a design function, not a broader service-orientated offering, service innovation was lacking. The only exception is the collaboration with internal design houses. The collaborative nature of those businesses matches the definition of service, as a solution co-created with the customer. Therefore, the mechanisms that support those solutions, including the design tools, customer interaction, and revenue model, are recognised as supportive dimensions for generating new service concepts.

MOON builds relationships with new clients to have more influence on design. Here the process of knowledge exchange with the clients is more collaborative and conceptual, with managers and designers leading. Internally, designers are the only contributors to the development of the design of the products. Knowledge of the design of products for all branches is essentially qualitative, intuitive, and implicit. Other members of the company are excluded from the process of knowledge exchange. In contrast, the long-term, contract-based relationships between MOON and its clients are

not innovation-driven. The process of knowledge exchange is generally reactive: MOON provides technical solutions which realise the exclusive design requirements of the clients.

Regarding the case of Hotel A in GALAXY, three dimensions of service innovation, namely a new revenue model, new concepts of service, and new value systems are identified. GALAXY was created to coordinate the provision of services in a collaborative manner. Services offered include conferences, festivals, and other similar events (NSG7). GALAXY plans to develop and manages those events by combining its existing services and products. As a cluster of local businesses aimed at leveraging tourist services with a uniform identity, GALAXY employs services and products from its members to collaboratively provide services and experiences (NSG10). The members of GALAXY share the costs of events that they host by paying membership fees (NSG8). Moreover, local councils and charities also fund the operation of GALAXY and the events they organise (NSG8). Design thinking was introduced and implemented in GALAXY to explore internal opportunities, identify potentials and combine the capabilities of all members in providing state-of-the-art services (NSG10).

'CCoI Researcher 1: Our role was to build up a group of businesses, would begin to work together and using creativity and design methodologies begin to develop something of significance to improve tourism in this area.' (NSG10)

To sum up, the resulting knowledge exchange fuelled innovatory outcomes. In the case of STAR and GALAXY, this informal and collaborative approach transcended the initial participants' engagement. In effect participants become knowledge activists,

which are a key enabler, according to Krogh et al. (2000) with design thinking to engage participants, organise innovative conversations, and integrate and coordinate the effort. In the case of STAR, the CEO and those involved recognised the full strategic potential, introducing a new way of working through the PODs; in GALAXY participants were encouraged to cooperate, not compete, and formed a successful lobbying and business network. Design thinking enables the participants to create a context for sharing knowledge. Such a context is characterised as a studio-like space that enables face-to-face interaction, on an individual and collective level. Enabling such interactions unleashes the latent knowledge potential (Krogh et al., 2000). Studio space incubates new ideas and solutions by encouraging participants, regardless of their backgrounds and status, to interact. However, the success of such an approach depends upon the degree to which senior management recognises the value and potential of service innovation and design thinking to transform the way they do business.

5. Discussion and Implications

5.1 Aggregated discussion of the findings

Corresponding to the research questions, the cases suggest that SMEs can be enabled, through design-led interventions, to think collaboratively and leverage knowledge to achieve service innovation. The cases suggest that the design-led interventions can stimulate both internal (staff) and external (customers) knowledge exchange which in turn leads to service innovation. Moreover, in terms of service innovation delivery, all cases suggest that SMEs rely more on their organisational attributes, for example, internal connectivity and closeness to the customer, than technology. SMEs, enabled by

the design thinking, conduct service innovation by engaging both internal members and external customers for knowledge exchange.

The result confirms the importance of the institutionalisation of value co-creation (Vargo and Lusch, 2016). Sustainable service innovation resulted from the institutionalisation of what was achieved in the pilots. In the cases of STAR and GALAXY, the ecosystems created in the pilot for collaborative knowledge exchange evolved and morphed into the PODs and a tourist cluster (GALAXY), which further engaged members of the entire organisations as well as customers in service innovation. By contrast, in the case of MOON, the pilot which enhanced operational performance, did not result in an ecosystem for value co-creation. Differences between the two organisations in extending the positive results of implementing design-thinking lies in the service orientation that was embedded in the mind of both the top management as well as the members of the organisation.

The following discussion responds to issues raised by Paton and McLaughlin (2008), Vargo et al. (2008) and Sphorer (2007) regarding the role and potential of design thinking within internal and external networks to stimulate service innovation and enhance business performance: 1）The dynamic style of the interventions, leveraging cross-organisational and external knowledge as and when required, facilitated change and new ways of thinking; 2）The ability to orchestrate the co-production of output within networks is essential (den Hertog et al., 2010; Kindstrom et al., 2013). This was achieved in all three cases, with STAR and MOON predominantly internally driven, and in GALAXY more outward-looking, which for service industries is to be expected

according to Doving and Gooderham (2008); 3）By implementing design thinking, participants learned from each other, adapting thoughts and approaches to wider stakeholder expectations; in so doing their actions were better aligned to strategic goals. However, alignment, as was the case in Moon, is not sufficient to deliver organisational change; 4) Successful interventions, designed to deliver service innovation should be capable of transcending their initial boundaries to create a service vision (den Hertog et al., 2010). This was achieved in GALAXY and STAR through embedding design thinking.

A research framework is proposed here by demonstrating the process of knowledge exchange with design thinking which is leading to SMEs service innovation (see Figure 3). The first service innovation outcomes originate within the participating groups; engaging three key actors: the CEOs, staff/members of the organisation, and design-led intervention by researchers. CCoI Researchers organise and initiate knowledge exchange by introducing and implementing design thinking. CEOs play an essential role in motivating the participants and in extending design thinking to the organisations. The second phase of knowledge exchange takes place across the organisation and customers, which is service-oriented. This engages both staff and customers, driven by the participants rather than by management leadership. From a service perspective, it is the internal network or the cluster that enables the SMEs to access, absorb, and make use of customer knowledge. The process of knowledge exchange between staff or the cluster members is therefore critical for the development of service innovation, and this is enabled by the implementation of design thinking.

[Insert Figure 3 here]

5.2 Theoretical contributions

This research contributes to the literature by enriching studies of service innovation from a perspective of knowledge, which is believed to be under-researched, even though it is essential for the success of service innovation (Droege et al., 2009; Hipp, 2010). An integrated research framework of 'Knowledge exchange in SMEs service innovation with design thinking' has been proposed. The relationship between collaborative knowledge exchange and service innovation, enabled by design thinking, is confirmed by the results from all three cases. Findings of the knowledge exchange from those cases agree with Desai (2010) that knowledge results from the combination of adaptive leadership, dynamic value networks, and interactive technologies.

Second, this research examined service innovation from the SDL perspective. SDL views service innovation as being dependent upon the creation of an ecosystem and platform that engage actors for value co-creation (Lusch and Nambisan, 2015; Vargo and Lusch, 2016). This research therefore contributes to the service innovation literature by redefining the roles and relations of the dimensions of service innovation and examining it in traditional sectors (manufacturing and hospitality SMEs' context).

5.3 Practical implications

Practice wise, design thinking is confirmed by this research as both a catalyst and enabler for SMEs to effectively exchange knowledge and innovate. Policy-wise this research provides evidence to the sponsor of CCoI, the Scottish Government, that such design-led interventions can not only enhance performance but also lead to service

innovation. Further, this research highlights the need to sponsors and interventionists that, as ever, sustained, and meaningful engagement of senior management is essential for lasting success.

This study addresses the call for literature on tools and methods for servitisation (Nudurupati et al., 2016; Bustinza et al., 2017). Cases from the manufacturing sector suggest that changing the culture and mindsets of both the top management and the staff are critical for the success of servitisation and the implementation of design thinking. Design thinking is confirmed by this research as both a catalyst and enabler for SMEs to effectively exchange knowledge and further innovate in service. This echoes Geissdoerfer et al. (2016) that design thinking can facilitate viable and sustainable business models for small businesses.

Last, this research reviewed the outcomes of CCoI from a service innovation perspective. The results suggest that a service vision is needed for implementing design thinking. Highlighting the critical role that top managements play in engaging organisations in implementing design thinking, this research suggests the need to embed design thinking within the leadership prior to rolling it out to a wider public. Support from the top management should focus on both the engagement of staff and the changing of vision from product to service focused.

5.4 Limitations and future research

This research examined how design thinking and design tools enable SMEs to engage key actors in the internal network or in a cluster to exchange knowledge and undertake service innovation. Given the importance of technologies as interfaces and

deliverers of new services (den Hertog et al., 2010) and the role that knowledge plays in service innovation (Droege et al., 2009), it would be promising to investigate how technologies, particularly ICT, could play the role as a facilitator of design thinking. In addition, as this research attempts to look at innovation in manufacturing businesses from the perspective of service, it would be beneficial to further examine this phenomenon as part of the ongoing development of the theory of service innovation (Droege et al., 2009). More cases from the manufacturing sector are needed to explore the value of service innovation.

Reference

Aal, K., Pietro, L., Edvardsson, B., Reinzi, M.F. and Mugion, R.G. (2016), "Innovation in Service Ecosystems: An empirical study of the integration of values, brands, service systems and experience rooms", *Journal of Service Management*, 27, pp.619-651.

Adebanjo, D. & Michaelides, R. (2010), "Analysis of Web 2.0 Enabled E-Clusters: A Case Study", *Technovation*, Vol. 30, pp. 238-48.

Ahmed, F., Naqshbandi, M. M., Kaur, S., & Ng, B. K. (2018). Roles of leadership styles and relationship-based employee governance in open service innovation: Evidence from Malaysian service sector. *Leadership & Organization Development Journal*, 39(3), 353–374.

Andreassen, T., Lervik-Olsen, L. and Calabretta, G. (2015), "Deriving valuable innovations: the case of trend spotting", *Journal of Service Theory and Practice*, 25, pp.10-30.

Andreeva, T. and Kianto, A. (2011), "Knowledge processes, knowledge-intensity and innovation: a moderated mediation analysis", *Journal of Knowledge Management*, 15, pp.1016-1034.

Ashcroft, E., Tuomi, A., Wang, M., Solnet, D. (2019), "Resistance To The Adoption Of Icts In Independent Restaurants: Insights From China And The Uk", *E-Review Of Tourism Research*, Vol. 16, No. 2/3, pp.105-13.

Barras, R. (1986), "Towards a theory of innovation in services", *Research Policy,* Vol. 15, Iss. 4, pp. 161-73.

Blazevic, V. & Lievens, A. (2008), "Managing Innovation Through Customer Coproduced Knowledge In Electronic Services: An Exploratory Study", *Journal of the Academy Of Marketing Science*, Vol. 36, pp. 138-51.

Bryman, A. (2012), *Social Research Methods*, Oxford, United Kingdom, Oxford University Press, Inc.

Bustinza, O. F., Gomes, E., Vendrell-Herrero, F. and Baines, T. (2017), "Product–service innovation and performance: the role of collaborative partnerships and RandD intensity", *RandD Management*.

Carlborg, P., Kindstrom, D. and Kowalkowski, C. (2014), "The evolution of service innovation research: a critical review and synthesis", *Service Industries Journal*, 34, pp.373-398.

Casalino, N., Borin, B., Pizzolo, G., & Cavallini, S. (2019), "Automation, Technology

Transfer and Managerial Practices for Organizational Growth Of Smes", A Smart Curriculum For Competitiveness, *Ieee Global Engineering Education Conference* (Educon), Dubai, United Arab Emirates, pp. 1534-41.

Cohen, W. M. (2012), "Fifty Years of Empirical Studies of Innovative Activity And Performance", *Handbook Of The Economics Of Innovation*, Vol 1, No. 1, pp. 129-213.

Corral De Zubielqui, G., Lindsay, N., Lindsay, W., & Jones, J. (2019), "Knowledge Quality, Innovation And Firm Performance: A Study Of Knowledge Transfer In Smes", Small Business Economics, Vol. 53, p. 145.

Den Hertog, P., Van Der AA, W. and De Jong, M. W. (2010), "Capabilities for managing service innovation: towards a conceptual framework", *Journal of Service Management*, 21, pp.490-514.

De Jong, J. P. J. and Marsili, O. (2006), "The fruit flies of innovations: A taxonomy of innovative small firms", *Research Policy*, 35, pp.213-229.

Denzin, N. K. and Lincoln, Y. S. (2011), *The SAGE handbook of qualitative research*, Calif.; London Thousand Oaks, SAGE.

Desai, D. A. (2010), "Co-creating learning: insights from complexity theory", *The Learning Organization*, 17, pp.388-403.

Dijksterhuis, E. & Silvius, G. (2017), *The Design Thinking Approach To Projects*.

Doving, E. and Gooderham, P. N. (2008), "Dynamic capabilities as antecedents of the scope of related diversification: The case of small firm accountancy practices", *Strategic Management Journal*, 29, pp.841-857.

Drejer, I. (2004), "Identifying Innovation In Surveys Of Services: A Schumpeterian Perspective", *Research Policy*, Vol. 33, pp. 551-62.

Droege, H., Hildebrand, D. and Forcada, M. A. H. (2009), "Innovation in services: present findings, and future pathways", *Journal of Service Management*, 20, pp.131-155.

Durst, S. and Edvardsson I. R. (2012), "Knowledge management in SMEs: a literature review", *Journal of Knowledge Management*, 16, pp.879-903.

Durst, S., Mention, A.-L. & Poutanen, P. (2015), "Service Innovation And Its Impact: What Do We Know About?", *Investigaciones Europeas De Dirección Y Economía De La Empresa,* Vol. 21**,** pp. 65-72.

Edvardsson, B. & Tronvoll, B. (2013), "A New Conceptualization Of Service Innovation Grounded In S-D Logic And Service Systems", *International Journal Of Quality And Service Sciences*, Vol. 5 No. 1, Pp. 19-31.

Ferreira, J., Coelho, A., & Moutinho, L. (2020). Strategic alliances, exploration and exploitation and their impact on innovation and new product development: The effect of knowledge sharing. *Management Decision*, 59(3), 524–567.

Fidel, P., Cervera, A. & Schlesinger, W. (2016), "Customer's Role in Knowledge Management And In The Innovation Process: Effects On Innovation Capacity And Marketing Results", *Knowledge Management Research & Practice*, Vol. 14, pp. 195-203.

Fidel, P., Schlesinger, W. & Cervera, A. (2015), "Collaborating to Innovate: Effects On Customer Knowledge Management And Performance", *Journal of Business Research*, Vol. 68, pp. 1426-8.

Geissdoerfer, M., Bocken, N. M. P. and Hultink, E. J. (2016), "Design thinking to enhance the sustainable business modelling process – A workshop based on a value mapping process", *Journal of Cleaner Production*, 135, pp.1218-1232.

Gupta, A. K., Smith, K. G. and Shalley, C. E. (2006), "The interplay between exploration and exploitation", *Academy of Management Journal*, 49, pp.693-706.

Hakanen, T. and Jaakkola, E. (2012), "Co-creating customer-focused solutions within business networks: a service perspective", *Journal of Service Management*, 23, pp.593-611.

Heimonen, T. (2012), "What are the factors that affect innovation in growing SMEs?" *European Journal of Innovation Management*, 15, pp.122-144.

Henry, L. J. (2012), "Intellectual Capital in a Recession: Evidence from UK SMEs", *Journal of Intellectual Capital*, 14.

Hipp, C. (2010), "Collaborative innovation in services", *Handbook of Innovation and Services: A Multi-Disciplinary Perspective*, pp.318-341.

Hsu, S.-M., Hsieh, P.-H. & Yuan, S.-T. (2013), "Roles Of 'Small- And Medium-Sized Enterprises' In Service Industry Innovation: A Case Study On Leisure Agriculture Service In Tourism Regional Innovation", *The Service Industries Journal*, Vol. 33, pp. 1068-88.

Hydle, K. M., Aas, T. H. and Breunig, K. J. (2016), "Towards a framework for New Service Development Practices", *Journal of Innovation Management*, 4, pp.55-67.

Johnson, M. P. (2015) *Creating Innovative Workplaces: Situational Challenges and Opportunities for Design Innovation* (Internal Review of CCoI 2), “

Kenney, M. (2001), “The Temporal Dynamics of Knowledge Creation in the Information Society”, In: Nonaka, I. and Nishiguchi, T. (eds.) *Knowledge Emergence: Social, Technological, and Evolutionary Dimensions of Knowledge Creation*. New York, United States: Oxford University Press, Inc.

Kindstrom, D., Kowalkowski, C. and Sandberg, E. (2013), “Enabling service innovation: A dynamic capabilities approach”, *Journal of Business Research*, 66, pp.1063-1073.

Klewitz, J. and Hansen, E. G. (2014), “Sustainability-oriented innovation of SMEs: a systematic review”, *Journal of Cleaner Production*, 65, pp.57-75.

Kolko, J. (2015), “Design Thinking Comes of Age”, *Harvard Business Review*, 93, pp.66-71.

Krogh, G. V., Ichijo, K. and Nonaka, I. (2000), *Enabling Knowledge Creation: How to Unlock the Mystery of Tacit Knowledge and Release the Power of Innovation*, New York, United States, Oxford University Press, Inc.

Kumar, K., Boesso, G., Favotto, F. and Menini, A. (2012), “Strategic orientation, innovation patterns and performances of SMEs and large companies”, *Journal of Small Business and Enterprise Development*, 19, pp.132-45.

Kurz, H.-D. (2012), *Innovation, Knowledge and Growth: Adam Smith, Schumpeter and the Moderns*, London, United Kingdom, Routledge.

Laforet, S. (2009), “Effects of size, market and strategic orientation on innovation in non-high-tech manufacturing SMEs”, *European Journal of Marketing*, 43, pp.188-212.

Laforet, S. (2011), “A framework of organisational innovation and outcomes in SMEs”, *International Journal of Entrepreneurial Behaviour and Research*, 17, pp.380-408.

Laforet, S. (2012), *Culture, structure, leadership, business goals, orientation and innovation Culture and innovation*, Cheltenham, Edward Elgar Publishing Ltd.

Laforet, S. and Tann, J. (2006), “Innovative characteristics of small manufacturing firms”, *Journal of Small Business and Enterprise Development*, 13, pp.363-380.

Lincoln, Y. S., Lynham, S. A. and Guba, E. G. (2011), *Paradigmatic controversies, contradictions, and emerging confluences, revisited*. The Sage handbook of qualitative

research, 4, 97- 128.

Lockwood, J., Smith, M. and Mcara-McWilliam, I. (2012), “Work-Well: Creating a Culture of Innovation through Design”, International Design Management Research Conference. Boston, MA. USA.

Lusch, R. and Nambisan, S. (2015), *Service Innovation: A Service-Dominant Logic Perspective*.

Lusch, R. F. & Vargo, S. L. (2008), The Service-Dominant Mindset. *In:* Hefley, B. & Murphy, W. (Eds.) *Service Science, Management And Engineering Education For The 21st Century.* New York, United States: Springer.

Naqshbandi, M. M., & Kamel, Y. (2017). Intervening role of realized absorptive capacity in organizational culture–open innovation relationship: Evidence from an emerging market. *Journal of General Management*, 42(3), 5–20.

Naqshbandi, M. M., Kaur, S., & Ma, P. (2015). What organizational culture types enable and retard open innovation? *Quality & Quantity*, 49(5), 2123–2144.

Naqshbandi, M. M., & Tabche, I. (2018). The interplay of leadership, absorptive capacity, and organizational learning culture in open innovation: Testing a moderated mediation model. *Technological Forecasting and Social Change*, 133, 156–167.

Madrid-Guijarro, A., Garcia-Perez-De-Lema, D. and Van Auken, H. (2013), “An Investigation of Spanish SME Innovation during Different Economic Conditions”, *Journal of Small Business Management*, 51, pp.578-601.

Mcnally, N. (2010), *Innovating Tourism in Caithness and North Sutherland.*

Mele, C., Colurcio, M. and Russo-Spena, T. (2014), “Research traditions of innovation: Goodsdominant logic, the resource-based approach, and service-dominant logic”, *Managing Service Quality: An International Journal*, 24, pp.612-642.

Nudurupati, S. S., Lascelles, D., Wright, G., Yip, N. (2016), “Eight challenges of servitisation for the configuration, measurement and management of organisations. *Journal of Service Theory and Practice*, 26, 745-763.

Oke, A. (2007), “Innovation types and innovation management practices in service companies”, *International Journal of Operations and Production Management*, 27, pp.564-587.

Paton, R. A. and Mclaughlin, S. (2008), “Services innovation: Knowledge transfer and the supply chain. *European Management Journal*, 26, pp.77-83.

Rhodes, C. (2018), *Briefing Paper on Business Statistics*, House Of Commons Library, U.K.

Rigg, C., Coughlan, P., O'Leary, D., & Coghlan, D. (2021). A practice perspective on knowledge, learning and innovation – insights from an EU network of small food producers. *Entrepreneurship & Regional Development*, 33(7–8), 621–640

Rubalcaba, L., Gallego, J. and Den Hertog, P. (2010), "The case of market and system failures in services innovation", *Service Industries Journal*, 30, pp.549-566.

Salonen, A. (2011), "Service transition strategies of industrial manufacturers", *Industrial Marketing Management*, 40, pp.683-690.

Sphorer, J. (2007), *Service Science: The next frontier in Service Innovation*, IBM Corporation. Produced in Singapore.

Svensson, C. and Barfod, A. (2002), "Limits and opportunities in mass customization for "build to order" SMEs", *Computers in Industry*, 49, 77-89.

Vargo, S. L., & Lusch, R. F. (2016), "Institutions And Axioms: An Extension And Update of Service-Dominant Logic", *Journal of the Academy of Marketing Science*, Vol. 44, No.4, pp. 5–23.

Vargo, S. L., Maglio, P. P. and Akaka, M. A. (2008), "On Value and Value Co-creation: a Service Systems and Service Logic Perspective", *European Management Journal*, 26, pp.145-52.

Wilden, R., Akaka, M. A., Karoen, I. O., & Hohberger, J. (2017), "The Evolution And Prospects Of Service-Dominant Logic: An Investigation Of Past, Present, And Future Research", *Journal of Service Research*, Vol. 20, No. 4, pp. 345–61.

Wymenga, P., Spanikova, V., Barker, A., Konings, J. and Canton, E. (2012), *EU SMEs in 2012: at the crossroads: Annual report on small and medium-sized enterprises in the EU, 2011/12*. Rotterdam: Ecorys Nederland BV.

Yin, R. K. (2014), *Case study research: design and methods*, Thousand Oaks, California, SAGE Publictions.

Zhang, W. and Banerji, S. (2017), "Challenges of servitization: A systematic literature review", *Industrial Marketing Management*, 65, pp.217-227.