Implementation of Design Thinking for Collaborative Service Innovation in SMEs: A Knowledge Perspective

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Executive Summary

Innovation is a key socio-economic motivator (Laforet, 2012; Kurz, 2012). Recent studies have revealed the global innovative potential of small and medium-sized enterprises (SMEs) (Wymenga *et al.*; 2012, Muller, 2015). Contemporary studies suggest that, despite the role played by innovation in enabling SMEs to survive and thrive, they have been hindered by inadequate, in particular, physical resources, such as funds and technology (Laforet and Tann, 2006; Laforet, 2009).

Lusch and Vargo (2008) argue that Service Dominant Logic (SDL) provides a new means of looking at value, one which emphasises that it is co-created by users and providers. Within this logic, attention focuses on service innovation, on the assumption that conventional definitions of innovation, which derive from product/ technical perspectives, do not fully explain the phenomena, particularly in SMEs (Droege *et al.*, 2009; den Hertog *et al.*, 2010). Service innovation is believed to result, in the main, from non-technological sources (Drejer, 2004; Carlborg *et al.*, 2014). Lusch and Vargo (2008) stress that SDL focuses on knowledge as an essential ingredient for value co-creation, in contrast to Good-Dominant Logic (GDL), which emphasises physical or operand resources. They further argue that service innovation is a process, from which new products, services, and technologies are generated, rather than an output in the case of GDL (Mele *et al.*, 2014; Lusch and Nambisan, 2015). Knowledge exchange as a process of value co-creation is therefore essential for service innovation. SMEs should be well placed to exploit the potential of service innovation as they are: close to their customers; have flatter structures; more effective internal communication; and possess a more positive attitude to risk-taking (Laforet, 2012).

Further development of theories and definitions relating to service innovation have been called for (Droege *et al.*, 2009), however, progress to date has been limited (Droege *et al.*, 2009; Carlborg *et al.*, 2014; Valtakoski and Järvi, 2016). This thesis, by adopting and contextualising as a framework the six-dimensional (6-D) model of service innovation (den Hertog *et al.*, 2010), examines service innovation in SMEs from a knowledge perspective.

This research is contextualised by an initiative, Creating Cultures of Innovation (CCoI), a Scottish Government sponsored project conducted by the Glasgow School of Art (GSA). This initiative was intended to enhance the performance of SMEs by design-led interventions, releasing the creativity of SMEs by engaging key stakeholders in collaborative knowledge exchange. A qualitative multiple case-

study explores the extent to which intervention triggers both knowledge exchange and innovation.

Results of this research contribute to the literature by enriching our understanding of service innovation *from a knowledge perspective* (Droege *et al.*, 2009; Valtakoski and Järvi, 2016; Witell *et al.*, 2016); by contextualising and exploring the 6-D model of service innovation in traditional SMEs (den Hertog *et al.*, 2010); by understanding the interactions with the key stakeholders in the service ecosystem of an organisation (Carlborg *et al.*, 2014; Mele *et al.*, 2014; Lusch & Nambisan, 2015); and, by providing empirical evidence for the development of SDL in a context of non-knowledge intensive SMEs (Lusch & Nambisan, 2015). Practically, this research also provides a service innovation lens through which the CCoI initiative may be evaluated. From an operational perspective, the research suggests a means, design thinking interventions, by which traditional SMEs exploit service innovation. Lastly, the results provide an insight for policy makers wishing to enhance the innovative performance of Scottish SMEs.

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Author’s Declaration

"I declare that, except where explicit reference is made to the contribution of others, that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

Signature _____

Printed name Bin Gao _____

Chapter 1: Introduction to the Research: Knowledge Exchange, Service Innovation, Design Thinking and SMEs

Chapter 1 outlines the rationale behind the research and how it contributes to literature, policy and practice. In addition, this chapter provides an overview of the research methodology, context and case studies.

1.1 Rationale for the Research

Innovation is recognised both by classical political economists like Adam Smith and David Ricardo, and by contemporary researchers, to be critical to socio-economic development (Kurz, 2012; Laforet, 2012). Recent studies highlight the role that innovation plays in creating sustainable growth (Wymenga *et al.*, 2012). Studies have revealed the potential for innovation within SMEs (Heimonen, 2012; Kumar *et al.*, 2012; McDermott and Prajogo, 2012a; Wymenga *et al.*, 2012; Madrid-Guijarro *et al.*, 2013), however, they have also noted constraints, such as, inadequate resources, in particular physical resources, and technology (Laforet and Tann, 2006; Laforet, 2009; Laforet, 2010; Laforet, 2011).

In contrast to traditional studies which attribute innovation to the possession of physical resources and technology, following a goods dominant logic (GDL), recent researchers *i.e.* Lusch and Vargo (2008), Paton and McLaughlin (2008), Ordanini and Parasuraman (2011), and Carlborg *et al.* (2014) attempt to view innovation from a service perspective, in the belief that value is created in collaboration. Service Dominant Logic (SDL) is a framework articulated by Vargo and Lusch (2006) in which the purpose of economic exchange and marketing is fundamentally attributed to the exchange of services (see pp. 23-6 for details). SDL focuses on operant resources, particularly knowledge, in contrast to operand resources emphasised by GDL (Vargo and Lusch, 2004; Lusch and Vargo, 2008; Vargo *et al.*, 2008). SMEs may be advantaged as since they are recognised to possess implicit knowledge potential, which is essential for service innovation (Laforet and Tann, 2006; McDermott and Prajogo, 2012b; Tomlinson and Fai, 2013; Molnar, 2014).

Knowledge exchange, as a process of value co-creation, is essential for SMEs to innovate (Ferraresi *et al.*, 2012; Heimonen, 2012; Deiters and Schiefer, 2012; McAdam *et al.*, 2014; Molnar, 2014). This research examines how knowledge is exchanged within SMEs, in order successfully to contribute to service innovation.

1.2 Small and Medium-sized Enterprise and Innovation

SMEs have a positive impact on the socio-economic landscape. Furthermore, their survival and development, in particular their innovative capacity, are seen as crucial to future prosperity, as noted by Laforet and Tann (2006), Ayyagari *et al.* (2007), Udayasankar (2007), Fink and Ploder (2009), McGrath and O'Toole (2012). SMEs contribute, on a worldwide basis, to economic wellbeing, employment, production and innovation:

1) SMEs account for 90% of all enterprises (Udayasankar, 2007), and in the European Union they account for 99.8% in the non-financial sector, contributing over 50% of Gross Domestic Product (GDP) and providing 67% of employment (Muller, 2015);
2) In the United States, SMEs provide 70% of employment and 48% of GDP (Ayyagari *et al.*, 2007) and in the United Kingdom 58.1% of GDP (Commission, 2012);
3) In addition, Fink and Ploder (2009) note the global impact of SMEs, citing that in Asian & Pacific Economic Collaboration (APEC) and Australia they account for 90% and 95% respectively, furthermore in Australia they employ 93.6% of the workforce.

Unfortunately, there is no universally accepted definition for the term SME, for this research, given the UK focus; the Companies Act 2006 definition, Sections 382 and 485, the Companies Act 2006 was adopted:

> *'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 (Henry, 2012).'*

Innovation is regarded as a key to success in today's turbulent macro-environment (Laforet, 2011; Wymenga *et al.*, 2012). From an operational perspective, innovation is competitively critical (Laforet, 2012; Tohidi *et al.*, 2012). For this reason, considerable attention has been paid to innovation, with new studies emerging on a regular basis (Durst and Edvardsson, 2012).

Innovation is seen to be essential to all enterprises, no matter their size (Laforet, 2009), and Wymenga *et al.* (2012) noted that SMEs committed to innovation were more likely to survive the 2008 economic crisis.

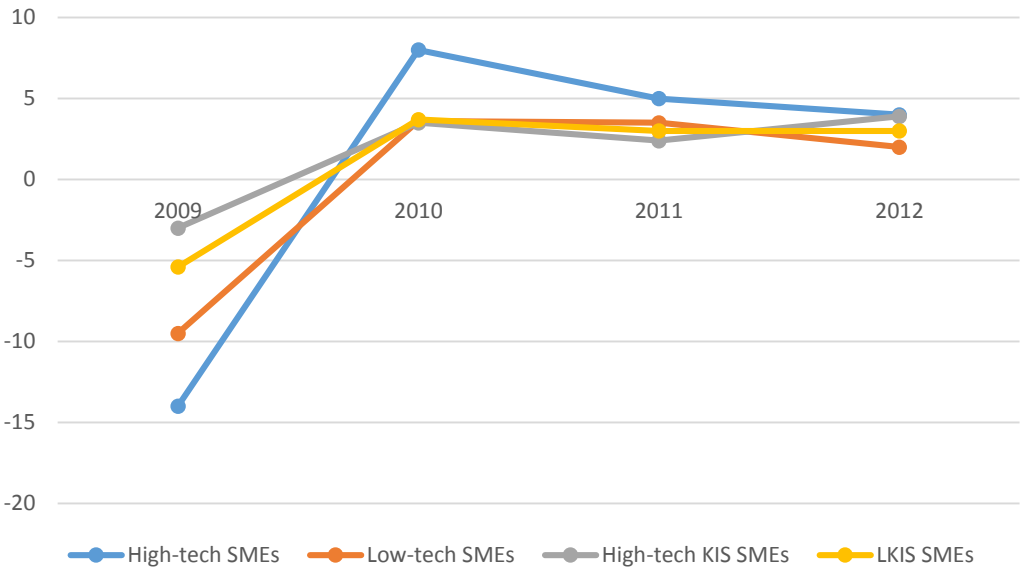

Figure 1-1: Gross Value Added (GVA) of EU SMEs by high- and low-tech manufacturing and high- and low knowledge-intensive services, 2009-2012 (estimates)
Source: Wymenga *et al.* (2012)

As previously noted, SMEs are constrained in innovation terms, in both products and processes, due to limited physical resources, particularly funds, and technology (Amara *et al.*, 2008; Cohen, 2012). However, SMEs do have innovative potential derived from first-hand market intelligence, proximity to customers, flexibility, rich implicit knowledge, and a risk taking mentality (Laforet and Tann, 2006; Laforet, 2009; Laforet, 2011).

1.3 Innovation, Service, and Knowledge Exchange

The following paragraphs provide an overview of innovation, service innovation, knowledge exchange and design thinking. Detailed discussions may be found in Chapter 2.

1.3.1 Innovation and Service Innovation

Research on innovation has tended to historically adopt a GDL perspective, which in turn has led to a tendency to neglect the service sector or innovation through service (den Hertog *et al.*, 2003; Droege *et al.*, 2009; den Hertog *et al.*, 2010; Mele *et al.*, 2014). Service Dominant Logic (SDL), in part, endeavours to address this issue.

SDL is a framework articulated by Vargo and Lusch (2006) in which the purpose of economic exchange and marketing is fundamentally attributed to the exchange of services. Goods, funds, organisations and networks are believed to be important elements of a

market-based economy and collateral institutions that mediate in the exchange of services (Vargo and Lusch, 2004; Paton and McLaughlin, 2008). SDL is therefore essentially 'a shift from the means and the producer perspective to the utilisation and the customer service' (Vargo and Lusch, 2004; Lusch and Nambisan, 2015; Vargo and Lusch, 2016).

There is no consensus about either the taxonomy or classification of service innovation in the literature (Droege *et al.*, 2009; Carlborg *et al.*, 2014; Valtakoski and Järvi, 2016). During its development, research borrowed definitions and theories of product innovation, prior to defining service innovation independently (Droege *et al.*, 2009). However, the dichotomy between New Product Development (NPD) framework and New Service Development (SPD) framework for measuring service innovation is giving way to a synthesis perspective that sees service innovation as a more all-encompassing, multi-dimensional process (Carlborg *et al.*, 2014; Hydle *et al.*, 2016). Service innovation is considered to require a broader acknowledgement of organisational activities (Djellal and Gallouj, 2010; Carlborg *et al.*, 2014). A resource-based perspective, looks at how an organisation integrates internal or external networks for optimising the usage of both physical and intangible resources, for new product development and new service development (Mele *et al.*, 2014). This trend is reflected by increasing attention being paid to the servitisation which is defined as a manufacturers capability to provide customer specific, integrated solutions (Bustinza *et al.*, 2017).

Scholars such as Vargo and Lusch (2010), Edvardsson and Tronvoll (2013) and Mele *et al.* (2014) have developed a new logic to explain service and service innovation, in contrast to the traditional Goods-Dominant Logic (GDL). GDL treats innovation, in product, technology or service, as an output. By contrast, SDL regards service innovation as a process of value co-creation between actors (Mele *et al.*, 2014; Lusch and Nambisan, 2015). Under GDL, value is created not by the company; but by the collaboration between them and the customer (Mele *et al.*, 2014). Service innovation is therefore not seen as an output but an input.

Following the continuum of theories about service innovation, from the assimilation of theories about product innovation (Barras, 1990; Gallouj and Weinstein, 1997), through the development of a distinctive theory for service innovation (den Hertog *et al.*, 2003), and the development of synthesis perspective (Gallouj and Savona, 2009); various frameworks have been proposed. Lusch and Nambisan (2015) developed an SDL framework that

comprises three elements, namely service ecosystem, service platforms and value co-creation, to address service innovation. However, this framework was developed from the IT sector (Lusch and Nambisan, 2015), leaving a gap for contextualising it within non-knowledge intensive SMEs. In contrast, developed and tested within the traditional service sector, the 6-D model of service innovation (den Hertog *et al.*, 2010) is a theoretical framework that treats service innovation as a multi-dimensional scenario (as in Figure 1-2, detail can be found in Table 2-3). Criticism of the 6-D model falls on its exclusion of the customer (Hydle *et al.*, 2016). However, from an organisational perspective, service innovation is linked to business strategy (Carlborg *et al.*, 2014) and various stakeholders, not only the customer. Challenges that are identified in the servitisation literature include: organisational structures and transformation (Kowalkowski, 2011; Salonen, 2011); changing organisational cultures (Baines *et al.*, 2009); and, ideas generation (Zhang and Banerji, 2017). The literature also calls for research to address the strategic issues associated with multiple stakeholders (Gallouj, 1997; Djellal and Gallouj, 2010; Hipp, 2010; Carlborg *et al.* 2014). A detailed literature review in Chapter 2 indicates that, due to its multi-dimensional and strategic nature (Carlborg *et al.*, 2014; Hydle *et al.*, 2016), the 6-D model is claimed by Droege *et al.* (2009) to appropriately define and investigate service innovation. Lastly, this research, broadly speaking, aims to address these gaps in the literature, as well as address the potential integration of the 6-D model which teats innovation as an output (Mele *et al.*, 2014) within an SDL context.

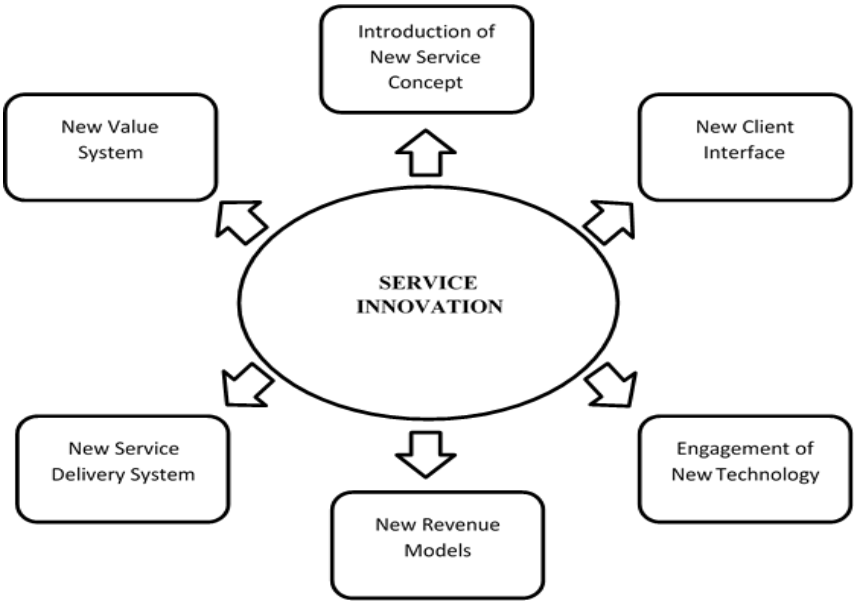

Figure 1-2: The Six-Dimensional Model of Service Innovation (den Hertog *et al.*, 2010)

1.3.2 Service Innovation and Knowledge Exchange

Scholars attribute successful innovation to knowledge creation, sharing and exploitation (Nonaka and Takeuchi, 1995; Kalthoff *et al.*, 1997; Krogh *et al.*, 2000; Nonaka and Nishiguchi, 2001; Kenny and Fahy, 2011). Thanks to technological developments the reliance of business on physical resources has significantly diminished (Krogh *et al.*, 2000; Kenny and Fahy, 2011). Knowledge and associated technologies are recognised as being key assets that enhance competitiveness and innovation (Nonaka and Takeuchi, 1995; Kalthoff *et al.*, 1997; Krogh *et al.*, 2000; Nonaka and Nishiguchi, 2001; Harris, 2009; Cricelli and Grimaldi, 2010; Desai, 2010; Westerlund and Rajala, 2010). Studies are primarily concerned with knowledge creation, storage and dissemination within larger enterprises. Information communication technology (Bordonaba-Juste *et al.*, 2012), which larger organisations rely on for knowledge management, are often less developed within SMEs (Paton and McLaughlin, 2008). Moreover, the manner in which larger organisations exchange knowledge is often more formal and structured (Krogh *et al.*, 2000; Nonaka and Nishiguchi, 2001), however, such an approach may not sit well with SMEs (Laforet, 2011). The shift to SDL represents a realignment of focus from operand resources to operant resources *i.e.* dynamic resources which act upon other resources (Vargo and Lusch, 2004). For this reason, intangible resources, particularly knowledge and skills, are essential to maintain competitiveness (Vargo and Lusch, 2006). An organisation that promotes and exploits knowledge acquisition, transfer and exploitation should be well placed to leverage innovative potential (Nonaka and Takeuchi, 1995; Nonaka and Nishiguchi, 2001; Paton and McLaughlin, 2008).

1.3.3 Design thinking and Service Innovation: The Context of the Research

Service innovation research follows a continuum from a technical to a synthesis perspective (Droege *et al.*, 2009). A more encompassing and multi-dimensional service innovation is defined under the 6-D model as:

> *'A service innovation is a new service experience or service solution that consists of one or several of the following dimensions: new service concept, new customer interaction, new value system/business partners, new revenue model, new organisational or technological service delivery system.(den Hertog et al., 2010)'*

Moreover, den Hertog *et al.* (2010) attribute successful service innovation to the possession of six capabilities:

1) Signalling user needs and technological options;
2) Conceptualising;
3) (Un-)bundling capability;
4) Co-producing and orchestrating;
5) Scaling and stretching, and
6) Learning and adapting.

Enterprises cannot effectively release their innovative potential unless they can simplify the complexity of innovation in both products and services (Kolko, 2011). Design thinking, a solution that was first attempted in 1991 by David Kelly and soon popularised, is attracting increasing attention (Geissdoerfer *et al.*, 2016), as Kolko noted:

> *'There's a shift under way in large organisations, one that puts design much closer to the centre of the enterprise…Every established company that has moved from products to services, from hardware to software, or from physical to digital products needs to focus anew on user experience…Design thinking is an essential tool for simplifying and humanising…' (Kolko, 2011)*

The opinion above is echoed by Geissdoerfer *et al.* (2016) who sees design thinking as a method for developing 'innovative solutions for complex problems'. Indeed, a shift is taking place in large companies, as observed by Kolko (2015), which places design thinking at the centre of the enterprises innovative drive.

The design-centric culture, as defined by Kolko (2015), focuses on users' experiences, especially emotional ones. Specifically, a company would use design-centric culture to:

1) focus on users' experiences;
2) create models to examine complex problems;
3) use prototypes to explore potential solutions;
4) tolerate failure, and
5) exhibit thoughtful restraint.

Moreover, at a strategic level, design-centric culture is all about these qualities - from empathy and experimentation, to design smarts - and these qualities need to be distributed throughout the organisation (Kolko, 2015).

The comparison between the capabilities identified by den Hertog *et al.* (2010) for managing service innovation and the features of design-centric culture described by Kolko

(2015), as Table 1-1 shows, demonstrates the potential of design-centric culture for creating or enhancing a company's potential. Indeed, as Geissdoerfer *et al.* (2016) and Andreassen *et al.* (2015) note, enterprises are empowered by implementing design thinking to engage key stakeholders, map and co-create value, and eventually innovate through service. This perspective of service innovation blurs the division between product and service innovation (Carlborg *et al.*, 2014; Hydle *et al.*, 2016). The servitisation of manufacturing, the transformation of selling products to providing integrated solutions, also requires unconventional approaches to innovation to ensure value in use (Baines *et al.*, 2009; Zhang and Banerji, 2017). Lusch and Nambisan (2015) also stressed the importance of design in creating service ecosystems, service platforms and enabling value co-creation. However, they looked at information communication technologies (ICTs) to develop the framework, which is, as mentioned previously, does not fit well with a traditional SME context (Laforet, 2010). Therefore, it is necessary to explore other methods that may enable service innovation within non-ICT intensive SMEs. Design thinking could be an alternative to ICT solutions; it promotes, creates and produces value through collaboration and innovation (Geissdoerfer *et al.*, 2016).

Regarding the previously noted calls for further research into the servitisation of manufacturing, which concerned the transformation for product to service centric business models (Fang *et al.*, 2008; Salonen, 2011; Zhang and Banerji, 2017); design thinking may offer a means of mobilising efforts to address the challenge.

Capabilities for Managing Service Innovation (den Hertog *et al.*, 2010)	**Design-centric Culture (Kolko, 2015)**
Signalling user needs and technological options;	Focus on users' experience;
Conceptualising, visualising, prototyping and testing;	Create models to examine complex problems;
(Un)binding capability;	Use prototypes to explore potential solutions;
Co-producing & orchestrating;	
Scaling and stretching;	Spreading empathy, experimentation, design smarts and other qualities that help create interactions with other complex systems to the whole organisation;
Learning and adapting.	Tolerate Failures.

Table 1-1: Comparison between the Capabilities for Managing Service Innovation and the Characteristics of the Design-centric Culture

SDL recognises knowledge as a critical source for successful service innovation. The collaborative nature of SDL, as Vargo (2011) notes, requires that stakeholders co-create, through knowledge exchange, service innovation. The challenge for SMEs in service innovation is how to best approach knowledge exchange.

This research is contextualised by the Creating Cultures of Innovation (CCoI) project. CCoI is an action research project conducted by the Glasgow School of Art (GSA), in collaboration with the Adam Smith Business School (ASBS), the University of Glasgow. The project was funded by the Scottish Funding Council to explore how design thinking can play a role in enhancing the improvement of skills utilisation in the workplace (Lockwood *et al.*, 2012).

CCoI interventions aimed to enhance creativity, productivity and performance of participant companies by implementing design thinking. From 2010, a group of researchers from the GSA conducted interventions in Scottish SMEs (Lockwood *et al.*, 2012). Employees from the 'shop floor' to the senior management have participated. Therefore, the context of this research is *'SMEs that have engaged with CCoI.'*

1.4 Research Drivers and Questions

Based on the extant literature, which will be reviewed in Chapter 2, this research is driven by the following:

- SMEs contribute, on a worldwide basis, to economic wellbeing, employment, production and innovation, and they continue to have a substantial impact *(*Heimonen, 2012; Kumar *et al.*, 2012; McDermott and Prajogo, 2012a; Wymenga *et al.*, 2012; Madrid-Guijarro *et al.*, 2013);
- Innovation is critical for companies, especially SMEs, to survive and sustain growth (Kurz, 2012; Laforet, 2012);
- Contemporary literature notes that SMEs possess innovative advantages in terms of lateral structures, risk-taking tendencies, proximity to customers, high trust and flexibility (Laforet, 2009; Durst and Edvardsson, 2012);
- Barriers within SMEs in relation to external, internal, structural and resources require traditional GDL approaches to be modified (Hotho and Champion, 2011);
- Research has not fully addressed the dynamic and complex nature of SMEs in terms of innovation (Hotho and Champion, 2011);
- Knowledge and innovation, as noted by SDL, are interrelated as highlighted by Lusch and Vargo (2006), Vargo and Lusch (2006), Lusch and Vargo (2008);
- Implicit knowledge is the source of creativity; creativity and innovation emerge from the process of knowledge exchange (Kalthoff *et al.*, 1997; Krogh *et al.*, 2000; Kenney, 2001; Nonaka and Nishiguchi, 2001);
- SMEs tend to innovate in an informal, unstructured, operational manner (Laforet and Tann, 2006; Laforet, 2010; Laforet, 2011);
- Clustering is an effective way for SMEs to overcome barriers relating to scale and capability (Adebanjo and Michaelides, 2010; Lamprinopoulou and Tregear, 2011). However, explorative research that addresses company-specific characteristics is needed (Droege *et al.*, 2009; Huber, 2012);

- From a SDL perspective, the process of value co-creation, between many actors, is critical (Lusch and Nambisan, 2015);
- SMEs would potentially be empowered by implementing design thinking for collaborative knowledge exchange and service innovation (Lockwood *et al.*, 2012).

The above, combined with observations relating to the CCoI interventions and specific calls for further research, led to four research questions:

Research question 1: How is service innovation initiated, developed and implemented by SMEs?

Research question 2: How is knowledge exchanged between the key actors for service innovation to be realised in SMEs?

Research question 3: How is knowledge exchange and service innovation enabled by the implementation of design thinking in SMEs?

Research question 4: How do SMEs collaborate in a cluster to exchange knowledge and to innovate in service?

1.5 Overview of Research Methodologies

The multiple-case study methodology (Yin, 2014) is discussed in Chapter 3. The process of data collection composed of three stages: the first covered secondary information in terms of manuals, websites and reports of the case companies. The second, service innovation and the 6-D Model, employed semi-structured interviews; and the third used focus groups to explore knowledge exchange design thinking.

The process of data collection is summarised in Figure 1-3.

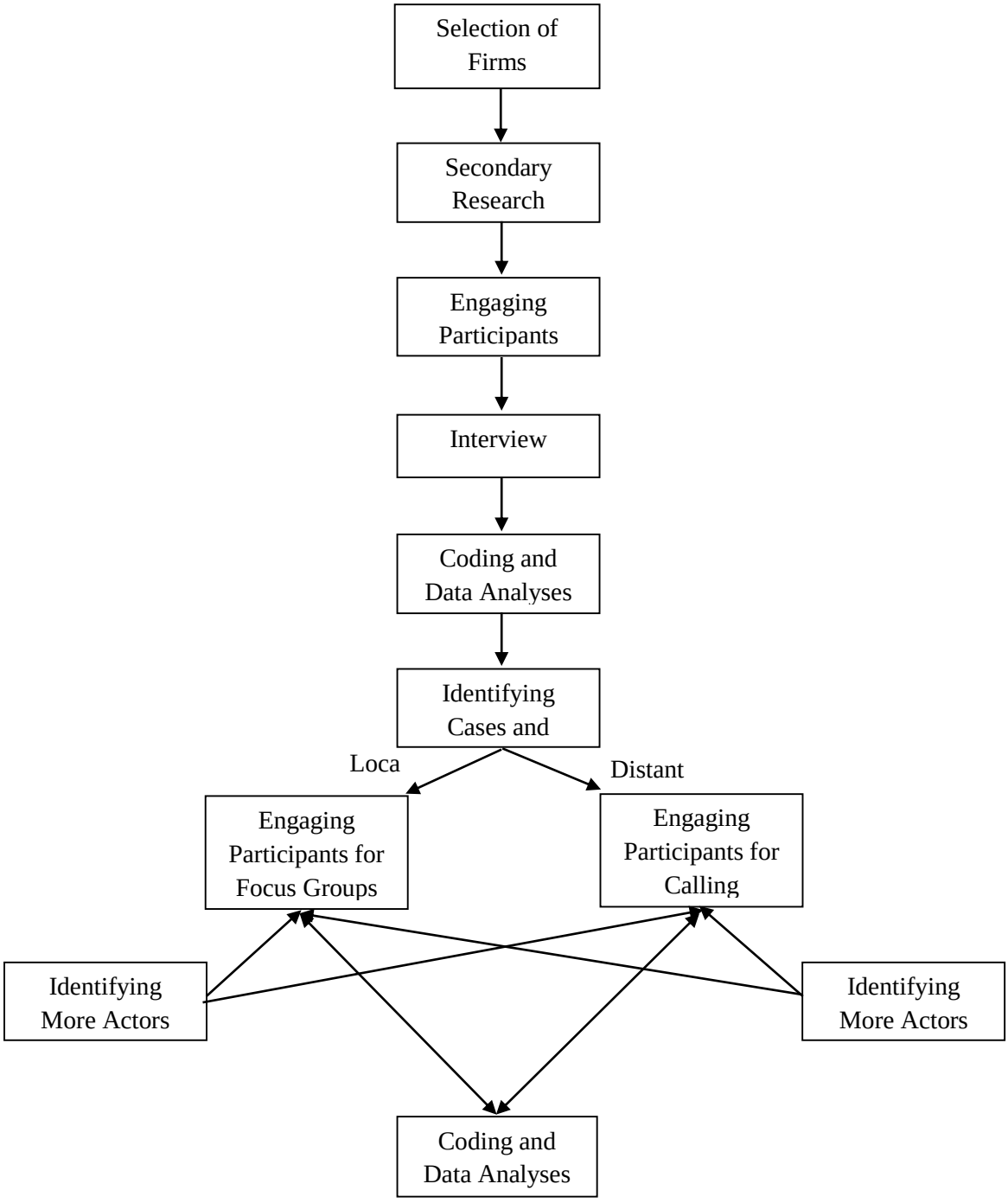

Figure 1-3: Process of Data Collection and Analyses

1.6 Overview of Selected Case Studies

Cases were generated from participants to The CCoI initiative provided the basis for the selection of the case studies, selected to align with research intent. Selection criteria and case overviews are provided in Chapters 3.

1.7 Contributions

This research attempts to contribute to the literature, to policy and to practice, by examining how SMEs collaborate both within their organisations and in clusters, to exchange knowledge relating to service innovation.

1.7.1 Contributions to Literature

By answering the research questions, this research contributes to the literature by elaborating extant research.

Firstly, this research develops our understanding of SDL by investigating how service innovation, being a consequence of value co-creation, is enabled by design thinking within the context of non-knowledge intensive SMEs. According to Vargo (2011), companies innovate by co-creating value with actors, including providers and users. The success of service innovation lies in the development of an ecosystem, service platform and value co-creation, all IT-enabled (Lusch and Nambisan, 2015). But what of non-ICT enabled innovation, traditional SMEs find themselves ICT constrained (Egbu and Robinson, 2005). Considering the contribution of those enterprises to the economy and to employment (Laforet, 2010; Laforet, 2011; Laforet, 2012) they warrant greater attention to address this problem and explore alternatives for enabling service innovation.

Secondly, this research responds to literature that calls for research into service innovation from the perspective of knowledge exchange. Service innovation conceptualisation and theory are still being formulated and debated; research from the perspective of knowledge is lacking *(*Droege *et al.*, 2009; Carlborg *et al.*, 2014; Valtakoski and Järvi, 2016).

Thirdly, this research addresses the call from den Hertog *et al.* (2010) for further exploration of the 6-D Model of Service Innovation in traditional SMEs' contexts. It also explores model relevancy within the manufacturing sector.

Forth, based on two cases generated from the manufacturing sector, this research addresses the call for further research into the transformation from product to service centric business (Fang *et al.*, 2008; Martinez *et al.*, 2010; Salonen, 2011; and Zhang and Banerji, 2017). Design thinking is proposed as a method to enable the initial stage of servitisation and addresses calls from Baines *et al.* (2007) and Nudurupati *et al.* (2016). The 6-D model has not been evaluated within a manufacturing context (Martinez *et al.*, 2010) and the two manufacturing cases should shed light on its applicability.

1.7.2 Contributions to Policy

The CCoI, which contextualises this research, was sponsored by the Scottish Government and a review will provide insights for policy makers. Results of this research will also provide a service lens to enable policy makers to recognise the value of design thinking.

1.7.3 Contributions to Practice

Practically, the results of this research provide a way for SMEs to release innovation potential; SME survival is critical to economic wellbeing (Muller, 2015). Most of the current research on this topic is based on empirical results obtained by transferring practices from large to smaller companies. However, such a translation is not straightforward (Edwards, 2000; Tidd, 2001; Edwards *et al.*, 2005; Hotho and Champion, 2011). Service innovation through collaborative knowledge exchange provides a means for SMEs in traditional industries to release innovative potential.

1.8 Summary of Chapter 1

An overview of this research, including rationale, context, theoretical background, methodologies, cases, and contributions, is displayed in Table 1-2. Contextualised by CCoI, this thesis examines how knowledge is exchanged, enabled by design thinking, to co-create service innovation within SMEs.

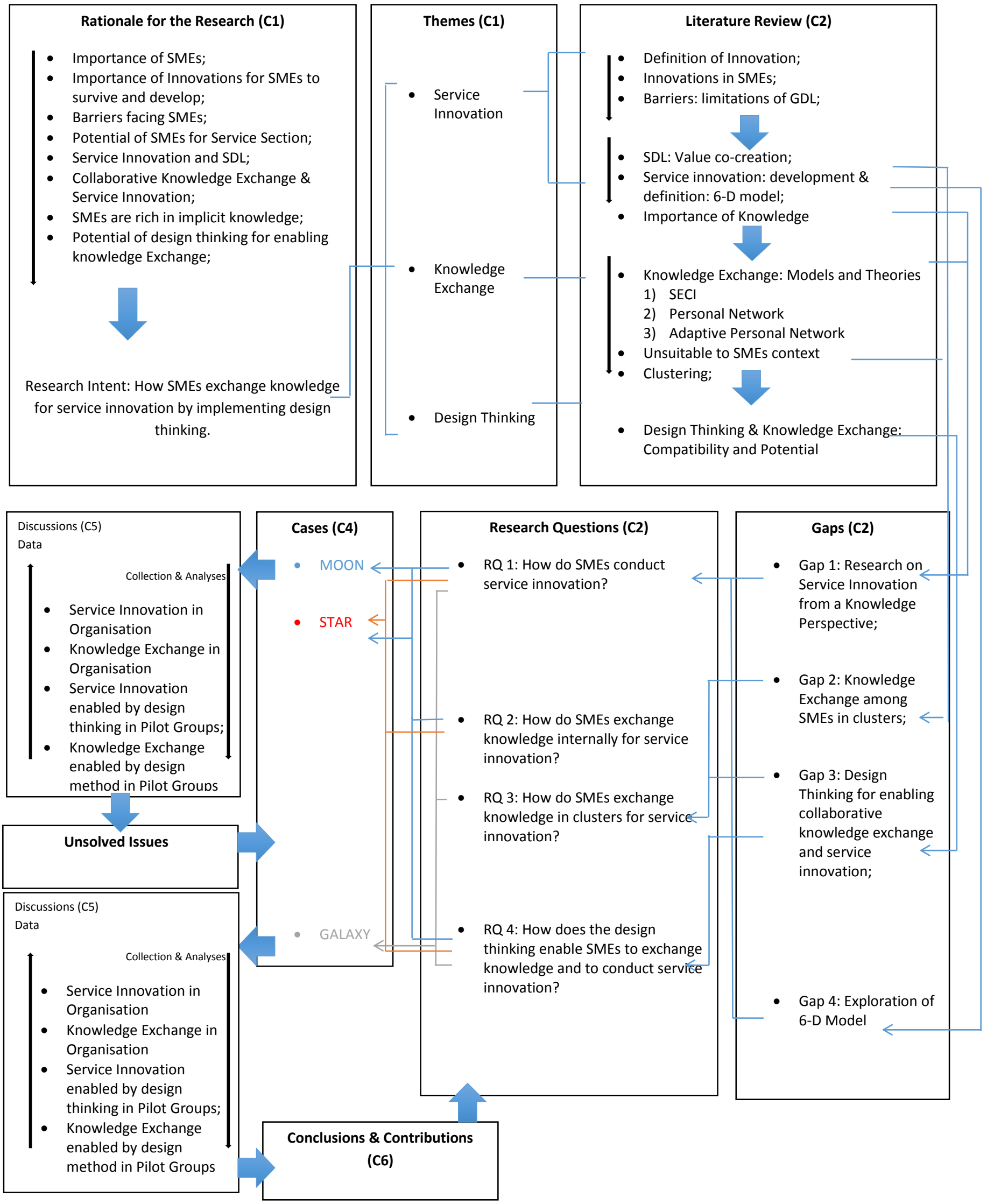

Table 1-2: An Overview of the Rationale, Context, Tasks, Methodologies, and Cases of the Research

A comprehensive literature review is provided in Chapter 2 and critically discussed: innovation; SDL; the relationship between knowledge and service innovation; SMEs and knowledge exchange. Gaps in the literature are identified to develop the research questions.

Methodologies are discussed in Chapter 3 as well as the ontological and epistemological status of this research; fieldwork design is also discussed in Chapter 3; as are the case studies.

The three cases, STAR, MOON and GALAXY are analysed and discussed in Chapter 4. A discussion on the findings is conducted in Chapter 5. Chapter 6 draws conclusions in relation to the research questions; and, notes both contributions and limitations.

Chapter 2: Service Innovation and Knowledge Exchange in SMEs

Chapter 1 indicates a gap in the literature, which this research intends to fill; the need for explorative research into service innovation from the perspective of knowledge. To achieve this aim, the extant literature was reviewed to address three major issues:

- Research into innovation, including its definition, evolution of theories, both in a general and in SME context;
- Perspectives of service innovation: streams of thought, definition and limitations;
- Research into knowledge exchange, models and theories, and knowledge exchange in the context of SMEs.

This chapter will firstly trace theories of innovation from the classical school through to contemporary studies and theories. Innovation contextualised to SMEs is then examined to understand the drivers, characteristics and barriers. Theories about service innovation and their streams from different perspectives, including Goods-Dominant Logic (GDL), resource-based view, and eventually SDL, are then reviewed. These include: assimilation stream (Barras, 1986; Barras, 1990), distinction stream (den Hertog *et al.*, 2010) and synthesis stream (Djellal and Gallouj, 2005; Djellal and Gallouj, 2010). Definitions of service innovation, including the 6-D model of service innovation proposed by den Hertog *et al.* (2010) and the framework proposed by Lusch and Nambisan, (2015), along with their limitations, are discussed. SDL is then introduced and its relationship to knowledge exchange and service innovation explored. The SECI model of Nonaka and Nishiguchi (2001); the personal knowledge network of Chatti (2012); the CAS model of Desai (2010); and, businesses clustering; are critically reviewed and discussed in order to address knowledge exchange. These models are critically reviewed in relation to the characteristics of SMEs and to value co-creation for implementation of service innovation. Finally, design thinking is explored to address the CCoI that contextualises this research.

Chapter 2 concludes by summarising the gaps identified in extant literature as a grounding for the research questions and methodologies, which will be addressed in Chapter 3.

2.1 Traditional Perspectives on Innovation

The following sections cover the traditional perspectives of innovation, including its definition and taxonomies (2.1.1), innovation in SMEs (2.1.2), factors for innovation in SMEs from a resource-based perspective (2.1.3) and its limitations (2.1.4).

2.1.1 What is innovation? Definition and Taxonomies

The classical school of social economy recognises innovation as a critical contributor to productivity and efficiency. Specifically Adam Smith regarded innovation as one of the three elements that lead to the division of labour (Kurz, 2012). David Ricardo, according to Kurz (2012), 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. Treating innovation as a by-product of the division of labour, classical scholars define innovation as a new machine, or as the talents and methods required to operate them. However, classical scholars neither recognise innovation as an engine for macro-economic growth, nor address it with a clear and systematic definition. A more detailed definition of innovation is articulated by Joseph Schumpeter who recognises innovation as significant to economic development (Schumpeter, 1939b).

Joseph Schumpeter (1883-1950) is regarded as one of the earliest social-economists to highlight the importance of innovation (Kurz, 2012). In contrast to his predecessors who treat innovation as a consequence of competition and the division of labour, he regards business growth as a result of constant innovation initiated by entrepreneurs using intuition and a desire for distinction (Schumpeter, 1939a; Schumpeter, 1942; Clemence and Doody, 1950; Kurz, 2012). Moreover, by relating innovation for the first time to new product development processes, ways of working, resources and the opening of new markets; Schumpeter defines innovation as a multi-dimensional phenomenon (Schumpeter, 1939a; Schumpeter, 1942; Kurz, 2012). His opinion is embraced by successive researchers and entrepreneurs who are labelled as *'Schumpeterian'* (Kurz, 2012).

In terms of the definition of innovation, describing it as 'doing things differently (Schumpeter, 1939a, p.66)', Schumpeter develops a more detailed taxonomy of innovation:

1) Product innovation: the introduction of a new good or of a new quality of a good;

2) Process innovation: the introduction of a new method of production, which can be founded upon a new scientific discovery, or a new way of handling a commodity commercially;
3) Opening of a new market: entering a market that has not hitherto been accessed;
4) Exploitation of raw materials or semi-products: the conquest of a new source of supply of raw materials or half-manufactured goods;
5) Developing new organisations by monopolising or de-monopolising.

This categorisation of innovation is focused on 'new combinations', 'the setting up of a new production function', and 'doing things differently' (Schumpeter, 1939a, p.84).

Schumpeter and his followers define innovation as a combination of *'differences'* and *'value'*, particularly commercial value. From the perspective of management, innovation is fundamentally a process of generating different ideas and implementing those ideas with a view to creating commercial value. Schumpeter, however, undertakes research and defines innovation without specifying the contexts, sizes, and industries. The large organisations that contextualise Schumpeter's research and argument differ from SMEs in their operations and innovation (Laforet, 2009). It is necessary then to pay attention to SMEs addressing their specific characteristics (Laforet, 2009).

2.1.2 Innovation in SMEs

Innovation is traditionally associated with financial resources (Baldwin, 1987), and it has long been associated with large companies with financial capacity and diversified risks (Gupta and Cawthon, 1996; Gupta *et al.*, 2006; Laforet, 2009). However, as stated in Chapter 1, innovation is beneficial not only too large companies, it is also critical to the survival and growth of SMEs (Laforet, 2009; Laforet, 2011; Wymenga *et al.*, 2012).

Physical resources are regarded as a prerequisite for innovation (Schumpeter, 1939a; Schumpeter, 1942; Kurz, 2012). Traditionally, innovation was linked to resources that larger enterprises held, a lack of which Schumpeter saw as being a disadvantage for small firms (Schumpeter, 1942). Research on innovation concentrated on large companies (Laforet, 2009). However, regardless of their weak financial power and inadequate physical resources, SMEs have been thriving through a commitment to innovation in service and products (de Jong and Marsili, 2006). As Table 2-1 illustrates research outcomes linking size an innovative potential have been mixed:

References	Summary of Results
Ettlie and Rubenstein (1987)	Large companies have advantages over smaller companies with stronger financial power and adequate resources for innovation.
Kamien and Schwartz (1975)	Innovation increases with size - except for firms in the chemical industry.
Rothwell and Zegveld (1986)	Innovation is not subject to size but to technology, markets and government policy.
Bertschek and Entorf (1996)	Small and large companies are more innovative than medium-sized companies.
White *et al.* (1988)	Firms with less than 20 employees and more than 50 employees have advantages for innovation over medium-sized enterprises with 20-49 employees.
Acs and Audretsch (1991)	Advantages of large companies for innovation over SMEs only exist in low-tech industries.
Wagner and Hansen (2005)	Firm size impacts on innovation type
Forés and Camisón (2016)	Incremental innovation performance is positively affected by size
Baregheh *et al.* (2016)	Organisational engagement with position and paradigm innovation is not affected by size.

Table 2-1: Literature about the Relevance between the Size and Innovation

In response to criticism that research on innovation within SMEs fails to consider contextual differences, Laforet (2009) conducted linear regressive research on SMEs in the manufacturing sector. This revealed that, despite its relation to financial power, size only has an impact on process innovation. In contrast to previous studies, the analysis of the samples from non-high-tech SMEs based in Yorkshire shows no significant relationship between size and innovation capability (Laforet, 2009). This is further underpinned by Heimonen (2012) who discovered that innovation in fast growing SMEs is not significantly related to size, age, or location.

Innovation is recognised to be a critical to SME survival and development (Laforet and Tann, 2006; Klewitz and Hansen, 2014). The value that SMEs can create through innovation, demonstrated in Figure 1-1, is evidenced by the Ecorys Report (2012). It is worth noting that British SMEs in knowledge intensive industries outperformed other EU countries in measures of business performance (Commission, 2012).

The next section reviews the extant literature about how undertaking innovation adds value to SMEs, from resource and service-based perspectives.

2.1.3 Factors and Characteristics of Innovation in SMEs: from a Resource-based Perspective

Two factors, entrepreneurship and power of purchase, are emphasised as essential for the success of innovation by Schumpeter in his masterpiece, *Business Cycles* (Schumpeter, 1939a).

Studies of strategy, operations, management and organisation, reveal a number of critical factors that affect SME innovation: the role of the owners/leaders (Storey, 2005); their vision and enthusiasm, exploitation of external resources, inward investment (Heunks, 1998); commitment to technological development (Kumar and Motwani, 1999); attitude of risk-taking (Salavou *et al.*, 2004; Laforet and Tann, 2006; Laforet, 2009; Laforet, 2012); level of activities, *i.e.* individualist or systematic (White *et al.*, 1988); market characteristics (Sebora and Theerapatvong, 2010); sectorial differences (Freel and Robson, 2004); strategies, market needs, competitive structures (Salavou *et al.*, 2004; Laforet and Tann, 2006); organisation, entrepreneurship, employees (Mambula and Sawyer, 2004; Beaver and Jennings, 2005; Gapp and Fisher, 2007); and, networking and organisational learning, and companies' absorptive capacity (Paton and McLaughlin, 2008).

Laforet and Tann (2006) recognise five factors that are critical for innovation in SMEs': promotion of a corporate culture, process innovation, analysing competitors, and development of co-operation and partnerships within a network:

1) Promotion of corporate culture

   Flexibility, effective communication, close relationships with customers, motivation of management, high quality labour force, less bureaucracy, efficiency and risk-taking, are raised as issues associated with an innovative culture (Pavitt,

1991, Laforet, 2011, Laforet, 2012). These factors are reinforced by Gupta and Cawthon (1996), Svensson and Barfod (2002), Nonaka and Nishiguchi (2001), and Massaro and Dal Mas (2014).

2) Process innovation

   Laforet (2012) suggests that more time and resources are expended on new methods of production, service and delivery, than on product innovation. Moreover, investment in human resources and customer relationships are recognised as being essential to long term process innovation (Storey, 2005).

3) Analyses of competitors

   In the case of product innovation, the literature suggests that SMEs in the manufacturing sector tend to open new market niches by repeatedly introducing new products through competitor analysis and adoption of a multi-functional approach to decision-making (Mosey, 2005).

4) Development of co-operation and partnerships within a network

   Research shows that SMEs are able to innovate through cooperation with network partners to overcome resource constraints (Terziovski, 2003; Ampantzi *et al.*, 2013).

5) Flat structure

   Finally, a flatter hierarchy are found to have impacts on innovation (Laforet, 2012). This is underlined by research which attributes successful innovation to flatter structures (Heunks, 1998; Beaver and Jennings, 2005).

2.1.4 Limitations of Resource-based Perspectives

By referring innovation to process, product or technology, previous research, as discussed above, suggests the value created and added to product or process is an output of processed physical resources. The lifecycle of an innovative product is significantly shortened as a consequence of accelerated evolution of technologies, ICTs (Kenney, 2001). As a result, the market value which is generated by innovation and embedded within the product is increasingly transient, and the commercial usefulness of the product declines (Kenney, 2001). On the one hand, the accelerated development of technology reduces the value of products; while, reduced costs, enhanced productivity and diversity of products provide a basis for competitive advantage by creating value for customers.

For this reason, reliance on tangible resources, or ‘hardware’ for obtaining competitiveness is diminishing and will diminish further; in contrast, service or ‘software’ provides a more

sustainable future (Kenney, 2001). However, innovation traditionally is treated as an 'output' of resources (Mele *et al.*, 2014). Early in twenty-first century, attempts were made to develop new logics 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). Therefore, the effective solution through service is less attributable to new technology, or manufacturing, than to effective knowledge and information management for value co-creation.

2.2 From GDL to SDL: Value Co-creation

The service sectors' Gross Value Added (GVA) suggests that companies rely on service for their success (Wymenga *et al.*, 2012). Lusch and Vargo propose SDL as a substitute for traditional GDL. According to Vargo and Lusch (2006), the shift in focus to service is *'a shift from the means and the producer perspective to the utilisation and the customer service'* (Vargo and Lusch, 2004, pp. 2-4). Specifically, the shift to SDL is essentially a shift in emphasis from the exchange of operand resources in terms of tangible, inert resources, to operant resources dynamically acting upon other resources (Vargo and Lusch, 2004, pp. 2-4). On one hand, intangible resources, in particular knowledge and skills, are centrally positioned to achieve competitiveness (Vargo and Lusch, 2006); on the other hand, instead of regarding innovation as an output of making use of those resources, SDL sees innovation as a process, in which the provider and user collaborate in resource integration to co-create value (Mele, 2014; Vargo & Lusch, 2016) . Accordingly, eleven foundational premises of SDL are summarised below (Vargo and Lusch, 2016):

FP1: Service is the fundamental basis of exchange;
FP2: Indirect exchange masks the fundamental basis of exchange;
FP3: Goods are a distribution mechanism for service provision;
FP4: Operant resources are the fundamental source of strategic benefit;
All economies are service economies;
FP5: Value is co-created by multiple actors, always including the beneficiary;
FP6: Actors cannot deliver value but can participate in the creation and offering of Value prepositions;
FP7: A service-centred view is inherently beneficiary oriented and relational;
FP8: All social and economic actors are resource integrators;

FP9: Value is always uniquely and phenomenologically determined by the beneficiary;

FP10: Value co-creation is coordinated through actor-generated institutions and institutional arrangements.

As stated by Vargo and Lusch (2004), business exchange is fundamentally a process of value co-creation between providers and consumers. Product, under SDL, is regarded as the conveyer of service, and organisations play a critical role in providing solutions, in the form of specified services that meet the requirements of the marketplace. This is in line with Schumpeter and other researchers who define innovation as commercialised new ideas (Schumpeter, 1939a; Clemence and Doody, 1950; de Jong and Marsili, 2006). Commercialisation indicates the acceptance of a product, service, or process by the marketplace, while new ideas are essentially a combination of existing resources, products, ideas, or ways of working (Schumpeter, 1942; Kurz, 2012). Under such logic, commercialisation of a new idea is essentially a process of materialising the ideas with a value that is co-created by providers and customers. Therefore, *per* the definition of SDL, the innovation in product, process, or ways of working are fundamentally innovation in service. The shift of business logic from GDL to SDL not only offers a reinterpretation of marketing and other business activities, but also the basis for a new paradigm for conducting innovation. Indeed, service innovation is attracting increasing attention (Droege *et al.*, 2009; Hipp, 2010). The following section will trace the development of research on service innovation.

2.3 Service Innovation

2.3.1 Development of Perspectives on Service Innovation

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). Development of research on service innovation under GDL follows a continuum, beginning with the technologist perspective of Barras (1990) who associates service innovation with the development of new technology. This technological perspective, however, is criticised for its narrow scope. Drejer (2004) develops the study of service innovation by leveraging theories of product and process innovation. However, Djellal and Gallouj (2010) counter that, due to the uniqueness of service, it is difficult to use theories of innovation, applicable to manufacturing sector to

explain service innovation. Scholars such as den Hertog *et al.* (2003) developed, from the service sector, a theoretical framework to interpret service innovation as a multi-dimensional scenario (Droege *et al.*, 2009). The recent synthesis perspective (Carlborg *et al.*, 2014) notes that, service innovation is no longer restricted in addressing the service sector, but also extended to manufacturing sector as well; attention is therefore paid to 'servitisation' : defined as the transference of manufacturing from provision of product to the provision of integrated, customer-oriented solutions (Baines *et al.*, 2009b; Zhang *et al.*, 2017). The resource-based perspective, on the other hand, moved the focus to the optimisation of internal and external resources for innovation (Mele *et al.*, 2014). Following this logic, innovation, as Maglio *et al.* (2006) argued, is a consequence of networks that encompass people, technology and organisations to integrate resources for value creation.

The above perspectives were criticised for still treating innovation as an output of technology, organisational collaboration, or usage of tangible or intangible resources (Lusch & Vargo, 2016; Mele *et al.*, 2014). SDL by contrast blurs the boundary between product and service, tangible or intangible resources, and provider and user, by focusing on service, value, resources, actors and ecosystems (Mele *et al.*, 2014; Lusch and Nambisan, 2015). Lusch and Nambisan (2015) further articulated SDL as a three-in-one framework: service ecosystem, service platforms, and value co-creation. However, this framework was developed to address service innovation in the IT industry (Lusch and Nambisan, 2015) which falls out of the scope of this research into traditional non-knowledge intensive SMEs.

The 6-Dimentions by den Hertog *et al.* (2003), is recognised as being useful, however, further research has been called for to better define its generic appropriateness (Droege *et al.*, 2009). 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. He subdivides service innovation into six dimensions (Figure 2-1). Details of the model as well as examples are given in Table 2-2.

However, the 6-D model still faces a number of challenges:

1) Following SDL, innovation is regarded as a process of value co-creation instead of an output of technology, collaboration or resources (Mele *et al.*, 2014). Focusing on organisation and people in new service development, the 6-D

model treats service innovation, being distinctive to product or technological innovation, as an outcome. The 6-D model that is derived from service sector still needs to be tested from a SDL perspective.

2) Derived from the service sector, 6-D model has not been tested within manufacturing. Traditional frameworks fail to encapsulate (Hydle *et al.,* 2016), more comprehensive frameworks are required. This research develops and empirically contextualises the 6-D model by den Hertog *et al.* (2010).

Despite of the issues as above, 6-D model is particularly suitable for this research as it focuses on the roles of the organisation and its people in new service development (Gallouj and Weinsteirn, 1997; den Hertog *et al.*, 2003; Droege *et al.*, 2009). This echoes the emphasis SDL places on treating service innovation as a process of value co-creation between provider and user. Moreover, research on service innovation tends, such as that of Lusch and Nambisan (2015), to focus on knowledge-intensive organisations, the 6-D model addresses the topic from open process perspective (den Hertog *et al.,* 2003). Lastly, recent servitisation literature calls for research on how best to organisationally manage the shift from product to a service –centric mind-sets (Fang *et al.*, 2008; Salonen, 2011; Zhang and Banerji, 2017). The 6-D model, due to its multi-dimensional nature, is a conceptual model that addresses the above challenges (Hydle *et al.*, 2016).

Dimensions of Service Innovation	Explanation	Examples
New Service Concept	Value that is created by the service provider in collaboration with the customer. The innovation is often a new idea about how to organise a solution to a problem or the new requirement of a customer. Many new service concepts are combinatory.	Combinations of elements of services that do exist individually or as part of other services in a new combination or configuration, *i.e.* telecom providers offering integrated bundles of their various services, or temporary staffing agencies offering pool management services, small retail outlets at high traffic locations, monobrand stores or the idea of designer hotels.
New Customer Interaction	The interaction process between the provider and the customers *i.e.* 'self-service'.	ATMs, mobile banking, the client interface interaction.
New Value System	Set of new business partners in the value chain or wider value network, i.e. actors involved in jointly co-producing a service innovation.	iPhone in combination with the iStore.
New Revenue Models	Developing the right revenue model to fit a new service concept.	Turnkey projects or so-called build-operate-transfer contracts; ASP-models or software as service models; customised service-based revenue model which counts profits made on client-specific service-contracts.
New Delivery	The organisational structure	The establishment of the EF

System: personnel, organisation, culture	of the company itself: new organisational structures; (inter)personal capabilities or team skills.	summer schools and student exchange; IKEA for example is not only an innovative retail concept, but also innovative in how it is organised, how it empowers its employees, how it motivates customers to assemble their own furniture, and how it has established a very clear and firm culture of how to approach clients and provide service.
New Service Delivery System: technological	Primarily the employment of information and computer technologies (ICTs).	Online booking systems, kitchen equipment and semi-prepared food; new ICT systems and logistics solutions, both at corporate and decentralised level.

Table 2-2: Explanations and Examples of the Six Dimensions of Service Innovation (den Hertog *et al.*, 2010)

2.3.2 Innovation and Knowledge Exchange

Physical resources such as capital, land and labour, have long been regarded as essential for innovation. More recently however knowledge has been highlighted by an increasing number of scholars to be critical (Nonaka and Takeuchi, 1995; Krogh *et al.*, 2000; Kenney, 2001; Nonaka and Nishiguchi, 2001; Vargo and Lusch, 2006; Lusch and Vargo, 2008). Economic development and productivity today rely on intellectual capabilities more than hard assets (Nonaka and Takeuchi, 1995; Krogh *et al.*, 2000; Siddike *et al.*, 2013; Du *et al.*, 2013; Klewitz and Hansen, 2014; Witell *et al*., 2016; Valtakoski and Järvi, 2016). The importance of knowledge and learning to the development of the economy and to company survival require closer attention. From an innovation perspective, research reveals that either knowledge exchange or learning is essential (Jansen *et al.*, 2009; Cadwallader *et al.*, 2010). Observing the exceptional success of Japanese companies in the twentieth century, Nonaka and Takeuchi (1995) assert that, despite the outstanding performances of those companies in managerial practices, effective exploitation of resources and powerful supply chain, their success can be fundamentally attributed to continuous knowledge creation.

Though physical resources are believed to be decisive for innovation, Nonaka and Takeuchi argue it is through knowledge creation that those companies maintain competitiveness (Nonaka and Takeuchi, 1995; Nonaka and Nishiguchi, 2001). This opinion is underpinned by Andreeva and Kianto (2011) who recognise the direct impact of knowledge creation on innovation. As a result, success of product innovation is believed to be subject to a firm's ability to manage, maintain and create knowledge (Levinthal and March, 1993; Andreeva and Kianto, 2011; Andreeva and Kianto, 2012).

SDL views business from a service perspective. According to Lusch and Vargo (2008), the provision of distinctive service is subject to the process of exchanging knowledge and skills. This is consistent with the results of studies by Nonaka and Takeuchi (1995), Krogh *et al.* (2000) and Andreeva and Kianto (2011). The recognition of knowledge and skills as key contributors to the success of service innovation resonates well with traditional SMEs who can take advantage of their tacit knowledge and proximity to customers (Laforet and Tann, 2006; Laforet, 2009; Laforet, 2011; Laforet, 2012).

Traditional theories of knowledge management describe knowledge acquisition as a linear, explicit, isolated, and information-based process (Wenger, 2010). The collaborative nature of SDL and service innovation renders those theories incapable of addressing the complicated process of service innovation that engages with various interacting agents (Higgins, 2009). In contrast, the literature increasingly ascribes organisational learning to contextualised action and critical reflection on real-world issues (Higgins and Aspinall, 2011). Organisational learning is therefore associated with contextualised environments and interactions among members of the organisation (Dervitsiotis, 2010; Peres *et al.*, 2010; Harris *et al.*, 2012).

Surprisingly there is limited literature addressing service innovation from a knowledge perspective (Droege *et al.*, 2009). Exceptions include the research of Oke (2007) which was conducted in the context of the Knowledge Intensive Service (KIS), *e.g.* IT, telecommunication and financial, sector. However the non-knowledge intensive SMEs, *e.g.* in manufacturing and traditional service sectors, remain under-researched (Droege *et al.*, 2009).

2.4 Knowledge Exchange: Theories and Models

Andreeva and Kianto (2011), on the basis of their empirical research, implied that firms in 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). Andreeva and Kianto (2011) concluded that knowledge creation is critical for innovation and that the explicit and tacit knowledge be brought to the fore.

This section introduces three models of knowledge exchange. The SECI model demonstrates a spiral process of knowledge creation, which converts implicit knowledge into explicit knowledge and then back again, engaging multiple actors. The personal networking model (PNM) positions individuals in the centre of knowledge creation. Lastly, the adaptive personal networking model (APNM) ascribes knowledge creation to networks tailored for specific situations. The strengths and limitations of these three models will be examined, to address the intention of the research - service innovation and knowledge exchange in SMEs.

2.4.1 SECI Model

According to Nonaka and Nishiguchi (2001), knowledge is created, transferred, stored and processed from tacit knowledge to explicit knowledge in four stages: socialisation, externalisation, combination and internalisation. The SECI process is conducted in a unified physical, virtual and mental space engaging members across the organisation (Nonaka and Nishiguchi, 2001).

Specifically, Knowledge is divided into two primary categories, namely tacit, defined as objective mental perception reflecting our image of reality and our vision for the future, and explicit, which is subjective and transferrable (Nonaka and Takeuchi, 1995; Nonaka and Nishiguchi, 2001). According to Nonaka and Takeuchi (1995), new knowledge originates from tacit knowledge characterised as personal and context-specific but at the same time difficult to formalise and communicate. On the other hand, explicit knowledge is characterised as expressible by words and is transferrable using formal, systematic language. Therefore, innovation is subject to the realisation of tacit knowledge through explicit interactions among front-line employees, middle-level managers, and senior managers (Nonaka and Nishiguchi, 2001). Based on the definition of tacit and explicit

knowledge, and the mechanism by which new knowledge is created, the four modes of knowledge conversion are illustrated in Figure 2-1:

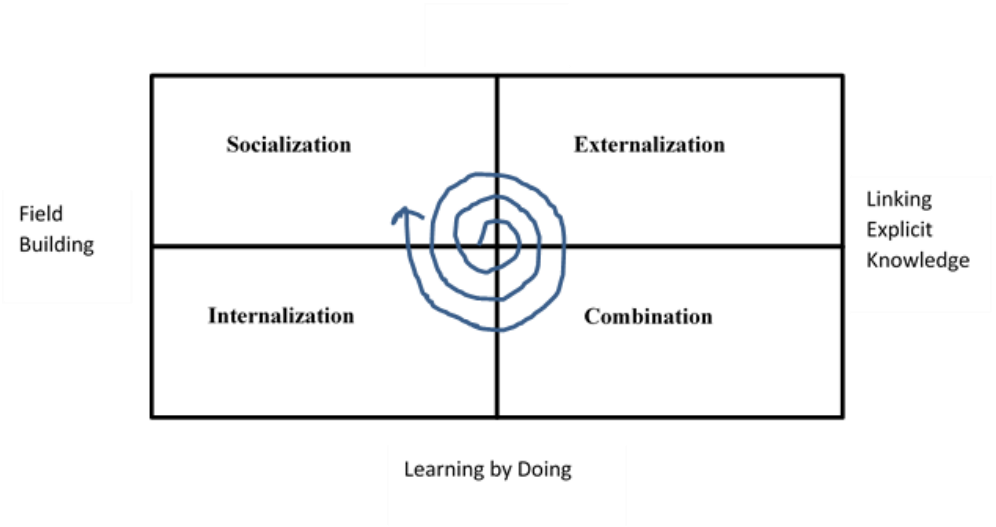

Figure 2-1: The Spiral Model of Knowledge Creation (Nonaka and Nishiguchi, 2001)

According to SECI, experience is, understood as being a resource from which new knowledge is derived, shared, socialised and externalised by means of metaphors, analogues, concepts, hypotheses and models. Moreover, externalised knowledge is combined into new corporate visions, business concepts, and product concepts, which are eventually transferred into tacit knowledge through internalisation. Specifically, as Nonaka and Nishiguchi (2001) suggest, new knowledge originates in individuals, but is realised in organisations:

1) Intention. The spiral process of knowledge creation is driven by organisational intention, which is referred to as goals and strategies;
2) Autonomy. Members in the organisation should be allowed to act independently as far as circumstances permit;
3) Fluctuation and creative chaos. Fluctuation is introduced intentionally to enhance the commitment of individuals;
4) Redundancy. Members of the organisation are exposed to redundant information to accelerate the process of knowledge creation, to help individuals understand their position and trajectory, and to encourage them to head in a certain direction;
5) Requisite varieties. Internal variety is introduced to an organisation by maintaining a flexible structure that addresses the complexity of its environment.

Hierarchical structures are criticised for not being able to foster the dynamic interaction necessary for knowledge creation (Nonaka and Takeuchi, 1995). The top-down model focuses on combination and internalisation, whereas the bottom-up model focuses on socialisation and externalisation. Therefore, the so-called middle-up-down model emerged; middle management play a critical role in connecting the vision of upper management to tacit knowledge.

Based on the SECI model, five enablers are suggested by Krogh *et al.* (2000):

1) Instilling a knowledge vision. A knowledge vision is related to strategy, it is a mental map that takes the present and projects the future, as well as highlighting the knowledge requirements. A good knowledge vision is characterised by a commitment to a direction; generation of new ideas in an explorative way; a specific style matched with the means of communication; and a commitment to shaping future competitiveness;
2) Managing conversations. An effective conversation based on trust, participation and interaction between individuals, is required for the process of knowledge creation;
3) Mobilising knowledge activists. Knowledge activists are required to sustain the commitment of an organisation to creating knowledge; they are a catalyst for knowledge creation; a creator of a context; a coordinator of initiatives; a merchant of foresight who 'provides the overall direction for knowledge creation in different micro-communities';
4) Creating the right context. Creation of knowledge is based on the interaction of individuals: sharing, creating and promoting (Krogh *et al.*, 2000). Organisations must create a shared knowledge space, that matches the context, and balances flexibility and control, to enable four kinds of interaction, namely face-to-face, individual , collective , and virtual;
5) Globalising local knowledge. Finally, as many organisations are no longer contained by borders, globalisation of local knowledge is believed to be another enabler of knowledge creation (Krogh *et al.*, 2000).

2.4.2 Personal Networking Model

The SECI model has been criticised by Wong and Aspinwall (2004) as it does not address limitations of finance, skill and human resources that face SMEs; its origins are very much

based on large company observations (Durst and Edvardsson, 2012). SECI creates new knowledge in the form of product on the basis of strategic interactions within the organisation, as asserted by Laforet (2011); this is not practically applicable to SMEs. Bouchard and Basso (2011) note that SMEs warrant bespoke attention. They cite Torres (1997) who claims that 'the linkage between size and the traditional SME form is no longer considered as kernel or at least sufficient to define the essence of this class of firms'. Accordingly, he writes that 'traditional SMEs' are characterised by 'the centrality of the owner, limited planning and information gathering activities, informal structure, and low specialisation'. As a result, formal policies and strategies are usually absent in SMEs, and instead the supervision of the owners plays a critical role (Anand and Daft, 2007). Those features differentiate SMEs from larger firms. For this reason, a knowledge management model featuring formal, strategic, intra-organisational, and long-term product innovation, as SECI does, is far less applicable (McAdam *et al.*, 2007; Hutchinson and Quintas, 2008). Therefore, a framework is required for SMEs that fits their unique characteristics (Durst and Edvardsson, 2012). Finally, since the SECI model primarily focuses on how tacit knowledge is externalised and combined into new corporative visions and product/business concepts (Nonaka and Nishiguchi, 2001), it does not clearly address innovation in service, which is more dependent on knowledge, particularly the implicit knowledge (Laforet and Tann, 2006).

Given the immediate, contextualised and individual nature of knowledge, then regarding knowledge as either a 'thing' in a traditional way, or as a 'process' according to Nonaka and Takeuchi, is limited (Malhotra and Majchrzak, 2004; Malhotra, 2005; Mcafee, 2006, Chatti, 2012). For this reason, according to Chatti (2012), previous perspectives on knowledge management that are based on a controlled mechanism should be replaced by person centred perspectives, which naturally emerge in a freeform way. The personal knowledge network, or PKN, which sees the bearer of knowledge, or knowledge worker, as the focal point of knowledge creation, is believed to address the nature of knowledge creation more succinctly (Chatti, 2012). PKN treats each knowledge worker as a centre of a knowledge network, and regards knowledge management as the continuous creation of PKN. Within PKN, an individual adapts to issues and develops solutions to these. The continuous inquiring, testing, comparing and adjusting of the individual problem, or theory-in-use, constitutes the organisational theory-in-use which evolves continuously. As a result, knowledge management is an extension of PKN with new tacit and explicit knowledge nodes, which reframe one's theory-in-use (Chatti, 2012). Therefore, unlike previous static and organisational perspectives about knowledge management, PKN views

knowledge as a personal network, and recognises that knowledge is essentially personal. Knowledge creation starts from knowledge bearers in knowledge ecologies by self-organisation by means of collaborative, open, bottom-up and self-directed processes (Chatti, 2012).

SMEs benefit from a close proximity to customers and rich tacit knowledge (Laforet and Tann, 2006; Laforet, 2009; Laforet, 2010; Laforet, 2011; Laforet, 2012). Weak financial power constraints them from releasing their capacity for product innovation (de Jong and Marsili, 2006; Bianchi *et al.*, 2010; Ahlgren and Engel, 2011; Laforet, 2011). However, from the perspective of SDL, certain features of SMEs can be seen as strengths in service innovation. The strategic, formal and structured process of knowledge creation typified by SECI does not suit SMEs. Employees of SMEs, as Laforet (2012) argues, must be seen as the focus of knowledge. The exploitation of implicit knowledge stored in each employee through PKN therefore sheds light on how to realise the potential of SMEs for innovation.

2.4.3 Adapted Personal Networking Model

Positioning the individual as the focal point of the knowledge network, PKN offers a new perspective (Chatti, 2012). However, the bottom-up mechanism for knowledge creation (Chatti, 2012) fails to take account of the fact that SMEs tend to adopt a top-down model for decision making (Desai, 2010). Traditional self-focused and linear learning is giving way to collaborative learning. This is due to the increasing requirement for knowledge and creativity (Desai, 2010). Large international corporations, such as Samsung, Ford, and IBM, *etc.*, strategically engage diverse stakeholders in the process of value creation by establishing different value networks (Allee, 2008; Michel *et al.*, 2008). Inspired by the new practices of collaborative learning, and based on complexity theory, Desai (2010) suggests a Complex Adaptive System (CAS) as a new framework for knowledge creation (Figure 2-2).

CAS value networks, composed of agents, behave , spontaneously in a non-linear manner (Desai, 2010). Within such a system, the goals and behaviours of the agents conflict, adapt, learn, and evolve in order for new ideas and values to emerge (Allee, 2008; Desai, 2010). However, the value network differs from complexity science by its imposition of human administrations (Desai, 2010). The interaction of agents, per complexity theory, is generally unpredictable and informal. In a value network, nevertheless, 'the emergent and dynamic constraints imposed by interdependent relationships coexist with the imposed

administrative controls of a human CAS' (Desai, 2010). However, the leadership within the value network needs to be adaptive and empowered by the value-network to foster adaptive leadership (Desai, 2010). Finally, technology plays a role in facilitating CAS to work appropriately and at the same time fostering adaptive leadership within value networks (Desai, 2010).

Adaptive leadership within the value networks is required, for then it fosters collaborative learning, creativity and adaptive outcomes. Finally, interactive technologies, according to Desai (2010), play a role in the system as an enabler of adaptive leadership, the co-creation of adaptation, learning, and creativity.

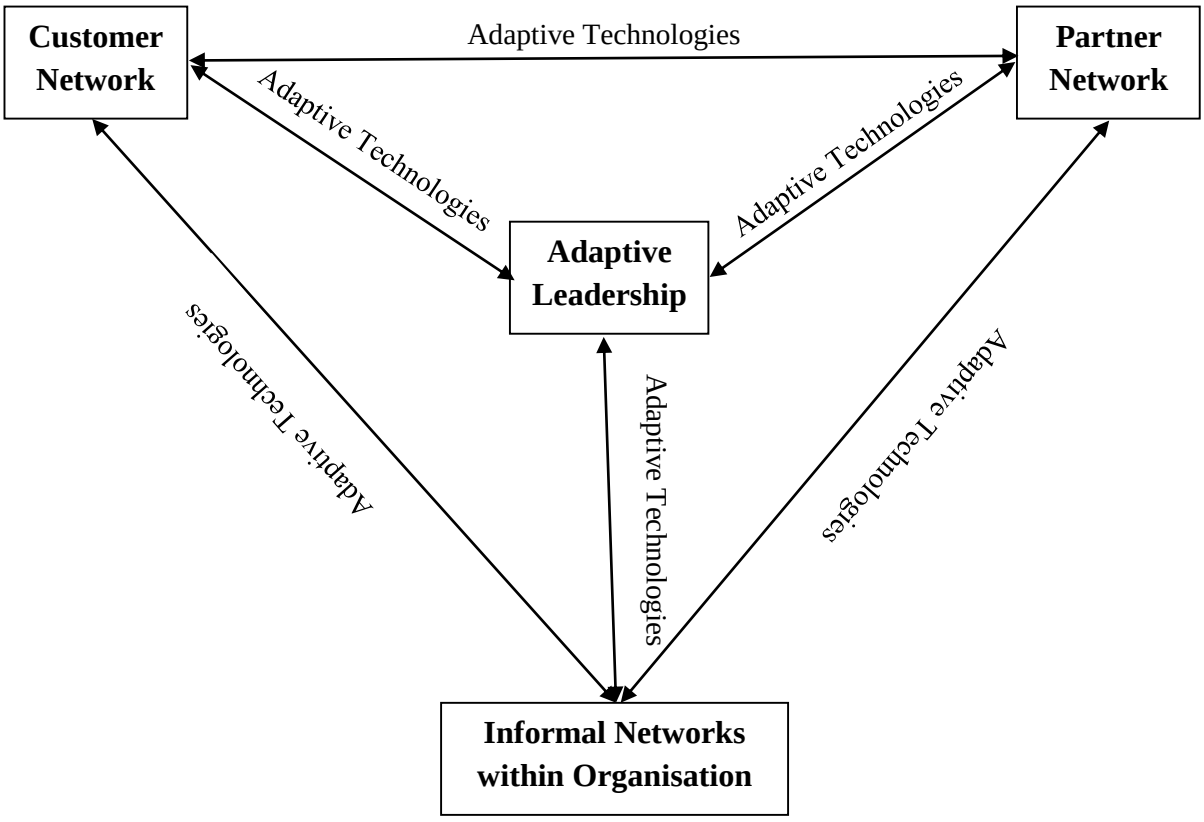

Figure 2-2: The Human CAS (Desai, 2010)

2.4.4 Clustering of SMEs for Knowledge

CAS is by nature a mixture of customer, partner and internal networks, organised by adaptive leadership and technologies. It extends the process of knowledge creation framed by the SECI and PKN to external stakeholders and applies top-down management to personal networks.

SMEs have long been constrained by their weak financial capacity, lack of strategic planning, and inadequate expertise/technologies (Adebanjo and Michaelides, 2010; Lamprinopoulou and Tregear, 2011). Researchers such as Westerlund and Rajala (2010) discovered they prefer to leverage external relationships and networks to facilitate innovation. According to Westerlund and Rajala (2010) they tend to rely on collaboration with other partners for explorative learning through product development, while depending on intra-organisational learning for process improvements. Other characteristics of knowledge creation in SMEs are: short-term and unconstructed learning, high trust and longer timeframes: low staff-turnover, and non-holistic management of knowledge creation (Partanen *et al.*, 2008; Westerlund and Rajala, 2010).

Given the benefits of clustering, including enhanced efficiency (Anderson *et al.*, 1994), reduced risks, improved access to human resources (Frisillo, 2007) and collective learning (Giuliani, 2007), the constraints facing SMEs can be overcome (Adebanjo and Michaelides, 2010; Lamprinopoulou and Tregear, 2011). The so-called clustering of businesses has attracted the attention of researchers (Giuliani, 2007; Giuliani, 2011; Belso-Martinez and Molina-Morales, 2013). Previous researchers assert a territorial perspective that firms within clusters perform better than isolated companies when it comes to innovation (Giuliani, 2007; Giuliani, 2011).

Claiming that innovation is derived from informal relationships between actors within the cluster, as a result of geographic proximity and embeddedness (Turner, 2010; Adebanjo and Michaelides, 2010; Lamprinopoulou and Tregear, 2011), the territorial perspective has been challenged by empirical studies that question the benefit of clusters (Giuliani, 2007; Turner, 2010; Hervas-Oliver *et al.*, 2011; Martin and Moodysson, 2011; Huber, 2012; Kesidou and Snijders, 2012; Belso-Martinez and Molina-Morales, 2013; Ben Letaifa and Rabeau, 2013).

Giuliani (2007) notes that knowledge is diffused purposefully and selectively within clusters, rather than pervasively and randomly. Moreover, collaborations within a cluster are founded on the basis of knowledge (Giuliani, 2007). He further concludes that the collaborative internal capability of a firm is a prerequisite for success within a cluster (Giuliani, 2007). The research by Giuliani, holding a microeconomic view, emphasises the industrial and firm specific characteristics when innovation in clusters are considered. This study is underpinned by Hervas-Oliver *et al.* (2011) who argued that it is the internal resources that determine the capacity of businesses to exploit external resources, where

new knowledge and innovation are generated (Hervas-Oliver *et al.*, 2011). Lastly, the question of knowledge spill-over as a consequence of geographic proximity from the territorial perspective is also proposed on cutting-edge industries like IT and software (Huber, 2012).

Advanced internal resources and capabilities are a prerequisite for the exploitation of external resources for innovation, reconfirms the SECI model designed by Nonaka and Nishiguchi (2001) emphasising that knowledge is created systematically and purposely, rather than randomly without thinking strategically. Explorative research on internal procedures associated with knowledge management, in terms of service innovation, is lacking *(*Droege *et al.*, 2009; Huber, 2012).

2.5 Design Thinking, Service Innovation, and Knowledge Exchange

As mentioned in 1.3.3, a universal definition of service innovation does not exist, however, the multi-dimensional perspective proposed by but y den Hertog *et al.* (2010), sufficiently differentiates service from product innovation (Droege *et al.*, 2009; Huber, 2012). Den Hertog *et al.* (2010) highlight six capabilities for conducting service innovation. By associating the success of a company in service innovation with the mastering of the six capabilities, den Hertog *et al.* (2010) recommends further explorative research to validate the approach both in terms of scale and context.

According to SDL, companies survive by offering integrated solutions rather than individual products or isolated services (Hakanen and Jaakkola, 2012). In the manufacturing sector, the relationship between servitisation and enhanced organisational performance is noted by Muller (2015). This logic is in line with the definition of service innovation as multi-dimensional solution, co-created by multiple actors (Maglio *et al.*, 2006; den Hertog *et al.*, 2010; Rubalcaba *et al.*, 2010). To meet individualised requirements of customer, interaction and co-creation of value among multiple actors, both inside and outside the organisation, an integrated network is considered to be critical (Lusch and Vargo, 2008). According to Lusch and Vargo (2006), ‘solution offerings are co-produced’ as they involve shared inventiveness, problem solving, co-design, or shared implementation with customers and other partners in the network. Moreover, in order to establish multiple networks, integrated for the same goal and preference, a collaborative and integrated management approach is required (Hakanen and Jaakkola, 2012).

Lusch and Vargo (2008) attribute innovation to the process of value co-creation among actors within the value network. The collaborative nature of SDL highlights the critical role that knowledge plays as an operant source in the process of innovation. This statement is also underpinned by research in SME context (Bianchi *et al.*, 2010; Clifton *et al.*, 2010; Jonsson and Lindbergh, 2010; Durst and Edvardsson, 2012; Halilem *et al.*, 2012).

Lusch and Nambisan (2015) stressed that service innovation is a collaborative process involving in a network which engages multiple actors in resource integration. They further offered a three-part framework for service innovation: service ecosystems that offers an organisational structure for actors to co-create value; service platforms that facilitates access to resources, particularly knowledge; and value co-creation as a consequence of collaboration through resource integration. Aal *et al.* (2016) encourages researchers to look to sustainable ways to integrate resources and co-create value, as determined by beneficiaries. Lindhult *et al.* (2018) underlined the importance of value mapping for service innovation. They concluded that, for service innovation to be enabled, researchers need to answer the question of how spaces can be created effectively and efficiently be coordinated and integrated for different value logics. ICTs being proposed by Lusch and Nambisan (2015) as an enabler, however, are testified as being not widely accepted by traditional SMEs (Adebanjo and Michaelides, 2010; Laforet, 2010).

Enterprises, as Kolko (2015) argues, cannot release their capacity for innovation unless they can simplify the complexity of innovation in both products and services. The need to adjust knowledge exchange models to different contexts is recognised by McLaughlin *et al.* (2008); they concluded that success is largely subject to the understanding of how employees create and share information and knowledge, and how barriers affect the tacit-explicit-tacit process, for solution development.

The models discussed within this chapter do not specifically address, in a generic manner, service innovation within SMEs, what research there is tends to focus on knowledge intensive SMEs (Droege *et al.*, 2009). The challenge, in terms of service innovation, for SMEs appears to be how best to leverage knowledge exchange to stimulate creativity within the key stakeholders, staff and the value network.

As mentioned in 1.3.3, solutions are expected to arise, for both large and small enterprises, from the implementation of a design culture. Indeed, a shift, within larger enterprises, towards a design centric approach has been observed by Kolko (2015) who detected the

embedding of design into ways of working. Such a shift is reflected in the literature about the servitisation, which emphasises the changing culture, organisational structure, internal communication and inter-departmental collaboration as being critical for successful servitised organisation (Alghisi and Saccani, 2015; Zhang and Banerji, 2017),

The design-centric culture that implements design thinking, as defined by Kolko (2015), focuses on users' experiences, especially emotional ones. Specifically, a company would use design-centric culture to:

1) Focus on users' experiences;
2) Create models to examine complex problems;
3) Use prototypes to explore potential solutions;
4) Tolerate failure, and
5) Exhibit thoughtful restraint;

Moreover, at a strategic level, the idea of design-centric culture is all about qualities, ranging from empathy, experimentation, to design smarts, and these qualities need to spread throughout the whole organisation (Kolko, 2015). The capabilities identified by den Hertog *et al.* (2010) for managing service innovation are compared with the features of design-centric culture by Kolko (2015) in Table 1-1. The comparison above demonstrates the potential of design thinking for creating or enhancing the capabilities of a company to innovate.

With regards to service innovation, advantages of design thinking, which is defined as a concept, a method, and a toolkit for leveraging service innovation, mapping value in networks, and co-creating value in the service sector, are recognised by Andreassen *et al.* (2015) and Geissdoerfer *et al.* (2016). Implementation of design thinking in enterprises enabled them to identify and understand key actors and the users of service (Andreassen *et al.*, 2015), to conceptualise, prototype and develop solutions (Geissdoerfer *et al.*, 2016), and to enhance communications (Geissdoerfer *et al.*, 2016). This conclusion is in line with the framework developed by Lusch and Nambisan (2015) that stresses the importance of service ecosystem, service platform and value co-creation for the success in service innovation. The role that design plays in the process of knowledge exchange is highlighted (Lusch and Nambisan, 2015). An experiment by Jevnaker *et al.* (2015) found that the introduction of design tools can contribute to a common language among participants and production of innovative service ideas. The workshop organised by Geissdoerfer *et al.*

(2016) suggested that design thinking can facilitate viable and sustainable business models for small businesses to map value and engage a wider range of stakeholders. Andreassen *et al.* (2016) identified service design as an enhancer of customer experience and organisational performance. Design thinking, being a toolkit and more importantly a way of thinking, is therefore proposed as an alternative to enable service innovation.

To date most studies in this area have been conducted in the service sector, as such they do not consider manufacturing, nor do they particularly address aspects of knowledge exploitation. Given servitisation calls for the development and delivery of integrated solutions, which in turn requires orchestrated collaboration (Carlborg *et al.*, 2014), design thinking, which is proven to be successful at mapping value, engaging key actors and creating solutions (Geissdoerfer *et al.*, 2016), may provide an enabling means of co-creating value and service innovation. Research calls have included: how does design thinking improve knowledge transfer (Jevnaker *et al.*, 2015); how might it impact upon more traditional industries (Geissdoerfer *et al.*, 2016); and, where are the cases of service design practice in private businesses (Morelli, 2012).

Given the strength of design thinking for effective innovation and knowledge transfer, it is critical to teach design-thinking to non-designers (Liedtka *et al.*, 2017). Culén *et al.* (2016) emphasised the importance of adopting semi-structured design tools for non-designers as activities commonly practiced by designers, such as prototype, face-to-face communications, visualisation of the problems (Kolko, 2015) appear strange and ambiguous to non-designers. This research therefore looks to how design thinking is adapted and implemented by non-designers from the SMEs to exchange knowledge and conduct service innovation.

2.6 Summary of Gaps in Extant Literature

Despite of the contributions of existing research to the literature, there are identifiable gaps:

1) More explorative research is required to explore and complement the 6-D model of service innovation in various contexts and scales (Droege *et al.*, 2009; den Hertog *et al.*, 2010);
2) Research on service innovation from a knowledge perspective within SMEs has been suggested (Droege *et al.*, 2009; Durst and Edvardsson, 2012);

3) Previous research on SME clustering has apparently failed to fully address company-specific characteristics;
4) Further research has been called for regarding cultural/organisational change within the context of servitisation of manufacturing (Baines *et al.*, 2007; Zhang and Banerji, 2017);
5) Existing models for knowledge exchange, in terms of SECI, PKN and CAS do not readily address SME related service innovation characteristics of SMEs;
6) Design thinking, as noted by Kolko (2015), has been successfully implemented in large companies to foster innovation. Design thinking may provide a means of enabling, and therefore reduce the necessity for ICT solutions, service innovation in SMEs.

Contextualised by CCoI, the intention of this research is to study how, by implementing design thinking, SMEs can leverage service innovation. Moreover, as this research employs the 6-D model (den Hertog *et al.,* 2010) it will provide an evaluation of its applicability within manufacturing concerns.

By addressing the gaps identified in the literature, this research contributes to debates concerning: theory of knowledge creation developed by Nonaka and Takeuchi (1995); PKN by Chatti (2012); CAS by Desai (2010); SDL by Lusch and Vargo (2008); 6-D model of service innovation by den Hertog *et al.* (2010) and research on the innovation of SMEs by Laforet (2009).

2.7 Summary of Chapter 2

Chapter 2 reviews the key literature. Previous researchers primarily concentrated on product and process innovation. Innovation, by its definition, is essentially a combination of a ‘new idea’ and ‘commercialisation’. The scope for a new idea is wider than its literal meaning, as it is regarded as ‘new combination of existing resources or ways of working’. ‘Commercialisation’, on the other side, denotes the value that is embedded in the innovation. SDL recognises the service nature of businesses by treating them as a process of value co-creation, between multiple actors in value networks. It does not dispute the nature of innovation as a manifestation of value, but concentrates on the ‘softer’ part of innovation, as the service rather than product.

Research on service innovation, including its definition and conceptualisation, is far from complete. Frameworks developed under GDL failed to treat service innovation independently from product or technological innovations. The framework developed by Lusch and Nambisan (2015) by following SDL, however, looked at IT for enabler of service innovation, which traditional SMEs may struggle with. The 6-D model of service innovation of den Hertog *et al.* (2010) describes service innovation by dimensions that are reflected in the business. It fits well with this research as it focuses on non-IT enabled service innovation. However, this model is still theoretical, and has only been tested in the service sector; research is needed to examine it within other contexts (Droege *et al.*, 2009; den Hertog *et al.*, 2010) and through the lens of SDL.

Moreover, the success of the service sector and service innovation is ascribed to knowledge as an operant resource that SDL regards as essential for business. Research on service innovation from the perspective of knowledge, particularly in the context of non-knowledge intensive enterprises, is nevertheless insufficient in the literature.

Chapter 2 also reviews the literature in relation to knowledge management. Three models, namely, SECI, PKN, and CAS, are introduced and compared. These models, regardless of their strengths, do not address the SME context. Moreover, literature aligned to service innovation in SMEs is inadequate. In addition, research on the clustering of SMEs calls for firm-specific studies into internal networking as a prerequisite to external knowledge transfer. This research attempts to fill this gap in the literature.

Lastly, given the potential of design thinking for leveraging knowledge exchange, this research, contextualised by CCoI, examines how design thinking enables SMEs to exchange knowledge, internally and more widely in a network, for service innovation.

Based on discussions in Chapter 2, Chapter 3 will introduce the methodology adopted by this research.

Chapter 3: Methodology

Three gaps and four questions, summarised in 2.6 and 1.4 respectively, have been identified. Chapter 3 will discuss the methodology that this research adopts to approach these questions.

3.1 Research Paradigm

Objectivism is this research's ontological position. As a social researcher, the author is inclined to see the world as a construction of experiences, not only of the author himself, but also of all related actors. A sensible epistemological stance for this research is therefore constructionism; a phenomenon is therefore understood by considering the mechanisms and relationships between the actors that compose it (Lincoln *et al.*, 2011).

Constructivism has also been selected because of the research interest. Collaboration is recognised as a solution to the innovation constraints faced by SMEs (Adebanjo and Michaelides, 2010; Lamprinopoulou and Tregear, 2011; Ampantzi *et al.*, 2013; Rubach, 2013). In-depth knowledge about this process cannot be obtained through gathering quantitative data. Instead, the author must understand the phenomenon through the interactions among the contributors, their opinions and perceptions (Denzin and Lincoln, 2011a).

The ontological and epistemological positions determine the paradigm that the research will follow and the methodology used to approach the research questions.

Quantitative research, by testing hypotheses derived from theories, tends to be deductive (Bryman, 2012). Accordingly, a quantitative researcher usually holds a positivist ontological position (Bryman, 2012), in the belief that the world is a single and identifiable reality that can be measured and studied scientifically (Easterby-Smith *et al.*, 2012). As a result, the quantitative researcher tends to use scientific methods and tools to achieve objectivity and validity (Denzin and Lincoln, 2011b).

The inductive approach is preferred by qualitative researchers as it relates the research to theory (Bryman, 2012). At the same time, believing that reality cannot be interpreted unless it is experienced, qualitative researchers normally take a constructivist or interpretivist stance. Accordingly, a qualitative researcher admits that she/he must be more

or less subjective in the process of interacting with the participants (Denzin and Lincoln, 2011b). Both research paradigms have their advantages and disadvantages (Easterby-Smith *et al.*, 2012). Quantitative research, rooted in natural science, is often criticised for its incompatibility with social research; qualitative research with subjective nature is criticised for its lack of validity and reliability (Denzin and Lincoln, 2011b; Bryman, 2012).

The author agrees with Denzin and Lincoln (2011b) that the selection of methodology is subject to the purpose and nature of the research. According to Denzin and Lincoln (2011b), qualitative research is normally more applicable to research intended to explore, whereas quantitative research to confirm or test existing theories.

The purpose of this research is to explore how knowledge is exchanged in SMEs in such a way as to initiate, develop and implement service innovation. The qualitative research paradigm has been selected for the following reasons:

Firstly, the research examines service innovation in practice. The statistical approach, based on quantitative data, does not allow the author to interact with the participants in a real-life setting. Secondly, explorative research is needed to be based on in-depth qualitative data of the firm and specific knowledge exchange in SMEs (Denzin and Lincoln, 2011b).

3.2 Reasons for Multiple-cases study

According to Yin (2014), the selection of method for social research is subject to:

1) type of research questions;

2) extent of control that a researcher has over actual behavioural events, and

3) degree of focus on contemporary as opposed to entirely historical events.

This research responds to *how to* questions, to explore the process of knowledge exchange for service innovation in the context of non-knowledge-intensive SMEs. Therefore, it is concerned more about how the process is conducted than what it is. For this reason, a survey that requires statistical analysis is not suitable (Yin, 2014).

Moreover, this research adopts the paradigm determined by taking constructivism as the epistemological stance, which requires the author to interact and communicate with subjects (Denzin and Lincoln, 2011b). At the same time, since the point of the research is to observe how enterprises work in real life, the experimental method which emphasises the controlling of behavioural events (Yin, 2014) is not appropriate. Thus, case studies, by interviewing the participants, are the most suitable method for this research. A case study, as defined by Yin (2014, p. 17), is an empirical study with the following properties:

1) it copes with technically distinctive situations in which there are more variables of interest than data points;

2) it relies on multiple sources of evidence, from which data must be brought together in a triangulating fashion;

3) it benefits from the prior development of theoretical propositions to guide data collection and analysis.

This research attempts to investigate a phenomenon in depth in a real-life situation, rather than to investigate what the phenomenon is like by quantitatively gauging the context via variables.

In the believe that constructionist approach is based on interviewing and observation and analysis of existing texts (Angen, 2000), multiple cases studies, conducted based on various sources of evidence, including primary data collected from interviews and focus group, and secondary data, to guarantee the validity, were employed. A case study protocol was developed to provide semi-structured guidance to assist data collection. Collected data were coded, encompassed, compared, and analysed for the knowledge that addresses the research intent (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 analytical software such as NVivo. The multiple cases follow the process recommended by Yin, which is demonstrated in Figure 3-1:

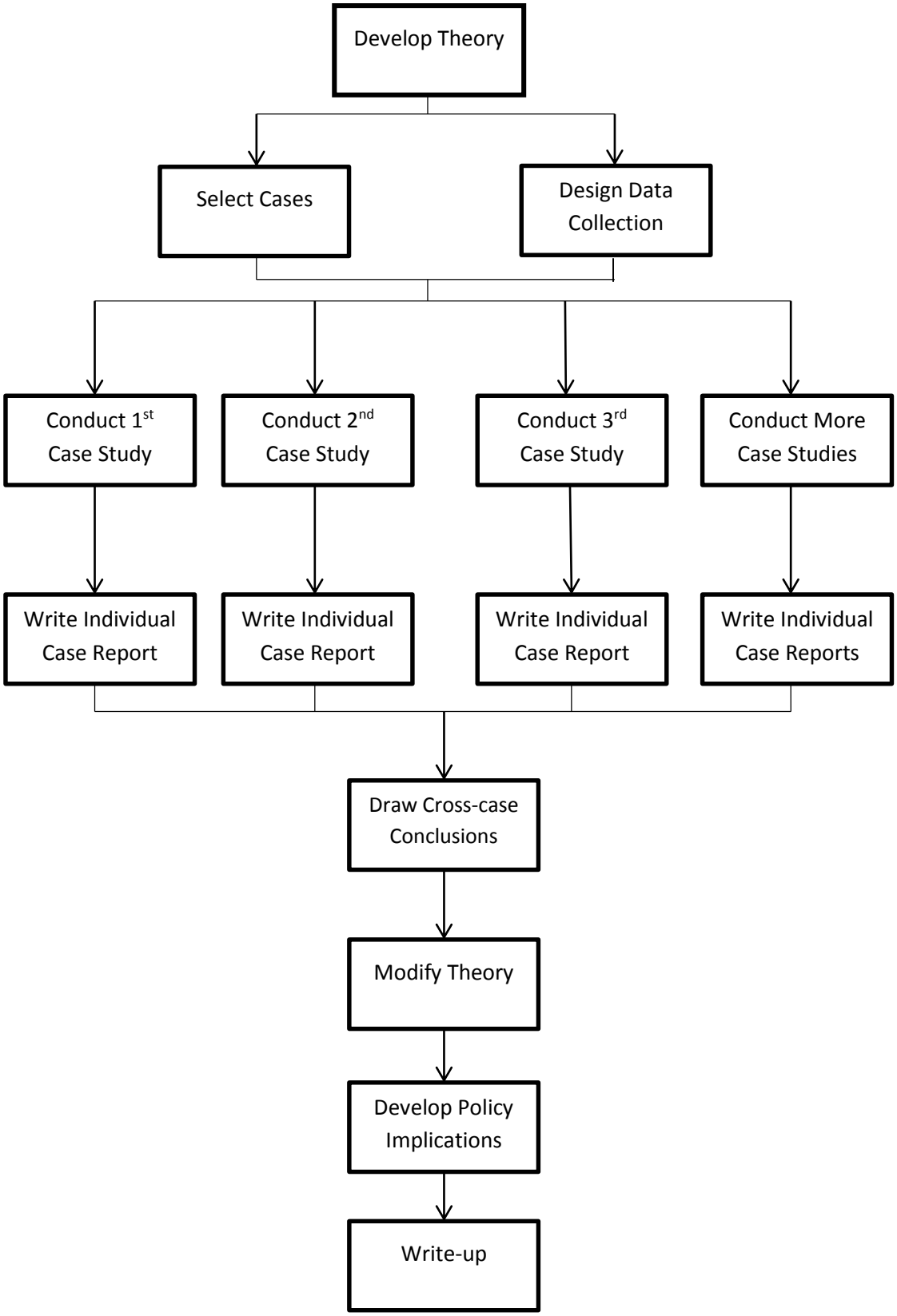

Figure 3-1: Figure Process of Multiple-cases Study by Yin (2014)

3.3 Basis of Case Selection

This research responds to calls from the literature for studies into service innovation in the context of SMEs. Moreover, this research is contextualised by CCoI. Chapter 1 and 2 discussed the potential of design thinking for enabling enterprises to conduct service innovation.

Aiming at improving the creativity, productivity and performance of the participant companies by implementing design thinking and tools, researchers from the GSA have conducted pilot studies since 2010 into mainly Scottish SMEs from various sectors, including manufacturing, service, public and a business cluster (Lockwood *et al.*, 2012). Staff from participant companies were invited, from 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.

Generally, CCoI attempts to intervene in participant companies in order to unlock their knowledge and skills for innovation by implementing the design thinking (Lockwood *et al.*, 2012). The targets of CCoI converge with the targets of this research in four regards:

1) CCoI hoped to enable SMEs to innovate by unlocking their knowledge and skills, this overlaps with the research interest in how knowledge is exchanged to release service innovation potential;
2) By engaging staff from across the organisations, the CCoI intervention addressed the challenge of inter-department collaboration (Baines *et al.*, 2007; Alghisi and Saccani, 2015);
3) CCoI is conducted in the SMEs, which also contextualises this research;
4) The intervention of the GSA and the ASBS in the participant companies is an example of the knowledge exchange that is of interest to this research.

Therefore, the cases for this research were selected based on three criteria (Figure 3-2):

Firstly, cases must be selected from SMEs. The profile of the chosen companies should match the UK definition of SMEs (See 1.2);

Secondly, cases are selected from the companies engaged in CCoI, which contextualises the research;

Thirdly, framed by the 6-D model of service innovation, cases must cover as many dimensions of service innovation as possible.

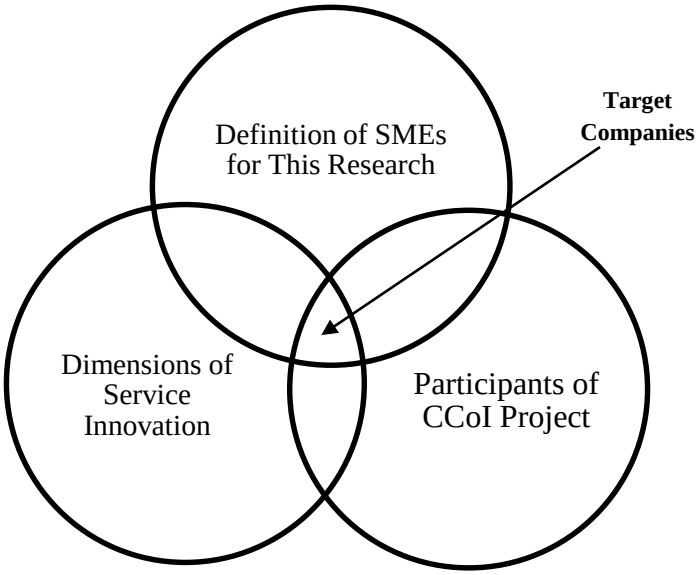

Figure 3-2: Channels for Candidates Selection

3.4 Participants Recruitment

The next step was to recruit the participants. Fieldwork was conducted to identify key contributors to the process of service innovation and then to investigate how they exchange knowledge in pursuit of service innovation. Candidates were selected from the participant companies of CCoI. Profiles of the participant companies are given in Table 3-1:

Name of the Participant (Anonymised)	Sector
Scottish Government	Government
GALAXY	Tourism
MOON	Manufacturing
MARS	Manufacturing
NEPTUNE	Mixed
STAR	Manufacturing

Table 3-1: Participant Organisations to CCoI and the Sectors (Johnson, 2015)

The process of recruiting candidates started in October 2015 by reviewing CCoI companies. Through the three channels above, three organisations, namely STAR, MOON, and GALAXY, whose names have been anonymised, fulfilled the criteria for data collection.

The first phase of investigation was conducted in the form of interviews and secondary information collection, to build a general feel for the businesses. Key contributors were identified in the first phase, and engaged in the second phase to flesh out how knowledge is exchanged.

Informed by the fieldwork protocol, those responsible for the management of the companies were invited to share their knowledge about the businesses and service innovation in face-to-face interviews. The design of data collection is discussed in 3.5.

3.5 Data Collection

3.5.1 Design of Data Collection

Data collection is the most important and time-consuming step. Sources of evidence can be various. Yin (2014) recommends six sources each of which has certain weaknesses and strengths for data collection:

a) documentation;
b) archival records;
c) interviews;
d) direct observations;
e) participant observation;
f) physical artefacts.

Data collection should be consistent with the research interest, paradigm, and questions. The sources from which data and evidence are generated, as stated by Yin, should be multiple and well managed (Yin, 2014), with strengths and weakness balanced. Stable, unobtrusive, and quantitative data, covering a wide span of time, events and many settings can be collected from documentation and archival records at the expense of neutrality, and accessibility (Yin, 2014). Evidence achieved through direct observations and participant observations is contextual and insightful but difficult in both time and cost (Yin, 2014). Interviews offer evidence that is insightful and targeted but which can compromise objectivity, accuracy and reflexivity (Yin, 2014). Physical artefacts can provide insightful sources of cultural features and technical operations, but they are not always available (Yin, 2014).

The purpose of this research, as stated above, is to investigate how SMEs, enabled by design thinking, exchange knowledge for service innovation. Technical issues, despite their importance, are not within the scope of this study. For this reason, physical artefacts are not regarded as a source to ground for the research.

Secondary sources such as profiles of these companies can be accurately represented in their documentation and archival records, including emails, agendas, administrative documents and internal publications. Secondary documents, 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 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 an 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, namely constructionism, which requires an interactive and interpretive method for coming to know the world (Lincoln *et al.*, 2011, p.107). Involving all participants and the researcher himself, the focus group puts the author in the middle space (Denzin and Lincoln, 2011b) to collect empirical evidence. Moreover, the focus group also mitigated the disadvantages of interviews and observations, for example bias, time-consumption, and costs (Yin, 2014), by engaging in dialogue with participants, and observing their interactions.

The entire process of data collection, therefore, was composed of three phases: participant selection, investigation, and data analysis. As demonstrated in Figure 3-3, documentation and archives were reviewed for both data analysis and preparation for interviews, or focus groups. Based on the secondary information, fieldwork was conducted in the form of interviews and focus groups. Cases were generated and investigated by interviewing the CEOs or people in charge of CCoI, on the basis of the 6-D model of service innovation developed by den Hertog *et al.* (2010), in order to identify the service innovation they conducted and the key contributors to this process. Those actors were engaged in focus groups to describe how they exchange knowledge for service innovation. In addition to service innovation and knowledge exchange, this research proposes to look at CCoI by analysing data collected through two channels. The primary data about CCoI was collected through interviews and focus groups in the targeted companies. Moreover, researchers from the GSA, who participated in the project, were interviewed to access information about the project. The second channel was through secondary data, including internal and published reports written by researchers. Primary data achieved by the fieldwork were recorded by various means including notes, diaries, and audio recordings, and then coded and analysed with the assistance of Nvivo. The process of data collection, the approach and sources are demonstrated in Figure 3-3:

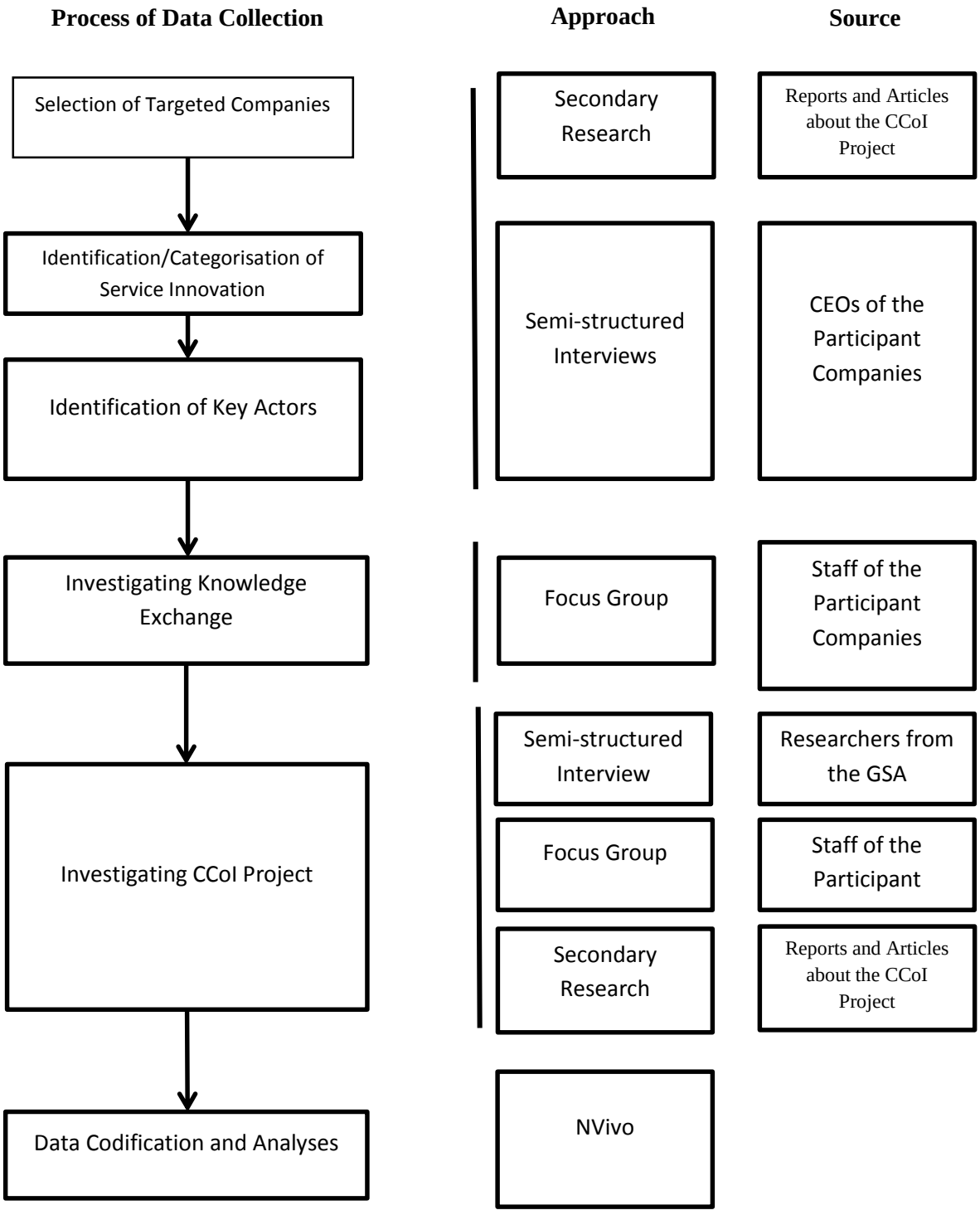

Figure 3-3: Design of Data Collection

3.5.2 Process of Data Collection

Contacts were built through the researchers from the GSA. The CEO and a Director of MOON, agreed to be interviewed, which proceeded on the basis semi-structured questions attached in Appendix 1. The interview was designed to identify service innovation. Moreover, key contributors to service innovation were identified for the next phase of the research, about how knowledge is exchanged. Informed of the fact that the company had locations at two separated sites, the author was referred to a Production Director of MOON who oversees the other site. Questions that Director of MOON could answer were dealt with during the first interview and decisions on further progress were left until Production Director of MOON was interviewed.

The second interview took place in the same month. Knowledge about the business of this site was given by Production Director of MOON. Key contributors to the design and production processes were identified, but the request to engage staff of the business in focus groups was declined. Further progress in data collection for MOON was suspended as the author had to wait for a response to the request to participate in focus groups.

The second company, STAR, was also contacted through the GSA researchers. This project followed the same principles as for MOON (Lockwood *et al.*, 2012). The company had undergone changes in management and culture in recent years. The CEO of STAR accepted the invitation and was interviewed on site. The process followed the same interview protocol. The author also visited the factory. The CEO of STAR agreed to organise focus groups with key actors identified in the interview, engaged for the second phase of data collection about knowledge exchange.

Having received no response from MOON, the author progressed to the STAR focus group in STAR. The CEO of STAR invited the members of the organisation who he believed to have comprehensive knowledge about knowledge exchange. Information about the members can be found in Table 3-2 and 3-3.

Issues relevant to knowledge exchange and POD, explained in 4.2.3, were discussed in the focus group. The discussion went well and all questions that the author had prepared were addressed.

As the data acquisition required by the author for STAR was complete, the author decided to close the fieldwork for this case.

In the meantime, the author was informed by MOON of an emerging financial crisis. The author therefore decided to follow the alternative plan to access primary data about the CCoI in MOON by interviewing the researchers from the GSA who had been engaged in the project.

The two cases above, STAR and MOON, covered the first three questions in 1.4, the final question regarding how SMEs collaborate in a cluster was not addressed. Therefore, it was necessary to further explore the potential of the design thinking for fostering service innovation by engaging multiple partners within a cluster. For this reason, another case study was required. This case must meet three criteria, in addition to the criteria mentioned in 3.3:

1) it must be an SME from the service sector;
2) it must be a cluster engaging other enterprises to provide service;
3) it must be a participant in CCoI.

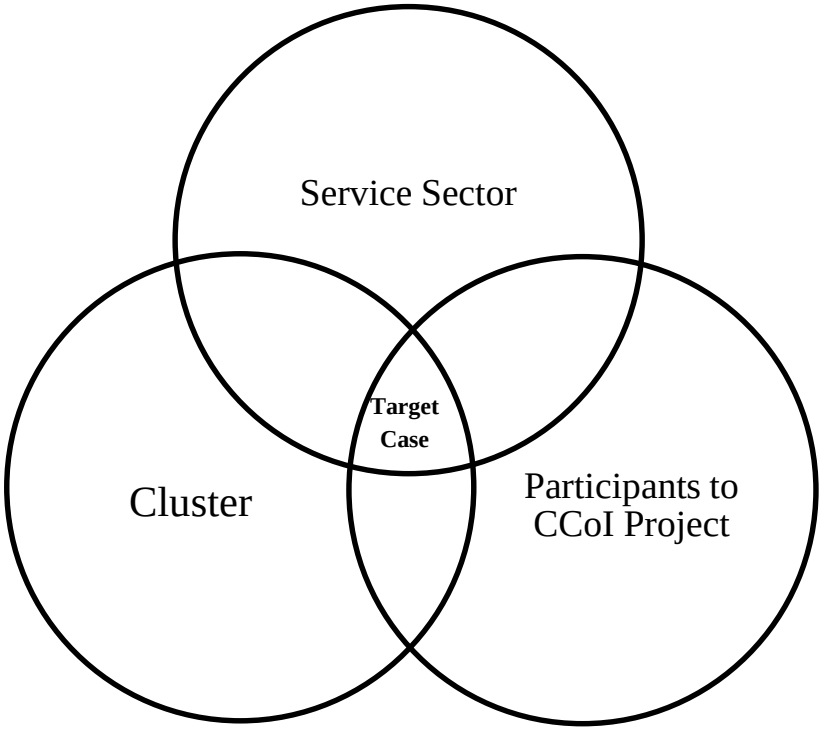

Figure 3-4: Channels for Case Selection

By reviewing the profile of the participants in CCoI, an organisation, anonymised as GALAXY was selected for further study.

Data collection followed the same process discussed in 3.5.1: the members of GALAXY, who are also owners of a participant hotel called Hotel A, were interviewed following the guidance of the fieldwork protocol. Questions were developed under the framework of the 6-D model of service innovation. Researchers from the GSA were also interviewed to access information about the implementation of CCoI. Secondary sources, including the reports and presentations by the researchers from the GSA, were collected to validate the primary data.

In the autumn of 2015, the author interviewed the CCoI participants (Table 3-5). During the fieldwork, the author was informed that one of the interviewees is the chairperson of GALAXY. Data about the company and the organisation was therefore collected by interviewing the owners of the company, the chairperson of GALAXY and the researcher from the GSA.

In contrast to MOON and STAR, the wider focus groups were not conducted for GALAXY, since the research questions about knowledge exchange were covered in the first two cases. The case of GALAXY was aimed at confirming service vision, design thinking and the owner as key factors for effective knowledge exchange and service innovation (see 4.4.4). Moreover, the GALAXY case was also conducted to address the service value system that MOON and STAR did not cover.

Data about how CCoI was conducted in GALAXY were gathered from two sources. The first source was the interviews with key participants and the director of GALAXY. The second source was secondary, including the internal reports and reflections of the researchers from the GSA.

3.5.3 Participants

Data about STAR was accessed through the CEO, CEO of STAR, by face-to-face interview. A focus group was organised to engage the key actors, identified in the interview with CEO of STAR, who have participated the process of knowledge exchange.

Data about MOON is accessed through interviewing the two directors: Director of MOON and Production Director of MOON respectively.

Data about GALAXY is accessed through interviewing the owner of Hotel A, chairperson of GALAXY and researcher 1 from GSA.

Data collected for the three cases are recorded by audio, notes, and photos. Profiles of participants are summarised in Table 3-2, 3-3 and 3-4.

Participant	Profile
CEO of STAR	Chief Executive Officer

Table 3-2: Profile of the Participant to the interview from STAR

Participants	Profiles
Marketing Director	Director of Marketing
Marketing Assistance	Assistance of Marketing
POD Manager	Director of Product Development
Produce Development Assistance	Assistance of Produce Development

Table 3-3: Profiles of the Participants to Focus Group from STAR

Participants	Profiles
Director	Director of Branch 3 & 4, MOON
Production Director	Director of Branch 1 & 2, MOON
Researcher 2	Researcher, the Glasgow School of Art
Researcher 3	Researcher, the Glasgow School of Art

Table 3-4: Profiles of the Participants to Interviews from MOON

Participants	Profiles
Chairperson of GALAXY	One of the owners of the Hotel A, Manager, Chairperson of GALAXY
Owner of Hotel A	One of the owners of the Hotel A
Researcher 1	Researcher, the Glasgow School of Art

Table 3-5: Profiles of the Participants to Interviews from GALAXY

3.5.4 Coding and Data Analyses

Primary data collected from the fieldwork was coded for analyses, with the assistance of NVivo. Interviews and focus group discussion were audio recorded and transcribed into texts, which were then processed on NVivo.

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). The qualitative data was collected through interviews and focus group that engaged key contributors to the knowledge exchange, service innovation and the CCoI interventions.

Yin (2014, pp. 143-65) recommends five techniques for analysing case study evidence. The pattern matching or congruence method (George and Bennett, 2004) matches empirical evidences with the predicted patterns in an experimental environment. This research does not adopt this technique for analysis since data was not collected to test

prepositions. Other two analytic methods, namely explanation building and time-series analysis are not adopted because this research is not aimed at verifying theories or testing variables (see 3.2). The last two techniques, logic models and cross-cases synthesis are favourable to the author for this research, which is contextualised in companies and a programme conducted in these companies. The author adopted to analyse the data to build both organisational-level and programme-level logics for two reasons. First, the organisational-level logic model is adopted because the research intent pertains to the logic between design thinking, knowledge exchange and service innovation contextualised in the selected companies and organisation. Secondly, the program-level logic model is also adopted because the research intends to unveil the effect of design thinking on the knowledge exchange and service innovation following the CCoI intervention. Given the multi-case study nature of this research, the cross-case synthesis technique is adopted to aggregate the data collected from the three cases for conclusions.

The process of data collection is mapped in Figure 3-3. Fieldwork is presented in 3.5.2. The author followed the case study protocol to interview the participants and ask questions. All questions are based on the research intents that cover service innovation under the framework of the 6-D model, knowledge exchange and design thinking. Responses of the participants were audio recorded and then transferred to the password-protected computer for transcription and storage. The transcribed data were uploaded to Nvivo for further process.

The raw data need to be coded before they are analysed and jig-sawed for the patterns and logics to emerge. Recorded data from interviews/focus group were transcribed into texts, categorised according to the 6-D model that frames the research, and then the cases and participants.

The tier 1 codes are derived from the 6-D model of service innovation. Because this research is framed by the 6-D model of service innovation, the author has to identify the new service from the collected data. Codes are therefore derived from the six dimensions of service according to the 6-D model. Applied codes and their meaning can be found on Table 3-6.

Second tier of codes are applied in order to further manipulate and sort the data for analyses. The second tier of coding follows the themes extracted from the research

questions. The research questions were translated into the following themes according to the research questions:

- Service innovation under the framework of 6-D model;
- Knowledge exchange for service innovation;

In addition to the two above, design thinking is another theme this research. However, as this research is focused on the affect that design thinking has on knowledge exchange and service innovation, relevant information is therefore extracted from the data labelled/coded to address the above two themes.

Specifically, service innovation and knowledge exchange are labelled by acronyms of NS (New Service) and KE (Knowledge Exchange). Given the multiple case study nature of this research, data were collected and analysed case by case aligned to the themes, prior to being aggregated. Since the data was collected over a number of stages, the researcher needed to use labels to identify the cases before he integrated all the data. Acronyms of S, M and G are therefore applied to representing STAR, MOON and GALAXY. For instance, data collected from the focus group in STAR covered both new service and knowledge exchange. They were transcribed and categorised under the title of Focus Group as it is demonstrated in Appendix 1. The data were further coded *per* the themes, *i.e.* NS if they are about new service or KE if they are about knowledge exchange. The data collected from the interview for the case of STAR were coded in the same way. The coded data were then categorised by the case. In this example, data collected from both 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. In such way, the data collected from difference sources were synergised to address the themes case by case. Both tier 1 and tier 2 codes and their links are listed presented in the Table 3-6. Details about the sources of coded data, which are expanded for analyses in Chapter 4 and 5, can be found in Appendix 1.

Tier 1 Code		Tier 2 Code					
Code	Meaning	STAR (S)		MOON (M)		GALAXY (G)	
		Service Innovation (NS)	Knowledge Exchange (KE)	Service Innovation (NS)	Knowledge Exchange (KE)	Service Innovation (NS)	Knowledge Exchange (KE)
NSC	**New Service Concept**	NSS1/2/3/5/11/ 12/14/15	KES1/4/5/7	NSM1/2/4/6/7/8 /10/11/12/13	KEM1/2/3	NSG7/10	KEG1/2/3
NCI	**New Customer Interaction**	NSS5/14/15	KES7	NSM3/4/9/10	KEM3	NSG10	KEG2/3
NVS	**New Value System**	NSS4/9/13	Unidentified	NSM7/11	Unidentified	NSG7/10	KEG5
NRM	**New Revenue Model**	NSS10	KES4	NSM5/11	Unidentified	NSG8	KEG2
NSDS-POC	**New Service Delivery System-Personnel, Organisation, Culture**	NSS6/7/8/14	KES2/3/4/5/6	NSM9/10/11/13	Unidentified	NSG9/10	KEG1/3/4
NSDS-T	**New Service Delivery System-Technology**	NSS13/14/16	KES2	Unidentified	Unidentified	NSG9/10	Unidentified

Table 3-6: Tier 1 and Tier 2 Codes and Their Disctribution

The coded data was analysed to generate the three cases, which are displayed in Chapter 4 and 5, from which the conclusions are drawn in Chapter 6.

3.6 Summary of Chapter 3

Chapter 3 outlines the methodology for this research and its approaches to data collection. Methodology is selected in accordance with the research paradigm determined by the nature of the research questions. With the research questions and research paradigm determined, due to its explorative nature and compatibility with the research interest, a multiple case study was chosen over other methods (Yin, 2014). The methodology is conducted by multiple means of data collection, which divide into three phases. In the first phase, cases are generated by selecting companies or projects that fall under the SME definition. In the second phase, interviews semi-structured based on the 6-D model of service innovation were conducted with the CEOs of the selected cases and people in charge of CCoI project, to identify both the innovation in service and key contributors. Actors identified in phase two were engaged in focus groups to discuss knowledge exchange and service innovation. The primary CCoI data was accessed by interviewing the participants, both from the companies and from the GSA. Findings about CCoI are validated by secondary data, including internal and published reports provided by the GSA. Data received in the second phase is further coded and analysed by Nvivo.

Chapter 4 will discuss findings about service innovation identified in STAR, MOON and GALAXY and the process of knowledge exchange among members engaged from the three participant companies/organisation. Moreover, the CCoI projects will be reviewed, by both secondary research on the secondary data, and by primary data collected from the participants in the project.

Chapter 4: Multiple Case Study

4.1 Introduction to Chapter 4

Three cases, STAR, MOON and GALAXY were selected from the pool of candidates that participated CCoI. The process of data collection was conducted under the guidance of the case study protocol attached in Appendix 3. Fieldwork is authorised and guided by the College Ethics Committee, the University of Glasgow.

Chapter 4 presents the cases by the three research themes: service innovation, knowledge exchange and design thinking. The case of STAR as well as the implementation of CCoI, including its profile, data analyses, and findings will be presented in 4.2 and MOON in 4.3. Both cases are combined in 4.4 for comparative purposes. The case of GALAXY will be presented in 4.5, with the final case discussion covered in Chapter 5.

4.2 Case of STAR

4.2.1 Case Profile

STAR is a textile manufacturer founded in 19th century. It provides abrasive attachment solutions, composites, flooring textiles, and pipe fabric technology, it serves markets ranging from aviation to wind energy. The company participated in CCoI in 2010. A pilot group was organised, following the disciplines of CCoI, to engage staff across departments and layers of management in promoting new ways of working and instilling a culture of innovation. A significant improvement in operational efficiency resulted (Lockwood *et al.*, 2012). One of the most remarkable consequences of the intervention, which was not anticipated, was POD, which revolutionised the operation and structure of the company. Departments of the company, which used to be separated, were integrated into a studio space. The two areas, marked by different colours, are open to each other and synergised. A POD area is composed of several sections marked by different colours that represent clusters of products (as demonstrated in Figure 4-1). Each POD has a manager. Customers from each market sector are invited to the POD and join the staff and experts from different departments in developing solutions. This is demonstrated in Figure 4-2.

Ideas and solutions generated by the staff and clients are gathered, compared and discussed in POD. They are then prototyped and assessed to filter out the most feasible and efficient

options (Figure 4-3). Participants across the company are encouraged to share their opinions and to comment on each idea in each stage of evaluation until one or several best ideas are chosen for implementation. The whole process is efficient, open, visible and inclusive: the best ideas go through evaluation and are implemented, whereas ideas believed to be inefficient or infeasible are identified at the prototype stage, and withdrawn. This significantly reduces the unnecessary waste and sifts the most feasible ideas by engaging staff with various backgrounds.

Figure 4-1: The POD Area

Figure 4-2: The Office Area

Figure 4-3: The Process of Filtering in a Unit of POD

The structure of STAR and POD are mapped in Figure 4-4. The next section, based on the data collected from the interviews and focus groups, will demonstrate the service innovation conducted in POD under the framework of the 6-D model.

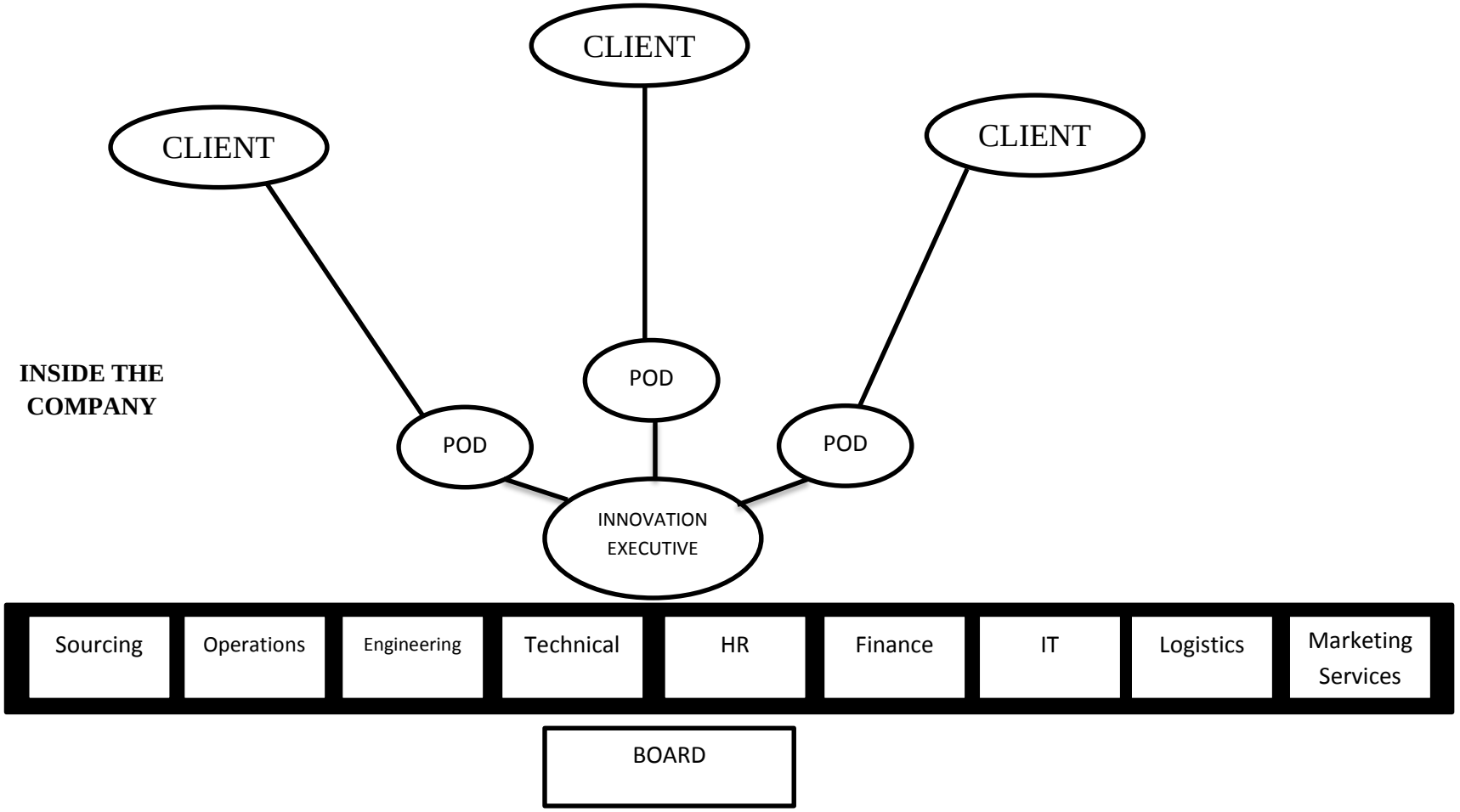

Figure 4-4: The Corporate Structure of STAR

4.2.2 Service Innovation in STAR

4.2.2.1 New Service Concept

New service concept is defined by den Hertog *et al.* (2010) as solutions created by the provider in collaboration with customers. STAR, as the CEO stated, identifies problems and develops technical solutions collaboratively with its customers (NSS1).

> *'CEO of STAR: …we also sit with the client in the area (POD), and design products together. So we will sit with them and it all really needs to start with the problem…'* (NSS1)

To conduct the process in an efficient and innovative way, they created POD, resulting from the CCoI intervention. This system integrated functional departments with product clusters.

The logic behind POD system is that solutions are developed by identifying problems *per* the needs of the customers. Indeed, as CEO of STAR suggested, 80% of their existing sales now result from collaboration between the company and its customers in POD (NSS5). In addition to the generation of ideas, STAR also needs to collaborate with its customers on price, cost and other issues associated with the solutions they offer (NSS5). Finally, an internal collaboration that engages the staff from different departments is conducted in POD to filter out the most feasible and efficient solution (NSS5).

> *'CEO of STAR: … about 5 of our sales are completely after five face-to-face visits. We need to make sure if our five face-to-face visits are on a program of opportunity that is valid; so we do use a filter system as a part of that.'* (NSS5)

Regarding the collaborations with the customers, CEO of STAR indicated that the novelty of ideas is negatively related to the strength of the relationship between the company and the clients (NSS2). As he stated, it is difficult to develop innovative solutions for long-term customers in a stagnant marketplace:

> *'CEO of STAR: …we have dealt with this customer for 30 years. So our relationship is very strong with them, but it's also very static; if we try to get them involved in the new products it could be quite difficult, particularly with the market places, sales is quite static, stagnant in marketplace.'* (NSS2)

In contrast, in fast moving markets, STAR has more opportunities to build a customer relationship that is more dynamic, innovative but short-term (NSS3).

> *'CEO of STAR: … If you look at different marketplace such as fibre, tips, that is a very fast moving marketplace, the relationships will be built there far more innovative, and far more short-term as well, far more dynamic.'* (NSS3)

In short, as shown in Figure 4-5, STAR collaborates with clients, mostly new clients in the short-term, for innovative solutions. POD accommodates the whole process. Design tools introduced by the GSA are used in this process, which will be addressed in the following paragraphs.

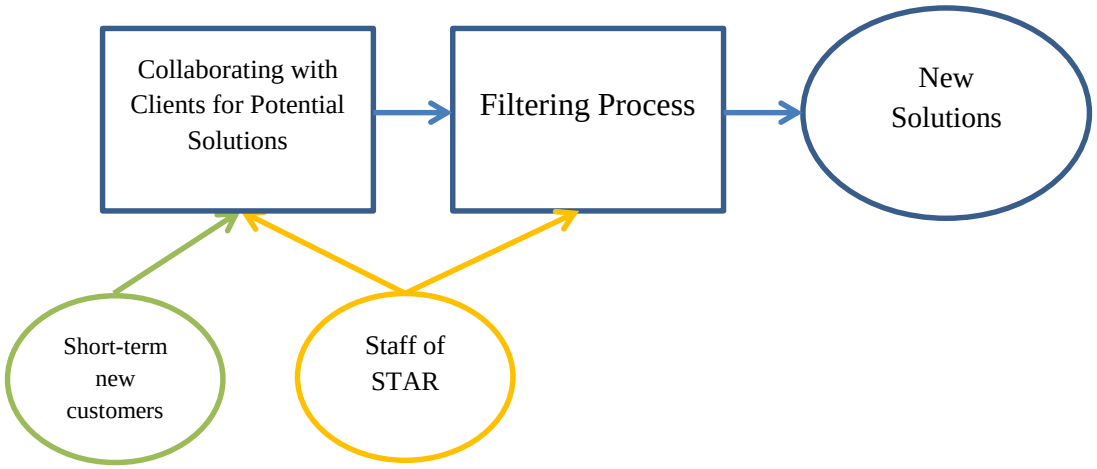

Figure 4-5: Creation of New Concept of Product and Key Contributors

4.2.2.2 New Customer Interaction

Scholars such as den Hertog *et al.* (2010) refer to customer interaction as self-services. The 6-D model was created and validated in knowledge intensive service sectors (den Hertog *et al.*, 2003; den Hertog *et al.*, 2010). In this case, as CEO of STAR stated (NSS5), POD works as a hub where the members of the company, from the top managers to frontline staff, interact with clients to generate solutions that meet their needs. STAR invites a client to POD, discusses what they are looking for, and then interacts with her/him to develop a solution.

> *'GB: So do you have generic products for most of clients, or do you just design certain products just for clients specifically.*
>
> *CEO of STAR: it depends on the POD; a lot of POD have customers' specific products, that we have developed hand-in-hand with customers over years.'* (NSS5)

Therefore, as demonstrated in Figure 4-6, the new customer interaction in POD precedes the creation of new concept of product in STAR.

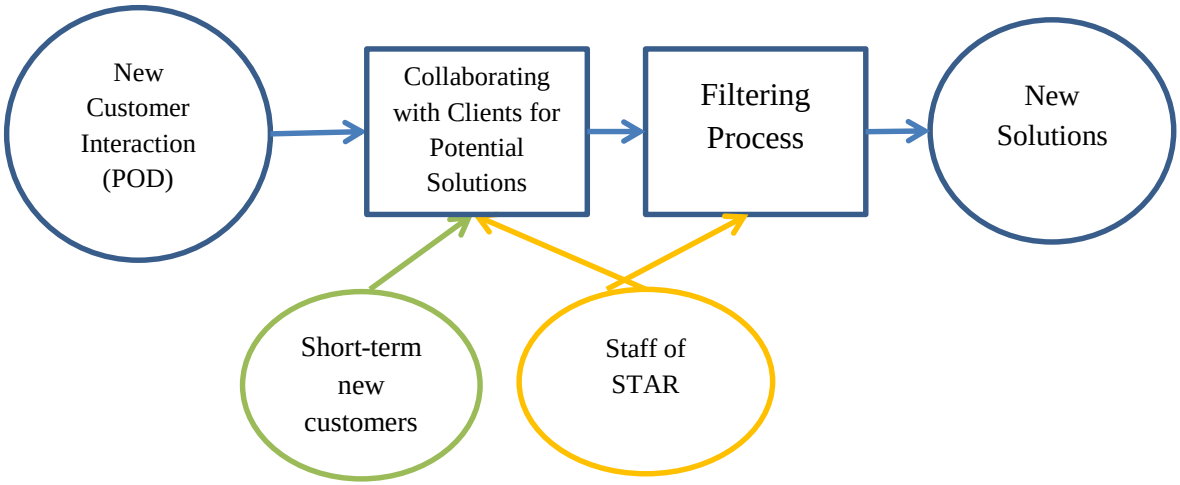

Figure 4-6: New Customer Interaction and the Creation of New Concept of Product (POD)

4.2.2.3 New Value System

New value system is another dimension of service innovation, defined as collaboration between the provider and its business partners in a value network (den Hertog *et al.*, 2010). Two partners of STAR were highlighted in the interview: the clients, with whom the company collaborates for new solutions (NSS3, NSS5) and GSA that introduced the design thinking and design tools (NSS9). The former leads to the creation of new solutions, whereas the latter introduces design thinking. Collaboration between STAR and its clients was addressed in 4.2.2.2. In terms of the collaboration between STAR and the GSA, two direct consequences were highlighted:

1) The creation of POD, which is recognised as the *milieu* of both new customer interaction and new service delivery systems (which will be discussed in the following sections);
2) The design tools as a part of POD, as stated by CEO of STAR, were introduced by the GSA and tailored by the staff to the STAR (NSS9):

'CEO of STAR: …it is just about having a mind-set on the use of (the design) tools and being open to different ideas. We have a toolkit that has 30-40 different tools that you can use, to help.

BG: Did they create the tools?

> *CEO of STAR: We created them together we effectively…a lot of tools are out there, the Glasgow School of Art helped create them and put them together, and train us up on a lot of the tools … there are lots of different tools we now use them in the POD that we have nothing of before get trained from the Glasgow School of Art.'* (NSS9)

However, GSA was not directly involved in delivering new solutions; since the new value system is defined as collaboration in providing the service, it is not recognised as a new value system by the 6-D model.

On the other hand, new solutions, as CEO of STAR stated, result from and are delivered by the staff collaboratively in POD (NSS4):

> *'CEO of STAR: …we actually have a filter process, we score our opportunities, and we use that in order to do a better job of grading the prospects and filtering out the good from the bad…So there are the key factors we use in terms of to grade an opportunity, to score those to filter out of the opportunities that we follow on to form. And that was done by the staff themselves. The top leadership was not involved in that process.'*(NSS4)

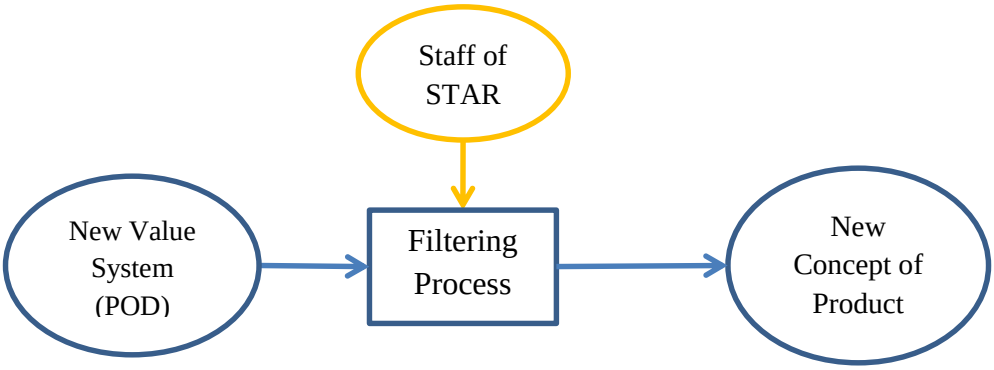

Figure 4-7: The Relationship between the New Value System and the New Solution

Therefore, as Figure 4-7 demonstrates, POD, due to its collaborative nature and its service function, is recognised as the value system. However, no external partnership, which den Hertog *et al.* (2010) refer to as new value system, was identified.

4.2.2.4 New Revenue Models

A new revenue model in the 6-D model is described as a supportive dimension for a new concept of service. As den Hertog *et al.* (2010) state, a new service concept is implemented by multiple actors through collaboration. Therefore, an appropriate way of distributing revenues and sharing costs is critical for the provision of new service. The new products of

STAR are developed by collaborating with clients, and cost sharing is manipulated to manage such collaboration. The cost for the prototype is usually bourn, as CEO of STAR stated, by STAR to attract the attention of clients and as a basis for their further relationship. As soon as the collaboration is established and clients agree to proceed, they will be involved in the payment of further development (NSS10):

> *'CEO of STAR: Typically, we eat all the costs ourselves, for the initial prototyping … because we want to make sure that we are not putting a barrier. We also make sure that the customer is sufficiently interested, and it's not just because the material is free … So, if there is a process we follow, we'll extend the sample run; if we get the feeling that the customer is now in the process and thinking they will buy, we will then engage them in the paying for some of the extended runs.'* (NSS10)

Therefore, the revenue model as a manner of sharing costs with customer in STAR, as Figure 4-8 demonstrates, is related to the collaboration stage. Costs for initial prototypes are covered by the company to attract customers and earn their trust. As soon as the partnership with the customer is built, the production costs are shared.

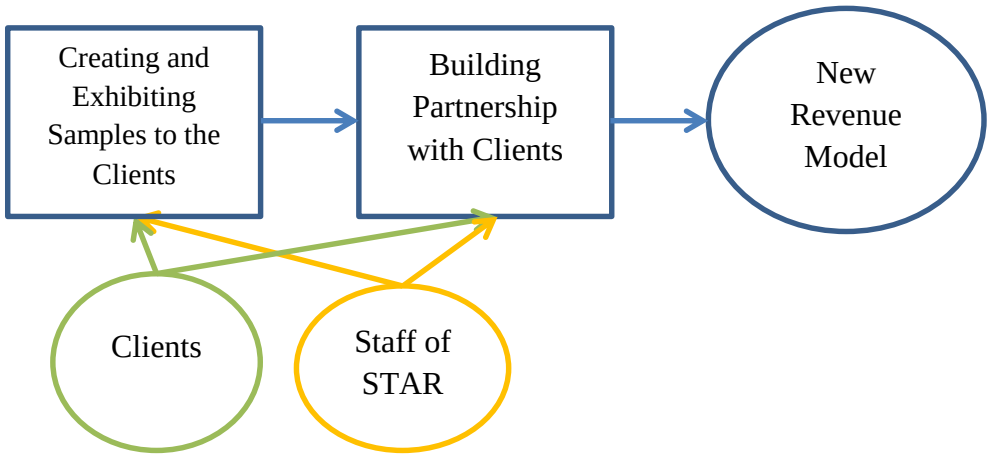

Figure 4-8: Process of creating new revenue models

4.2.2.5 New Service Delivery System: personnel, organisation, and culture

The new service delivery system is referred to as the human resources, team skills of staff, organisation, and culture to deliver service innovation (den Hertog *et al.*, 2010). STAR collaborated with the GSA to cultivate innovative culture (KES1).

> *'CEO of STAR: …a lot of work by the GSA was about creating the culture of innovation rather than just training people to be innovative … that (the culture of innovation) certainly is good legacy in that.'* (KES1)

The most important legacy of CCoI in STAR is POD (KES1). CEO of STAR described this as collaboration between employees across departments to develop solutions (NSSF12), an open place for internal knowledge exchange and development of ideas (NSS7), a hub for communication between clients and staff (NSS8), and a marketing channel (NSS8):

'CEO of STAR: So what we have here is in those boxes underneath points; this is (the place) where all of these guys are: engineering, technical, producing, quality, etc. and POD leaders are there. Each of those POD is literally an area for each POD manager to set and their own space...

BG: So you have each POD working for each specific project by mixing the staff from different backgrounds?

CEO of STAR: Yes. And the other point is, they leave (the office area), in order to join the customers in POD … They come to the POD, they work in a POD, they go back to the desk. They do their work here (POD) but take their direction here (the office area).

CEO of STAR: POD think of ideas; (the incubation team) fast track it (the generated idea) through the prototypes; we get filter for samples, we then take it though the POD to the customers, and the customers then say, 'we like this, we hate that, we don't want this', and it feedbacks...' (NSS7)

'CEO of STAR: … So if people ask us if it is like a mixed organisation, definitely not. It's not going to be a functional boss or a geographical boss, it is literally the people who work the services in the POD

BG: Can I understand the leader as a hub between your team and customers for communication and interaction?

CEO of STAR: Yes, very much.

BG: So one leader is responsible for several projects?

CEO of STAR: Yes, but he (the POD leader)'s responsible for making sure the exchange goes ahead, but in terms of the content, he does not need to know the content necessarily by the detail, the technical person can help him. He's there to make sure the POD continues to proceed itself forward.' (NSS8)

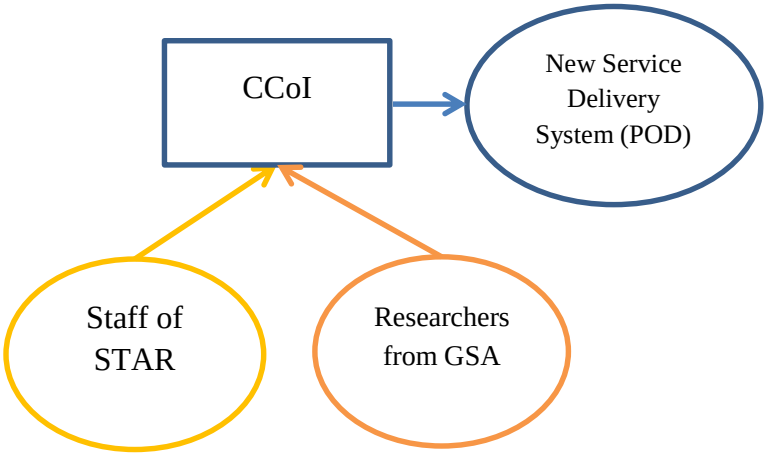

Figure 4-9: Development of the new service delivery system and the key contributors

4.2.2.6 New Service Delivery System: technological

The technological dimension of service innovation is referred to as information and communication technology (Bordonaba-Juste *et al.*, 2012), which facilitates the creation of new concepts, interactions with customers, and the delivery of new services (den Hertog *et al.*, 2010). STAR has a website to promote the company but does not use it to deliver any service. The interview slightly touched other issues relevant to the technology and highlighted the conceptual tools that the GSA introduced as a part of CCoI to visualise the implicit knowledge imbedded in the staff (NSS9), the details of which are discussed in the following sections.

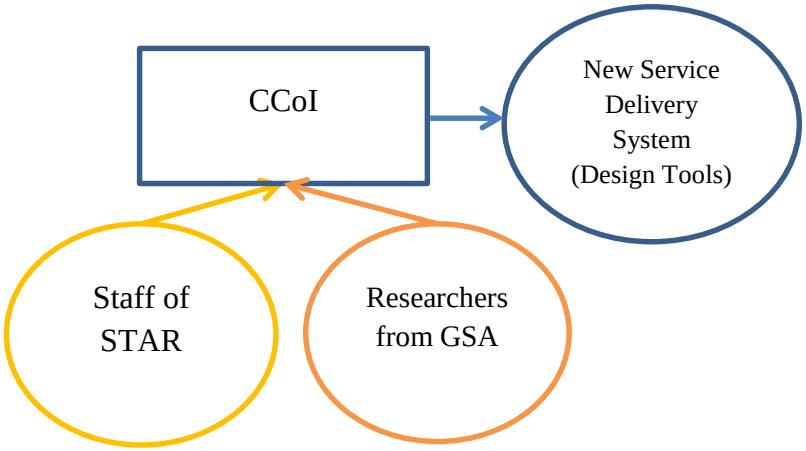

Figure 4-10: Development of the new service delivery system (Design Tools) and the key contributors

4.2.2.7 Summary of Service Innovation in STAR

Results about service innovation in STAR discussed are summarised in Table 4-1.

Dimensions of Service Innovation by den Hertog *et al.* (2010)	Reference of Data	Findings
NEW SERVICE CONCEPT	NSS1, NSS2, NSS3, NSS5, NSS11, NSS12, NSS14, NSS15	• New products are solutions specified to clients' requirements; • New solutions are developed by collaborations between STAR and the clients; • More innovative products are resulted from short-term relationship; • New solutions are developed and filtered in POD;
NEW CUSTOMER INTERACTION	NSS5, NSS14, NSS15	• Staff interact with customers through POD for solutions;
NEW VALUE SYSTEM	NSS9, NSS13	• No external partners are involved in the delivery of new services; • Internal collaborations were found among the staff for developing and delivering new solutions in POD.

NEW REVENUE MODELS	NSS10	• Costs are consumed by the company to establish partnerships; • Costs are shared with clients for solution development;
NEW DELIVERY SYSTEM	NSS6, NSS7, NSS8, NSS14, KES1	• POD is the hub of communication between the clients and internal team of staff; • POD is an open place for internal knowledge exchange and development of ideas; • POD is a combination of employees from different departments for solution development; • POD is marketing channel; • POD is a consequence of CCoI project.
NEW TECHNOLOGIES	NSS13, NSS14, NSS16	• ICT is not intensively applied except for exhibition of the company; • New tools as a part of POD, introduced by GSA through CCoI project, are employed to assist the solution development.

Table 4-1: Service Innovation Identified in STAR

Figure 4-11 links the six dimensions of service innovation identified in STAR to show their relationship.

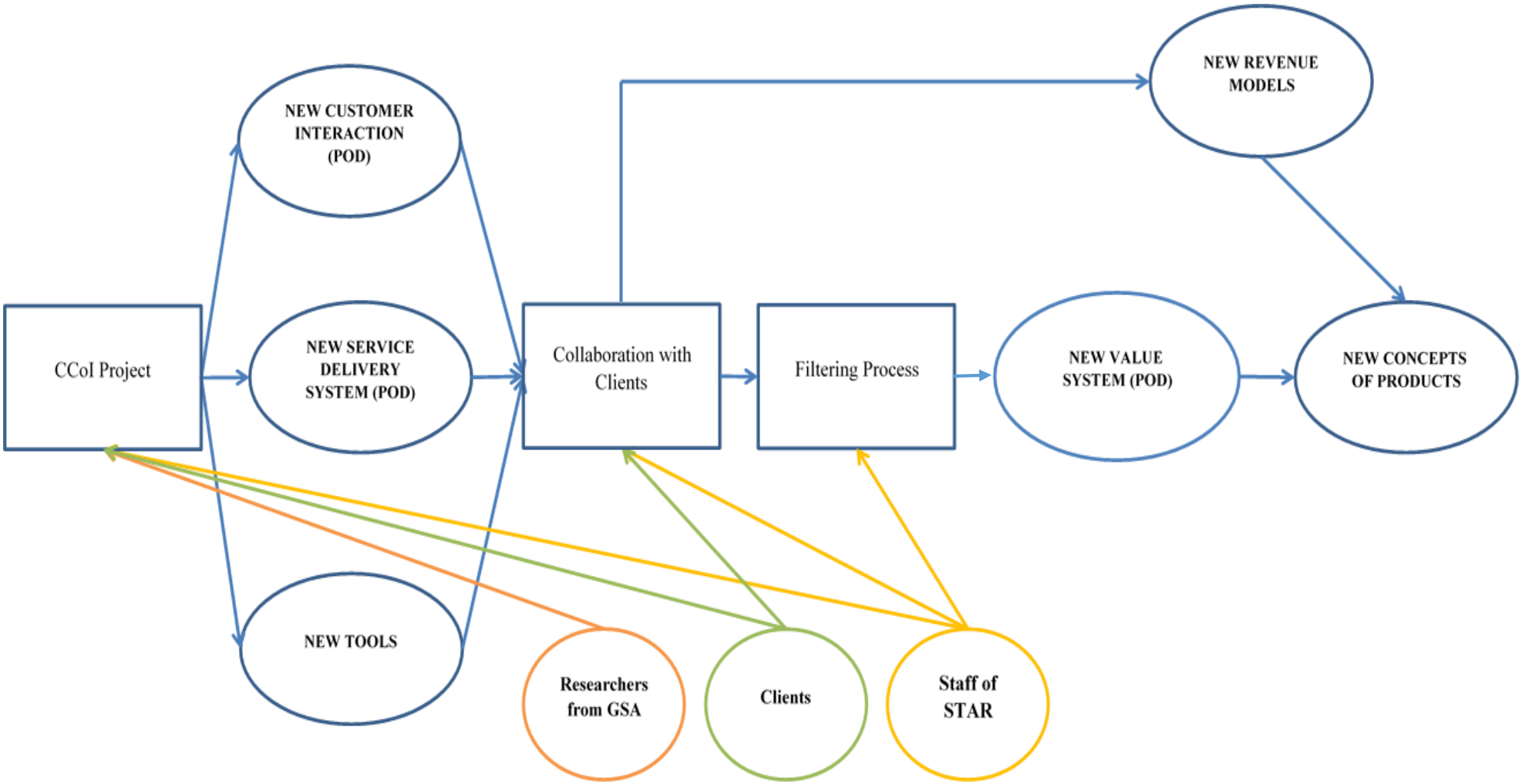

Figure 4-11: Relationships between Dimensions of Service Innovation in STAR and Key Contributors

Based on the data from the CEO of STAR, as Table 4-1 demonstrates, the following points about the service innovation are highlighted from the findings:

1) As a manufacturer in the business-to-business sector, STAR provides technical solutions, in the form of textile products, to clients. The process of developing solutions is collaboration between the clients and the staff. The company is organised according to product clusters. Staff across departments and layers of management are allocated to individual cases to find a solution with the client;
2) The novelty of the solution is subject to the relationship between STAR and the clients: the long-term relationship leads to more stable collaboration but less innovative products, but short-term clients contribute 80% of sales. Short-term relationships enable STAR to be more proactive and collaborative not in product development, but rather in innovative solutions. POD functions not only as a place for communicating and building new relationships with clients, but also a *milieu* where staff exchange knowledge about new opportunities. Therefore, a knowledge exchange process is identified between staff and clients for solution development;
3) Regarding the technical dimension as a service deliverer, STAR are involved in the development of solutions: a knowledge exchange process inside the company exists;
4) POD is identified as a *milieu* for the process of knowledge exchange, both between staff and clients and among the staff inside the company. By expanding the culture and work practices of CCoI to the rest of the organisation, POD has reformed the company in terms of its way of working, the relationship between staff and departments, and the culture of the organisation. Therefore, POD is recognised as new service delivery system. In summary, the following changes and advantages POD brought to the company were highlighted by CEO of STAR:
    a) POD brings together departments that used to be independent;
    b) POD provides a platform for staff from different backgrounds to contribute both their professional and informal knowledge, explicitly and equally;
    c) POD, as highlighted in the focus groups, imbeds the strategic pursuits of the company in all employees by engaging with them (KESFG-7);
    d) POD transformed the company to being market-oriented, with top management and all departments as facilitators;
    e) POD reforms the manufacturing company into a service-focused business;
    f) POD involves clients and staff in the process of solution-development;

5) A new value system was not identified in STAR as an external network for delivering service (den Hertog *et al.*, 2010). However, considering the nature of its collaboration and the combination of the capabilities of various stakeholders for developing and delivering new services, POD was identified as a new value system, which engages staff to contribute their abilities and creativity to developing and delivering solutions with clients;
6) STAR uses cost sharing as a way of establishing and managing its relationship with clients. Specifically, costs of products in the early stage of development are borne by STAR to convince potential clients of the value. The cost of the products that result from collaboration with clients is shared as soon as the commercial relationship has been established. This is not only for financial reasons, but also for long term management of the client relationship;
7) The POD system is identified as a new service delivery system. It is not only a legacy of what was achieved within CCoI, but also a place where other dimensions of service innovation, such as new customer interaction, new product concepts, and new cost sharing models were created and developed. POD provides a platform for the communication and process of knowledge exchange, thus engaging the stakeholders;
8) Regarding the technological dimension of the service innovation, ICT is not intensively employed in STAR for innovation or knowledge exchange. However, design tools as a part of the CCoI project were introduced by the GSA researchers and were accepted, practiced and adapted *per* the requirements of the company. These tools were preserved as a part of POD after the project was closed.

Figure 4-11 illustrates that the collaboration with the GSA in the CCoI project is a starting point of the development of the other dimensions of service innovation. POD as a new service delivery system and a place for customer's interaction is a legacy that CCoI left to the company after the pilot was completed. Design tools adopted by STAR as a part of POD were introduced by the GSA and were developed together.

The new service delivery in STAR, or POD, functions as a platform on which they interact with customers and with staff, and finally in a collaborative way to create new solutions.

The following discussion will focus on how the design thinking enables the staff of STAR through CCoI to exchange knowledge, and eventually undertake innovation in service by the six dimensions identified above.

4.2.3 Results about Knowledge Exchange in STAR

4.2.3.1 Profiles of the participants

A focus group was organised with the help of CEO of STAR. Four people participated and they represented the different departments and responsibilities within the company, and were key contributors to the dimensions of service innovation. Questions, which can be found in Appendix 1, were developed based on the interview. The aim of the focus group was to respond to the research questions about knowledge exchange and service innovation and how it is made possible by the design thinking. Profiles of the participants are described in Table 3-3.

4.2.3.2 Discussion on Service Innovation

Questions are semi-structured covering the six dimensions of service innovation identified from the interview. Moreover, service innovation was also discussed to confirm and complement the results of the interview with CEO of STAR. Discussions and debates were encouraged to gather data objectively.

The discussions focused on new solutions, value systems, delivery system and technology, whereas new customer interaction was hardly touched upon and new revenue model was not mentioned.

The participants, by describing how they create, process and implement service innovation, confirmed what was revealed by CEO of STAR about new solutions (NSS11, NSS12, NSS14, NSS15), customer interaction (NSS14, NSS15), value systems (NSS13), service delivery systems (NSS14) and technologies (NSS14, NSS16).

The idea for a new product is created collaboratively by the staff and clients of the company in POD, with the assistance of design tools introduced by the GSA (NSS14). This is described by POD Manager:

> *'POD Manager: We find the customers ourselves, and we basically have a brainstorm session with them. (BG: With the clients?), yes. So we define like a couple of their products … We would just generate the ideas with them, and we have got a number of tools from the GSA that help us generate ideas and also, when it comes towards the end of like brainstorm session, select the ideas that are the best.'* (NSS14)

In addition to collaboration with clients, the Marketing Director indicated that staff also contribute to the creation of new product concepts (NSS11):

> *'Marketing Director: So we would both come and generate some ideas, but at the same time it doesn't always need to be a customer's lead; it can be something POD Manager thinks, or Marketing Assistance thinks…and they would then bring this to the POD.'* (NSS11)

Similarly, the sources of the new product concepts, as the Marketing Director indicated, are various, spanning the personal experience of everybody from the staff to suppliers:

> *'BG: How do you identify the unrequired products, or in other words, innovative things?*
>
> *Marketing Director: A lot is to be researched; different people in the company would do, by going to exhibitions, networking events… also by speaking to your customers, '*
>
> *Marketing Director: …We don't do (market research) ourselves. We will get technical people involved in the visits to market or exhibitions where there is an expert person interested in something that we are currently doing. Neither have we got the POD structure very much focused. It's anything to do with composites: for me it's just looking at the things that Produce Development Assistance be related to. You need to get to speak to these people and find out what they are great at, what they want from a product that (they) can't get on the market at the moment; that's when the gap starts to become noticeable.'* (NSS11)

The process begins with a brainstorming session with the clients in POD. Tools from the GSA were applied to visualising and generating ideas (NSS14). As soon as the POD manager finds that they need professional assistance to develop an idea, she/he will invite experts from the office area to join them in the process:

> *'Marketing Director: …So if I was in the market, and saw an opportunity and I felt that it would be beneficial to have Produce Development Assistance from concepts development to take part in a brainstorm session with the team of my POD, or if I was the lead to look at, from the technical side, (POD Manager: yes) POD Manager could come into my meetings; we will set meetings; we will look at that specific opportunity, and get involved with composite POD discussion.'* (NSS14)

The filtering process mentioned by CEO of STAR in NSS4, to select the best idea was also highlighted in the focus group by POD Manager and Marketing Director (NSS12). The process is democratic since each participant votes with three dots, and the idea with the most votes will be implemented (NSS14):

'POD Manager: …when it comes towards the end of brainstorm session to select the ideas that are the best and having proved a really good one is a topography (Marketing Director: Yes) is when you have lots of ideas, and you basically give each person 3 dots spend, and then you put a dot to that idea they think the best. So they will end up with two or three dots for what is the best idea. You've generated them in a democratic way.' (NSS14)

'POD Manager: …I mean that there might be like four/five ideas that come out of the meeting but we wouldn't have the capacity and the time to develop all… we just take them to next step and then at the next step you will narrow it down a little bit further and in the end; we might have two or three ideas to take forwards.' (NSS12)

The dimension of new customer interaction was also discussed by Marketing Director and POD Manager in the focus group (NSS11). POD was recognised as a place where the staff and the clients interact, with the POD manager being intermediary (NSS15):

'Marketing Director: It (POD) can be a mixture of both. So some products of redevelopment, developing at the moment in the concept POD, are, products that customers said, 'we need you to change that, we need you to do something like this.' (NSS11)

*'POD Manager.: Also as a manager you basically do everything: you (Produce Development Assistance) will be involved in the development, and you will be involved in the marketing, you will be involved in the market research, you will be involved in finding the best materials, you (Produce Development Assistance) will be involved in the selling product to the market, you will be involved in speaking to the customers… So, there are so many contexts.' (*NSS15)

The focus group also underlined the statement made by CEO of STAR that partnerships with clients are constructed according to their size, turnover, quality, credit, and need for the products (NSS13).

'Marketing Director: Depending on the strategy you are looking at. It could be: are we going to be after a market leader or are we going to be after size of company, turnover, quality of customer, and how much they will pay on time, what's the classic position, or sort of kind setting … (POD Manager: the empathy?) the empathy, we are speaking to certain companies, we are speaking to decision makers. (Laugh).

Produce Development Assistance: I think they vary so much doesn't it? It depends on what you are working on at the time.

Marketing Director: Yeah. Even, you know, what's the type of detail you get from different customers, whom you are learning most from, who seems more keen on your products… it does a whole, but that, lot of that, fits in to the filter's talking about the CRM what we call madness filter.

> *Marketing Director: Yeah, I think it's empathy …the customer basis you gain, the soft side of things. I find that the meetings with us have been an hour to see the potential of a client with, like the director, we will feel that empathy together. Then you work out how you will read that, potential business and opportunity.'* (NSS13)

Moreover, they also discussed the collaboration between STAR and the GSA in the creation of innovative culture and design tools, noting the introduction of the design tools and the rationale for the intervention: to help businesses improve their performance and efficiency in operations (NSS16).

> *'Marketing Director: …so there was already a link there with GSA which Produce Development Assistance just become aware of the intention to start working with businesses to implement culture of innovation which supports things like what we were looking to try, new product development, new product production, but also how to use the design-based tools, even looking at process to improve efficiency of organisation. So for me that was really the pivotal point of how STAR really started to change as a company. (Others: Yeah).'* (NSS16)

The new delivery system identified in the interview, or POD, was described by the participants, such as Marketing Director and Produce Development Assistance, as a platform that engages the members of the organisation equally with weekly or monthly meetings for contributing and exchanging their opinions openly (NSS15). Further, POD was also described as a place where the team of STAR work with clients to create new of product concepts (NSS15).

> *'Produce Development Assistance: I think, (POD is) not just a typical office staff room. In the POD we have machine operators and heads of production. They bring lot of the knowledge not only about the equipment, but as well as general knowledge about the market, (which is) really valuable.'*
>
> *Marketing Director: It (the new ideas) can be a mixture of both (from the staff and from the customers). For example, composite POD is working on the fairly retired product, and that wasn't customer requested that but with we identified ourselves that patent was due to expire and there is an opening for something like that.'* (NSS15)

Finally, the role of POD as a market-focused unit with the POD leader being both a salesperson and intermediary between the company and the clients, as CEO of STAR described, was confirmed by Marketing Director (NSS11):

> *'Marketing Director: … I work underneath the POD director. So both of us are effectively salespeople for that POD, so we would both come and generate some ideas, but at the same time it doesn't always need to be a customer's lead, it can*

be something POD Manager thinks, or Marketing Assistance thinks. That's a completely new area, and all could be that, as a technical person within the department has a new idea to improve a customer's products and they would then bring this to the POD (NSS11).'

Participants to the focus group did not mention the application of ICT, but they did mention the design tools introduced by GSA for visualising the business process and creating innovative culture (NSS16).

The following paragraphs present the findings from the focus group about how knowledge is exchanged in STAR to support the service innovation identified above.

4.2.3.3 Knowledge Exchange for New solutions

The various actors who contribute to the creation of new solutions in STAR can be categorised into two groups: external and internal actors. External include clients and institutes such as the GSA. Internal actors are staff, the members of POD and participants of the pilot group of CCoI. The process of solution development, from generation to implementation, takes place primarily in POD. As described above, POD is a hub between clients and the company, as well as a platform for knowledge exchange. For this reason, discussion in the focus group about the development of new solutions concentrated on how staff exchange knowledge in POD.

Solutions provided by STAR are developed through collaboration between the clients and the staff. Under the disciplines of design thinking, the process begins with a brainstorm session between the POD members and the clients to identify problems (KES7). Typically, a client is, as POD Manager stated, invited to a POD meeting area and members across the company are invited from the office area to join the process.

However, the involvement of clients in the process of new idea generation, as stated by Marketing Director, and agreed by all participants, does not mean the new product concepts always come from the clients. The new product concepts could also come from the staff of the company based on their knowledge and experiences (KES5):

'Marketing Director: what we have as a POD team is generally a set team in place. So they would have, weekly meetings, monthly meetings, depending on what happens in that POD at the moment. But what you can also find is to say something new you come up with.

> *POD Manager: and also because everybody feels responsible for the team, they are really more involved in how the businesses are actually doing. (All agreed)'* (KES5)

In STAR, members of staff are involved in regular POD meetings to exchange their ideas (KES5). Characteristics of the process in POD, such as the informality and equality, were highlighted by the participants, as in contrast to their previous way of organising (KES5).

> *'Marketing Director: (it) is almost an equal platform…*
>
> *Produce Development Assistance: I think I also feel in that way because the owner of the company, there was a time as when I was first said to him,) , he was one of the best laughs ever, we have a great conversation cause we are both equal. We've got a very great relationship bounding each other and it's really nice because you have no scares.'*
>
> *'BG: Is this very informal before POD was introduced?*
>
> *Marketing Director: It was formal, (ALL: Yeah).*
>
> *Marketing Assistance: When I join the company I can really see how it is to be an innovative structure because it was informal; you just speak what you manage to. Everybody has got the same level input. So that was great contributions from everybody there across the board because there were some really good strong relationships formed.' (*KES5)

These ideas, as described by both CEO of STAR and the participants of the focus group, are visualised with design tools, which renders the whole process straightforward, clear and understandable to everyone (KES7, KES1).

> *'Marketing Director: … We generated the ideas with them* (researchers from the GSA)*, and we have got a number of tools from the GSA that help us generate ideas and also, when it comes towards the end of like brainstorm session, select the ideas that are the best and which have been proved a really good one is a topography (MQ: Yes).'* (KES7)

Ideas about new solutions, as the Marketing Director and Produce Development Assistant stated, come from not only the professional areas of the staff, but from any other sources that the participants believe to be valuable (KES7). The brainstorming session, described by CEO of STAR, is followed by a filtering process, and all these ideas are compared against a set of criteria to select the best and most feasible solution (KES4). The process of selection involves staff from different backgrounds, and it allows them to comment and vote. The idea that reaches the end of the process will be implemented and the rejected ideas will be put aside for annual review (KES4).

> *'CEO of STAR: It's very visual, there is no hiding (BG: And efficient). Yes, because people go with that. At the end, if we have finished product, what we do here is, with each of these elements (draw on the board), you know you have an idea. If you look at it, just every single new product production process, but in eight stage processes, or the nine-stage process, you have probably learned few of them. You are going to have to make this product, you then hold up on the products, that the dead should be strangled quite early on. But because you've got process you need forward the process. What we see is, this is an 8 stage-process. But we build the stage up, almost like a Lego. But if on the second stage you don't get there, you stop. And we've killed there already (pointing to the other board with three yellow stickers on), at the early stage. So we could fill fast at least. But filling fast is not of doing something, it's 'do it' and 'learn from it'; if it does not work, kill it, and move on to something new. So we don't have an 8 stage process for every single thing. We have an 8-stage process for the things succeed, some of them might fail it, by five, so we have the people work to get there, but no more, we don't have any more people work on it when it's killed. And then every year, we review all the failures for why it failed. That's why we keep that, all year, for a good lesson to learn. And we revisit the whole process.'* (KES4)

The knowledge exchange behind the development of new solutions, including the key events and participants are demonstrated in Figure 4-12. Relationships between the events and the participants, as well as CCoI are highlighted.

From Figure 4-12, four key actors are identified as influencing the process of knowledge exchange in POD for developing new solutions:

1) Clients and staff are the influencers that directly participate in the knowledge exchange taking place in POD;
2) The POD manager plays the role of organiser and opportunity detector, who is responsible for identifying the problems from the point of view of clients and engaging the staff of the company.

The process of knowledge exchange, as Figure 4-12 demonstrates, is composed of two phases: the phase of idea generation, which engages the staff, clients and POD manager in identifying opportunities; and the phase of filtering, which involves staff from across the company in choosing the most feasible solutions.

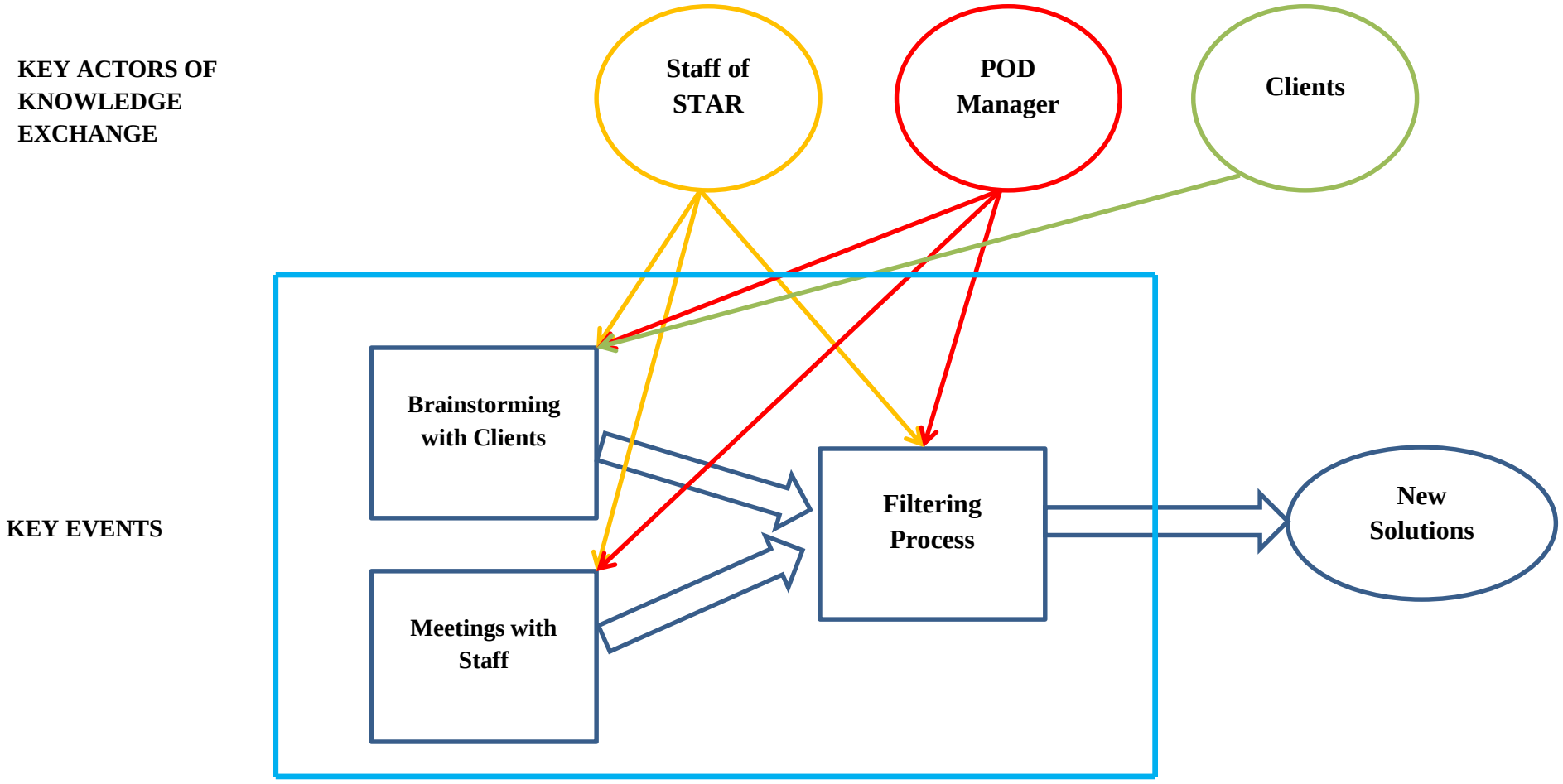

Figure 4-12: Knowledge Exchange for New Solutions in STAR

4.2.3.4 Knowledge Exchange for New Customer Interaction

POD not only incubates the solutions but also provides a place for customer interaction. Each POD section is assigned to one product cluster of STAR. Such a structure enables the company to individualise the solutions by directly interacting with clients. Compared to the situation before POD was created, when clients of STAR were managed by an independent marketing department, the customer interaction in POD is more efficient in the following ways:

Firstly, POD is segmented not by the functions of the company but by product clusters. Clients are invited to POD according to the cluster of products they require. Acting as sales person for the product cluster, as stated by Marketing Director, the POD manager finds the clients and builds contacts (KES7). Therefore, the interaction between the company and client, as noted by the focus group, is initiated and organised by the POD manager to collaborate and create solutions.

> *'BG: Who built the contact with clients in the beginning?*
> *Marketing Director: We don't move from POD to POD. So at the moment, Produce Development Assistance, as the director of the fabric technology POD, is the person that goes out and gains her new contacts. And I work underneath the POD director, so both of us are effectively salespeople for that POD, so we would both come and generate some ideas…*
> *POD Manager: We find the customers ourselves, and we basically had a brainstorm session with them. (BG: With the clients?) Yes. So we define like couple of them like Produce Development Assistance their product … We would just generate the ideas with them.'* (KES7)

Secondly, opportunities for building relationships with clients are identified, developed, and managed by the members of POD collaboratively. Members of the organisation exchange knowledge from their perspectives to identify and evaluate the opportunity before the interaction is initiated (KES7).

The knowledge exchange dimension of new customer interaction is demonstrated in Figure 4-13. Relationships between the events and the participants, as well as the projects of CCoI that influence the knowledge exchange, are highlighted.

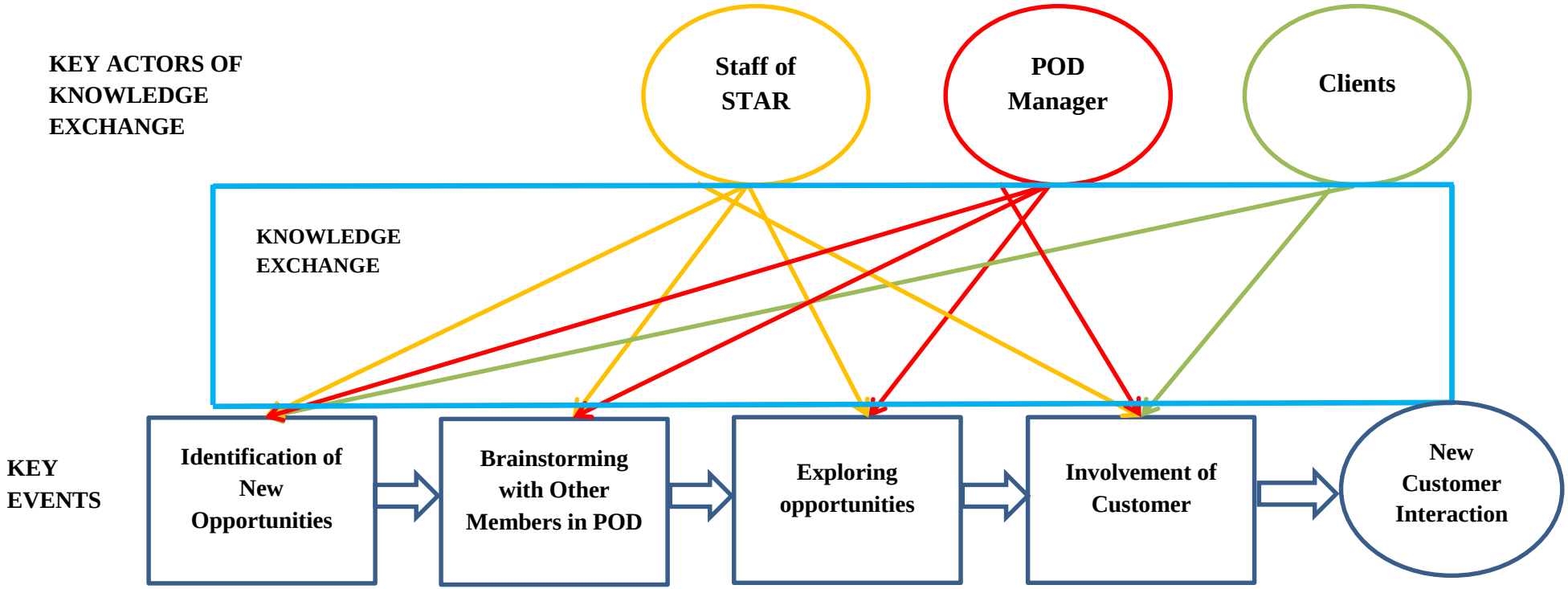

Figure 4-13: Knowledge Exchange for New Interaction with Customer in STAR

4.2.3.5 Knowledge Exchange for New Value System

The new value system, which is defined as the external partnership to which the company provides services (den Hertog *et al.*, 2010), was not identified in STAR. However, as it is discussed in 4.2.2, POD is recognised as a combination of staff that brings together their functions and capabilities to develop and deliver new solutions. For this reason, the study of knowledge exchange for the new value system is focused on the internal network that engages key actors.

The partnership with GSA was inspired, determined and managed by the new top management before a POD was created. It was CEO of STAR that realised the necessity of changing the company, and brought in the team from GSA:

> *'Marketing Director: We really had to look at how we were operating as a business and how we would change that through the connections we had. With the director coming in five years ago as chairman, he had previously been chair of Glasgow School of Art, so there was already a link there with GSA and he was aware of the intention to start working with businesses to implement culture of innovation... when CEO of STAR came it (the problem in the company) was really highlighted. It felt that our sales of our existent products were in decline, we thought it was a sign of recession but it was not, and we needed to react to that.'* (NSS12)

Therefore, the top-down process for establishing the partnership with GSA, which preceded the creation of POD, was different from the bottom-up process that takes place in POD for generating and filtering new solutions.

The process of knowledge exchange in partnership with the GSA as new value system is demonstrated in Figure 4-14. Relationships between the events and the participants, as well as CCoI that influences knowledge exchange, are highlighted in the frame. It is noteworthy that, as well as the staff and the researchers from the GSA, the pilot group of CCoI also involved the top management, namely CEO of STAR, who played critical roles in engaging other actors. Such engagement of the top management, according to the evaluation made by Johnson (2015) of the project, played a critical role in generalising the success across the organisation.

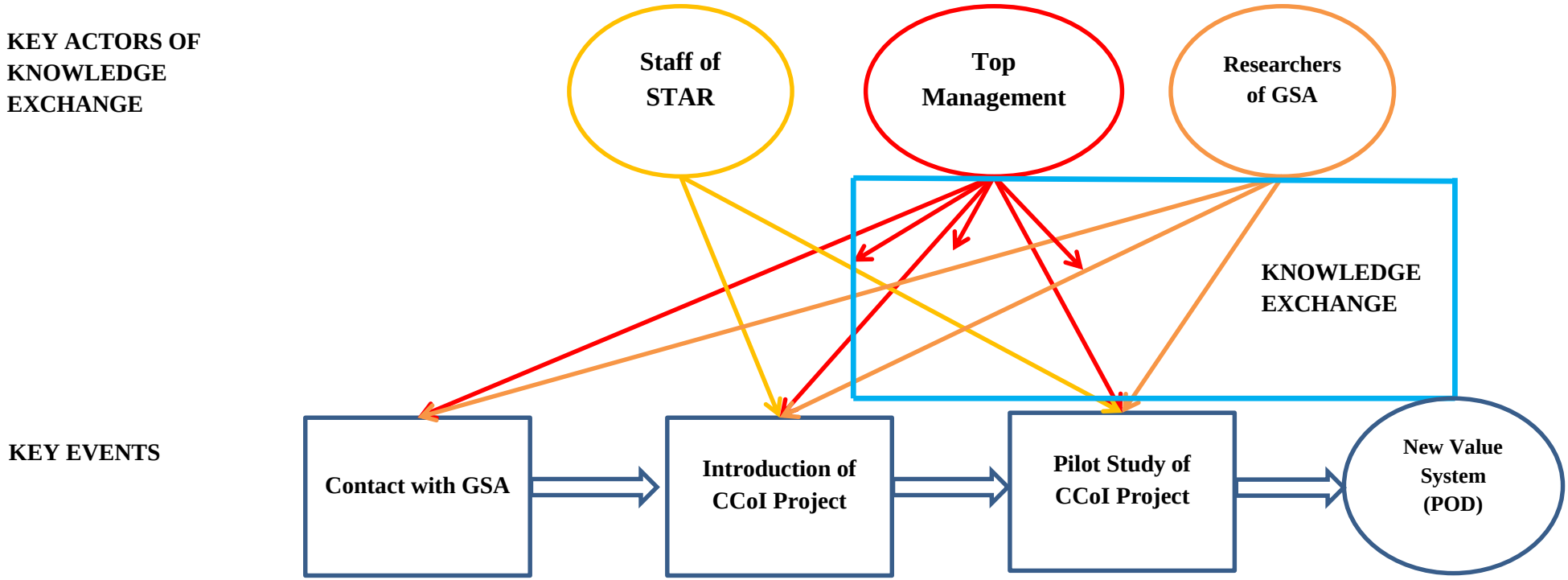

Figure 4-14: Knowledge Exchange for Partnership with Glasgow School of Art as New Value System in STAR

4.2.3.6 Knowledge Exchange for New Delivery System

POD, which is recognised as a new service delivery system in 4.2.2., was described by the participants of the focus group as an unexpected result of CCoI. The project aimed at enhancing the operational performance of the SMEs by implementing a design thinking, as Lockwood *et al.* (2012) noted. Results from both the interview with CEO of STAR and the focus group confirmed that both POD and design tools were directly derived from the CCoI intervention. Tracing how POD came about in STAR, the following paragraph will discuss the process of knowledge exchange behind it.

The new service delivery system identified in the interview with CEO of STAR is POD. The idea of this system, as stated by Marketing Director and POD Manager, came from the CCoI intervention (KES6).

> *'Marketing Director: I think … there were 12 individuals selected from all of these organisations. We've got through the design councils' double diamond modal and looked at how the design-based tools could be used. So, for me that was the start of the movement (POD Manager: THE START), to what then became a POD structure (Agreed by POD Manager).*
>
> *POD Manager: With that start, which was not supposed to be on our own in the right beginning it was going to end up as a POD situation (Produce Development Assistance: We didn't know what's going to happen really (laugh).) Yeah, that was a part of the process, because it was such an obscure mix of people.'* (KES6)

The intervention, as stated by Marketing Director, was introduced by the new chairman. Both top management and the participants welcomed the intervention. Members of the focus group were excited when the topic of discussion moved to POD. The new CEO and the participants, as CEO of STAR and Marketing Director admitted, realised that declining performances were hidden by a satisfactory financial status (KES3, NSS12), which justified the introduction of CCoI to bring about change.

> *'CEO of STAR: We have been in a situation where the products we did for years had been very good for us in terms of profitability; so we had money in the bag and they were still continuing to come through; so we'd go into this way of working, whereas it wasn't being productive, wasn't having solutions in the end of it, but we still had the money in the bag, so everything was okay.'* (KES3)
>
> *'Marketing Director: We are traditional textile organisation. We had a number of products, which were working as a kind of our cash cows we developed them years ago, they were nice to us and the decline hidden behind was not noticed. So*

for me that was really the pivotal point of how STAR really started to change as a company (Others: Yeah)' (NSS12)

As stated by the participants, the process of knowledge exchange, taking place in an open and interactive environment created by CCoI, was innovative, passionate and engaging. Participants were selected from different departments and layers of management to form a team. Studio-like environments enabled participants to exhibit and exchange their opinions in an open, equal, relaxing and interactive fashion. All those features were incorporated into POD system (KES6).

'Marketing Director: I think that you go back to the NOW team that we didn't have before. It was about people working as a team. Quickly we saw benefits of that. We had a cross-functional team; so when we started to use tools to generate ideas, it was clearly seen in the benefits of cross-functional working how the ideas came through so much quicker, and also the skills identified that won't be aware we had, and that also aided us in terms of moving people through the organisation who might not have otherwise, because we were able to work as a team and use tools. People had the equal inputs, and equal see, and that was probably the first time in our organisation really felt that it was the team. And that is being a key part of our POD structure now: it is based on that. We were working like studio environment; we were writing on the walls, we were using posters and a lot of those kind of things we've now grow in the POD structure too.

POD Manager: We had to work as a team to say how we were going to do that (Also said Marketing Director).' (KES6)

In the past, as the Marketing Director noted, the company was divided into departments, each focusing on its own business and assignments, without integrated knowledge or awareness of each other or the entire corporation. For instance, as stated by the Marketing Director, the marketing department focused only on customer management and promotions and the members rarely exchanged opinions with staff from other departments. The silos effect, resulting from separated organisation, eventually prohibited staff from holistically understanding their business and the general corporate strategy (NSS13):

'Marketing Director: I've been in the company for 12 years now. If I think back of how things were, we operated from two different sides; we worked to our own departments; and you didn't really speak to many people with that department, or in the same building there's another department. You should learn more but, for me you know, I was in sales and marketing departments and it does not have the site here, and we had development done here; you were working in that department but the department was not linked anyway. There was no clear strategy for the organisation in terms of where we will be going and there was lack of decisions happening as well.' (NSS13)

Meetings in the company before POD was introduced, however, were formally organised, as Marketing Director stated, neither creative nor strategic (NSS13):

> *'Marketing Director: And the meeting was very formal; it was in formal meeting room environment: there was no action really coming out of the meetings. There was nothing clear or defined in terms of what we will look at what we are moving to, that obviously was then the results, there are nothing coming through the organisation (laugh).'* (NSS13)

The CCoI intervention apparently changed this 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 Marketing Director and POD Manager, 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) were 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 the relationships formed which I think helped the transition of moving, from (previous organisation of STAR) to the POD system, so that was great contributions from everybody there across the board because there were some really good strong relationships formed.'* (KES6)

The process of knowledge exchange for new service delivery system is illustrated in Figure 4-15. The process of knowledge exchange for this dimension is traced back to the process, namely CCoI, which is unrelated to the business of the company. The key contributors to this process, with the staff being the exception, were not engaged in the knowledge exchange process for the creation of new solutions.

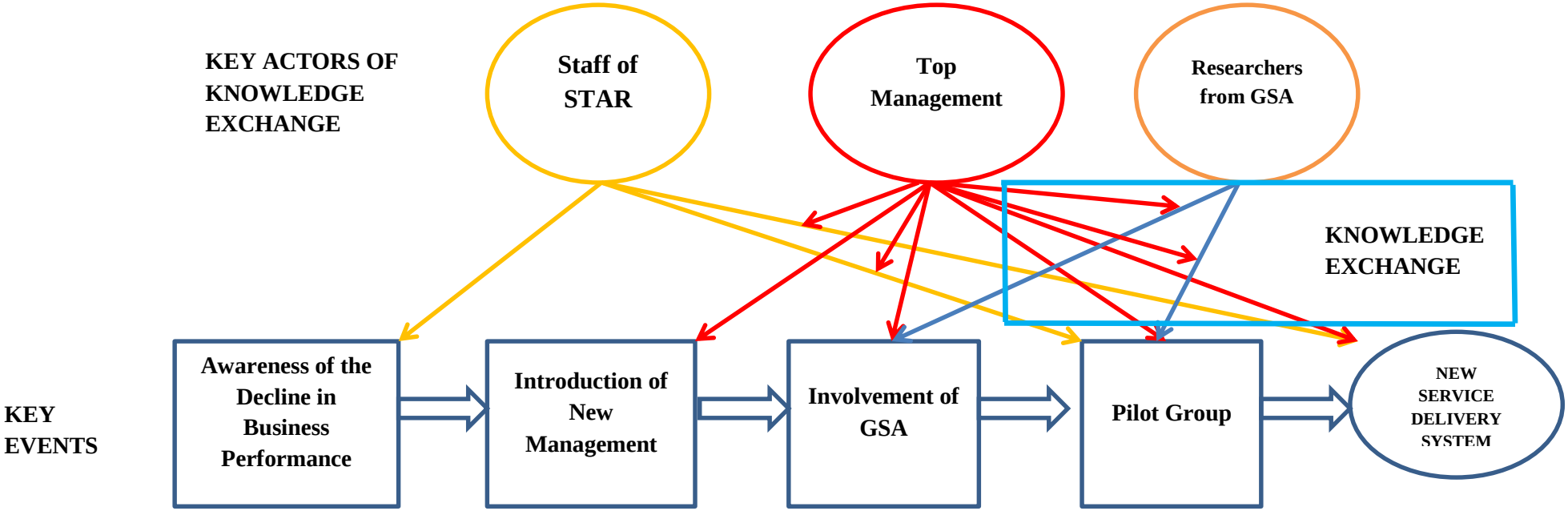

Figure 4-15: The knowledge exchange for New Service Delivery System in STAR

4.2.3.7 Knowledge Exchange for New Delivery System (New Technologies)

Finally, the GSA introduced and applied design tools in the organisation through CCoI. Both the researchers from the GSA and the staff of STAR described these tools as 'conceptual', and 'visualising'. Those tools were created and adapted by implementing disciplines employed by the GSA. Introduction of these tools as well as the training of the staff was interactive. However, regarding information technology, none of the members of the focus group mentioned or raised any example of its implementation. This is in line with the description given by CEO of STAR that ICT is not extensively applied to boosting their services but for exhibition.

The knowledge exchange for new service delivery system (technology) in STAR is demonstrated in Figure 4-16. Relationships between the events and the participants, as well as CCoI that influence the knowledge exchange, are highlighted. The process of knowledge exchange for POD and the design tools duplicated: principles of design thinking and tools were introduced by the GSA and modified in collaboration with the participants of CCoI and eventually incorporated into POD as service deliverer.

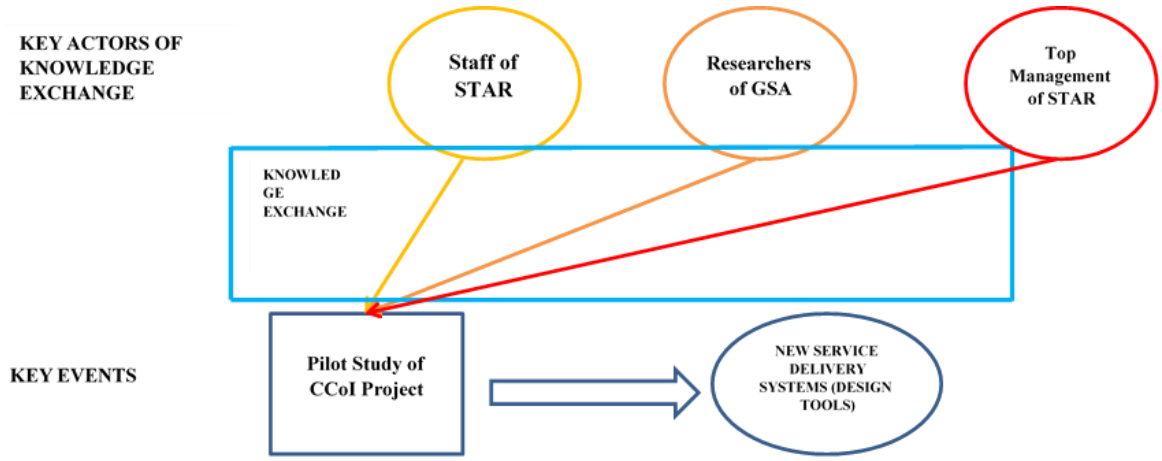

Figure 4-16: The knowledge exchange for New Service Delivery System (New Technology) in STAR

4.2.3.8 Summary of Knowledge Exchange in STAR for Service Innovation

Based on the data above, the process of knowledge exchange for service innovation in STAR is demonstrated in Figure 4-17.

Two phases of knowledge exchange are identified in STAR for service innovation:

1) The first phase of knowledge exchange takes place in the CCoI pilot, which resulted in the creation of POD as a combination of four dimensions of service innovation. Members of the company and researchers of the GSA were involved in this process of knowledge exchange. This process engaged staff, top managers and the researchers from the GSA. Facilitated by the design thinking and design tools, the staff contributed their knowledge of the company and its products to the process. Researchers and top managers, on the other hand, played the role of organisers;
2) The four dimensions of service innovation, which are incorporated in POD, enabled the second phase of knowledge exchange. The second phase of knowledge exchange happens in two stages. In the first stage, the staff of the company exchange knowledge with customers to co-create new ideas for solutions and new revenue models. In the second stage, staff came together to develop and evaluate those ideas to determine which are most feasible. Researchers from the GSA did not play any role in the second phase. The top management, by contrast to their role in the first phase as organiser, was engaged in the second phase;
3) The second phase of knowledge exchange is made possible by POD. The first phase of knowledge exchange played a critical role in developing the dimensions of a new service delivery system, new customer interaction, and new tools for delivering services, which engaged the customers and the staff with the new value system and new revenue model that eventually led to new solutions as new concept of service.

The next section will look at how the CCoI was conducted in the pilot group, and how it is possible for the company, by implementing the design thinking, to exchange knowledge and innovate in service.

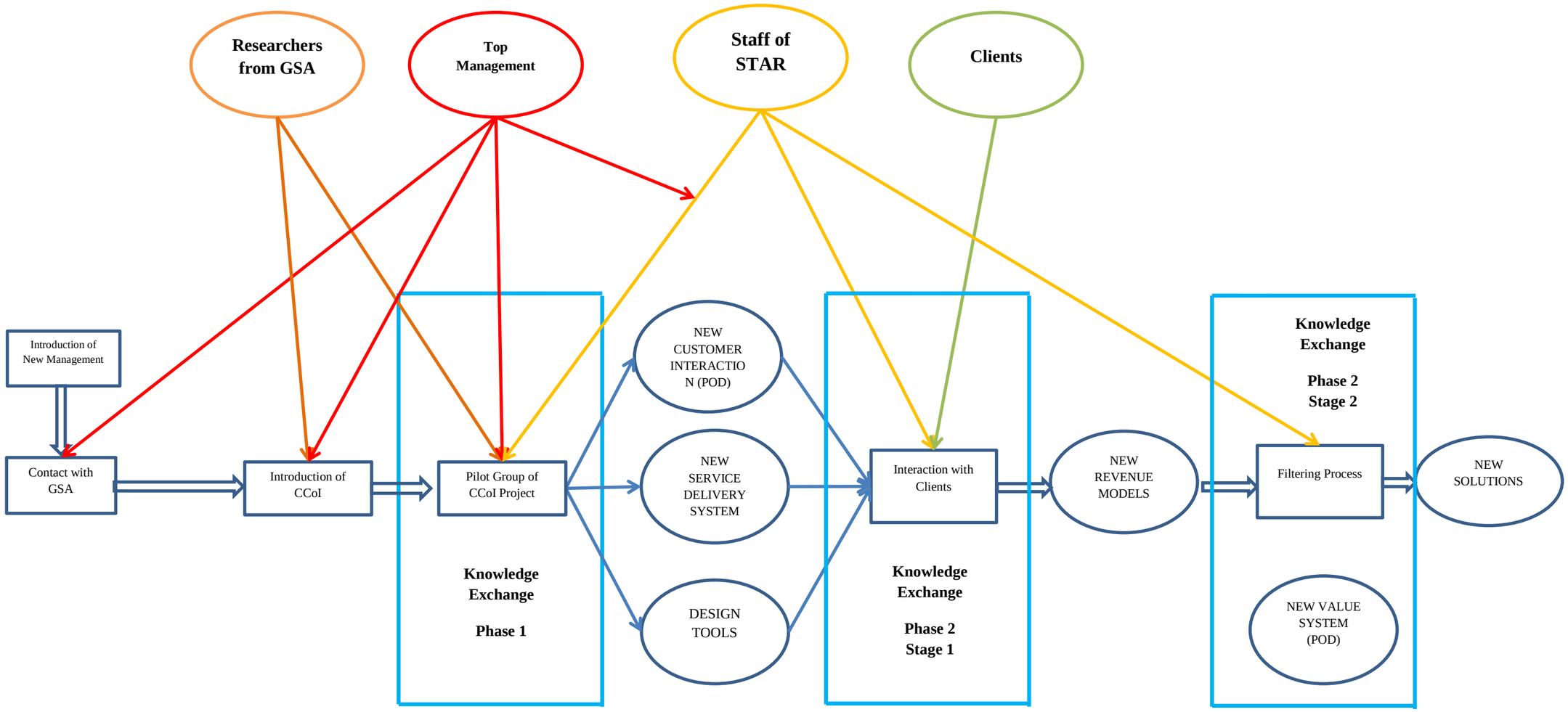

Figure 4-17: Service Innovation, Knowledge Exchange and Intervention of CCoI in STAR

4.2.4 CCoI in STAR

Researchers from the GSA selected 12 members of the company from different departments and layers of management to form a pilot group (Lockwood *et al.*, 2012).

In the beginning, participants were deliberately detached from their everyday work in order that they become familiarised with the design thinking, and its responsibilities and ways of working in their departments (Lockwood *et al.*, 2012). Three examples were cited by the director of the project to illustrate how the researchers engaged the participants with various activities before they developed solutions to their real-life tasks (Lockwood *et al.*, 2012).

1) CCoI stimulated new conversations in STAR to instil an innovative culture and design thinking. Participants were encouraged to develop a common identity, called New Opportunities Within, and engage other members outside the pilot group in the communication. The innovative culture created in the pilot group was extended to the rest of the company and eventually, and unexpectedly, resulted in POD;
2) CCoI enabled the organisation to learn through prototyping. A design workshop called ‘Marble Run’ was conducted in the pilot group to help test the system and diagnose problems. This workshop embedded a risk-taking attitude and organisational learning in the minds of the participants. This process was further inherited by POD;
3) CCoI fostered collaboration across STAR to develop solutions. Design tools were applied to externalise the implicit knowledge of the participants and to share this with other members to build a cross-functional team for solution development. Thus, over 50 new product ideas were created before the project was closed, with 10 of them being implemented. This new way of working was incorporated into POD by transforming a compartmentalised and hierarchised company into a collaborative, flexible and service-oriented structure.

The design thinking introduced by the GSA was implemented in the pilot group temporarily and maintained in the company in the form of POD. This result, as mentioned above, was unanticipated. Moreover, it is noteworthy that after the pilot group, the participants were aware of the importance of service as a new direction for the company, and it became possible for them to innovate in service. This was mentioned by the director of the project:

> *'Before, STAR was like an old Bentley on a journey to somewhere new and exciting it had never been before. With reputation and success in the past, the only problem was we hadn't had a service for a while, we kept running out of fuel and we would take the wrong turning and direction at times. Having had a service, a full tank of fuel and a built-in Sat Nav we are now on the journey with a clear direction ahead. We also have breakdown recovery with supportive tools to help us on our way.'* (Participant of the CCoI project, cited by Lockwood *et al.* (2012))

4.2.5 Summary about the Knowledge Exchange and CCoI

As is demonstrated in Figure 4-17, the other four dimensions, namely the new service delivery system, new customer interaction, new value system and new tools, support the dimension of new service as the solutions developed collaboratively by the staff and their customers. It is noticeable that, though the new value system, which is primarily referred to as the external partners (den Hertog *et al.*, 2010), was not observed in STAR; the same function is fulfilled in POD by combining capabilities of staff into holistic solutions to problems specified for each customer. Therefore, 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. Therefore, to address the research question about how design thinking enables SMEs to exchange knowledge for service innovation, this section will investigate how CCoI took place in STAR, and how the results eventually evolved into POD.

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 for innovative culture; design tools were applied to externalising the implicit knowledge of the participants and enabling 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. Staffs 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) New service delivery system. One of the most remarkable outcomes of the pilot group is POD, which is recognised as a service delivery system. The design thinking that had been practiced 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. POD works as a means to interact with clients, which engages staff from all;
4) The emergence of management awareness that service is a new direction for innovation. STAR was for a long time oriented to work on the development of products and technologies without clear strategy or direction. CCoI not only enabled the company to achieve an in-depth understanding of its potential for innovating, but also uncovered the value of design thinking, by giving it a new vision and perspective for leveraging its current business.

POD as an extension of the pilot group to the rest of the organisation is working as a mechanism that engages all stakeholders, from top management to staff, from clients and other partners in the process of knowledge exchange for one purpose: innovating in services.

Key actors engaged in the process of knowledge exchange for creating the service innovation by six dimensions are displayed in Figure 4-17.

Five groups of people are identified in the data as key contributors to the creation of service innovation in STAR, including top management, staff of STAR, researchers from the GSA, clients and POD manager.

Specifically, top management of STAR, such as CEO, played a critical role in building relationships with the GSA. Moreover, top management's participation in the pilot enabled the researchers from the GSA to effectively motivate the staff to take part and to contribute. The determination of top management to change the culture of the company and implement CCoI was recognised by both the staff and GSA as a critical factor for the success of CCoI in STAR (KES3, KES5).

Researchers from the GSA are recognised to have played roles in introducing, managing and organising CCoI in STAR. They implemented the design thinking, applied design tools in the company and engaged the participants.

Staff of STAR contributed to the process of knowledge exchange in all dimensions of service innovation except for initiating the collaboration with the GSA for CCoI.

Clients are invited to collaborate with the staff of STAR to exchange knowledge so as to develop new ideas for products, customer interactions, and revenue models.

The POD manager works as an intermediary between the staff of STAR and clients.

Knowledge Exchange for Service Innovation	Key Actors
Knowledge Exchange for New Concept of Product	POD Manager, Staff of STAR, Clients
Knowledge Exchange for New Customer Interaction	POD Manager, Staff of STAR, Clients
Knowledge Exchange for New Revenue Model	Top Management, Pod Manager, Staff of STAR, Clients
Knowledge Exchange for New Service Delivery System	Top Management, Researchers of GSA, Staff of STAR
Knowledge Exchange for New Service Delivery (Technology)	Researchers of GSA, Staff of STAR
Knowledge Exchange for New Value System (Partnership with Client)	Top Management, POD Manager
Knowledge Exchange for New Value System (Partnership with GSA)	Top Management, Researchers of GSA

Table 4-2: Participants to the Process of Knowledge Exchange for Service Innovation in STAR

Analyses of data taken from MOON will be displayed in the next section, after which there will be discussion on the results of both cases.

4.3 Case of MOON

4.3.1 The Case Profile

MOON is a textile manufacturer, founded in the 19th century with over 100 employees. The company has four branches. Branch 1 supplying international fashion brands; sharing this site, Branch 2 is an own brand (cashmere products). Branch 3 is a textiles manufacturer. Branch 4, which shares the site with Branch 3, is a supplier of industrial textile products (NSM8, NSM1). The structure of MOON and its businesses is represented in Figure 4-18.

MOON engaged with CCoI in 2014 for 12 months. The design intervention followed the same terms of engagement and principles previously detailed for STAR. Unlike STAR the intervention struggled to expand beyond the initially selected pilot group.

Following the same data collection protocol, the author interviewed the managers of both sites of the company. The original plan, as *per* STAR, was to then conduct focus groups with key contributors, this did not take place. Unfortunately, Branches 2 and 3 were put into administration and further access denied. The author modified the plan and interviewed the researchers from the GSA to collect additional primary data.

As with STAR, the interviews were semi-structured and mirrored the 6-D model of service innovation. Knowledge exchange was examined to discover its relationship with the service innovation. Lastly, the intervention of CCoI in the company was examined to reveal how the design thinking enabled service innovation and knowledge exchange.

Profiles of the interviewees, anonymised, are listed in Table 3-4.

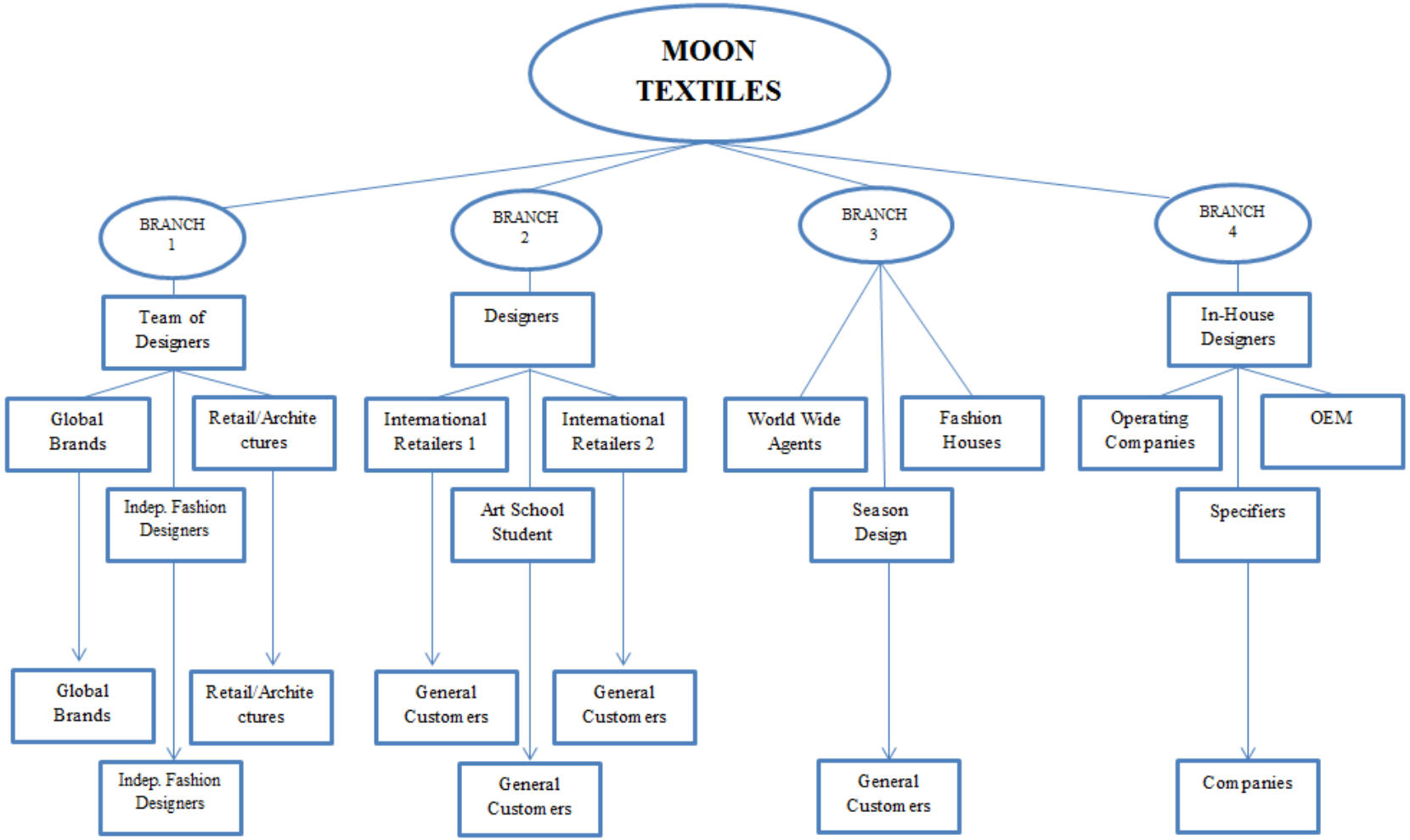

Figure 4-18: The Structure of MOON

4.3.2 Results about the Service Innovation in MOON

4.3.2.1 New Concepts of Service

In contrast to STAR, which is uniformly a business-to-business company, MOON was more complex. Branches 1, 3, and 4 of MOON are primarily business-to-business (B2B), while Branch 2 focuses on retail (NSM8). Branch 1 supplies direct to international fashion brands, whereas 3 and 4 either supply directly to industry or indirectly through intermediaries. The following points about the new concept of service as a dimension of service innovation were identified in the interviews.

As stated by Production Director of MOON, Branch 1 and Branch 2 compose two value streams, international and own brands (NSM8):

> *'Production Director of MOON: So we are effectively designer and manufacturers to create products for global brands. Branch 2 is slightly different proposition because Branch 2 is our own proposition which is about business to consumer.'* (NSM8)

Branch 1 products were described by Production Director of MOON as technical solutions to customers using their designs (NSM10):

> *'Production Director of MOON: …They are, but what's not so simple is how you make something like to be woven, just because something can be drawn on a picture does not mean you can weave it. (BG: So you offer technical support to your clients for this to be realised?) Yes, because not everybody can… You know some of the equipment is not the same, so it's not just a question of saying it's like a photograph, it is not photograph; that is achieved by understanding the weaving process.'* (NSM10)

MOON is essentially a manufacturer. The concepts and designs of the products come directly and exclusively from international brands. The process of interaction with the clients for solutions takes place at a directorial level:

> *'Production Director of MOON: …when we are working with the global brands, we are listening to their view of what they want to create. So they have an intention about what they think their requirement is for…So in this site, we have two roles. We are the manufacturer, and with the brand… But in this one (international fashion brand), the customer is going to (the client's) store, getting the (the client's) experience … There's nothing of the product designed for us. So actually the whole brand experience is not us. What relevant to us, is that we will fulfil the brand experience of what is provided (by the international fashion brand).*

Our only role in that, is to supply for them (BG: To respond to their requirements) to respond them to help them deliver that promise but a consumer in (the client's) environment would not know anything about Branch 1.

BG: Who are involved in this kind of meeting?

Production Director of MOON: Produce Development Assistance be the director, or weaver. If it's for a global brand, it's just the director.' (NSM10)

The process of production for Branch 1 is displayed in Figure 4-19.

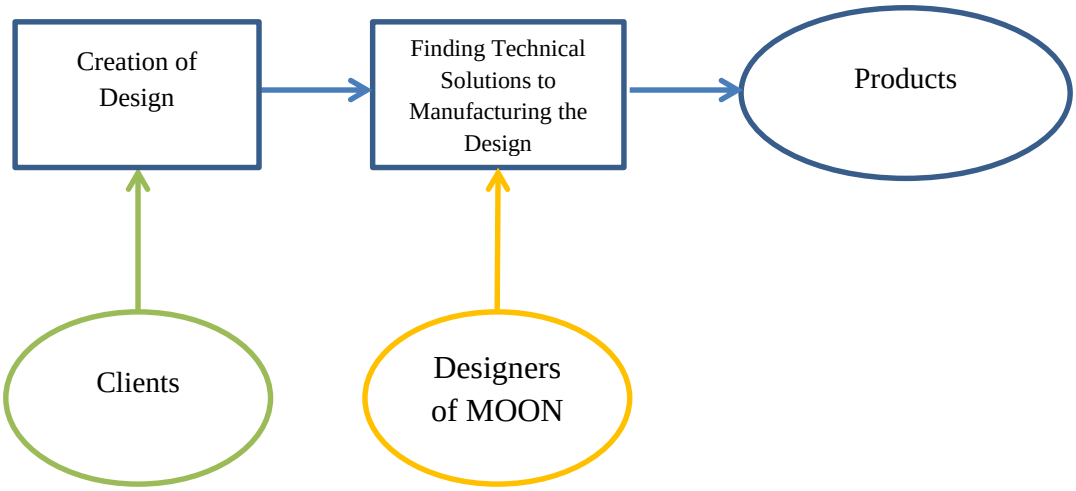

Figure 4-19: Development of Products in Branch 1 of MOON

While Branch 1 responds to the requirements of other brands without influencing design; with Branch 2, MOON directly supplies own design products to end consumers (NSM11).

'Production Director of MOON: On this one (their own brand), we are doing all the manufacture design, but we are also delivering the consumer experience so when somebody order something or get some to post them or have a nice packaging or the gift…then the brand experience is of us.' (NSM11)

The company distributes Branch 2 products directly to retailers. This process is displayed in Figure 4-20.

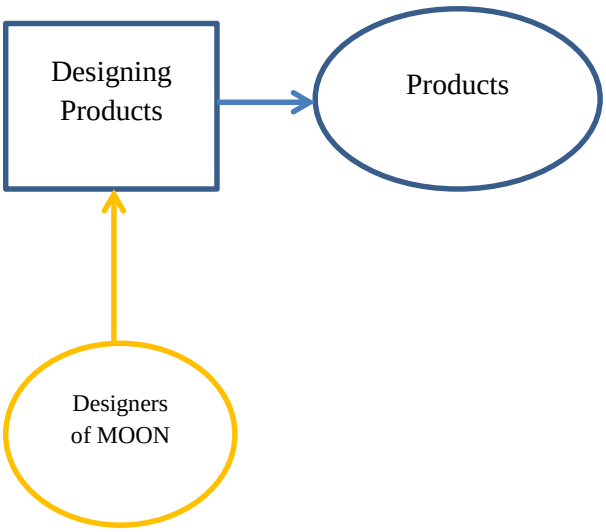

Figure 4-20: Development of Products in Branch 2 of MOON

However, both Branches do not collaborate with consumers to develop solutions. Products of Branch 1 are based on the designs of international brands. On the other hand, the products of Branch 2 rely on the in-house design team (NSM12):

> *'BG: How do you get the knowledge about the sales, the designs of your products?*
>
> *Production Director of MOON: It's judgment. (BG: Who is responsible for this?) Director, director is responsible for our own brand. She is responsible for what we create, and which colour we have for styling, design, how much we make, how much we are going to sell, how do we sell that…she's also responsible for getting the customers so she knows what the (retailors) like, …it's not all facts and figures and data. Fashion is not rational. Because there is a lot of feel. So it's not business perspective because there is going to be a lot of analyses. Probably (it's) more from qualitative understanding or getting groups together or watching consumer's behaviour.'* (NSM12)

There are some unplanned patterns or designs, as Production Director of MOON mentioned (NSM13), which are identified, and evaluated qualitatively by the designers based on their implicit knowledge.

> *'Production Director of MOON: … Sometimes we get fabrics we don't plan to. So with Produce Development Assistance, we make samples. Produce Development Assistance come up with four ideas, so we plan something we think that one, that one, that one (he pointed on the drawing), and that one is good, but sometimes this one is okay. So it can slightly help the process, but somebody thinks that thing is nice, and so it's chosen.*
>
> *BG: But how do you get to know that the unexpected one is good?*

> *Production Director of MOON: that's visual things. So if we go through the fabrics, what do you like? You know what you like; you probably can't articulate exactly why you like it. Because we made them as a by-product of the form we want it. So we make the form we want, we got these ones, so then to show them…but you can't completely understand why. You get to get insights, (BG: That's intuition?) and intuition, but it exactly I can't understand why do people feel the way they feel, and so that's interest of us and we spend time thinking about it, but you don't really know… it's not at all an objective, it's not all qualified, or we defined.'* (NSM13)

The site of MOON provides textile products to business clients directly or through intermediates. Branch 3 provides textiles primarily through agencies. The influence of MOON on the designs is subject to collaboration between MOON and the clients. The earlier they collaborate, as Director of MOON stated, the more MOON can influence the design, and the more innovative the product will be (NSM4).

> *'Director of MOON: We've been able to work with them (the clients) at concept stage, rather than responding to the decision on the concepts. There would probably be variations in the theme, rather than definite different designs. But we would have a great level of design influence. If we are able to influence, the more involvement we have earlier in the process, the better conversion, the better chance we have and secure the order in the end of it, … That's being a really important step for this business to be able to get involved in this designing project at much earlier stage.'* (NSM4)

Generally, creation of new ideas for products at both branches is speculative: MOON creates its products, exhibits samples to the clients in the hope that those clients will favour them (NSM1, NSM2). The process of creating new products in Branch 3 is displayed in Figure 4-21.

> *'Director of MOON: We would design that collection (of Branch 3), the components of that collection, speculatively and then, and then release it, hoping the customers will find designs interesting …'* (NSM2)

> *'Director of MOON: Design process (for Branch 4) is almost exclusively to brief, so there is very little (flexibility). It's more prescriptive to a client's design. So quite often, when we are given with an opportunity to work with those companies, we are matching a fabric design they already have.'* (NSM1)

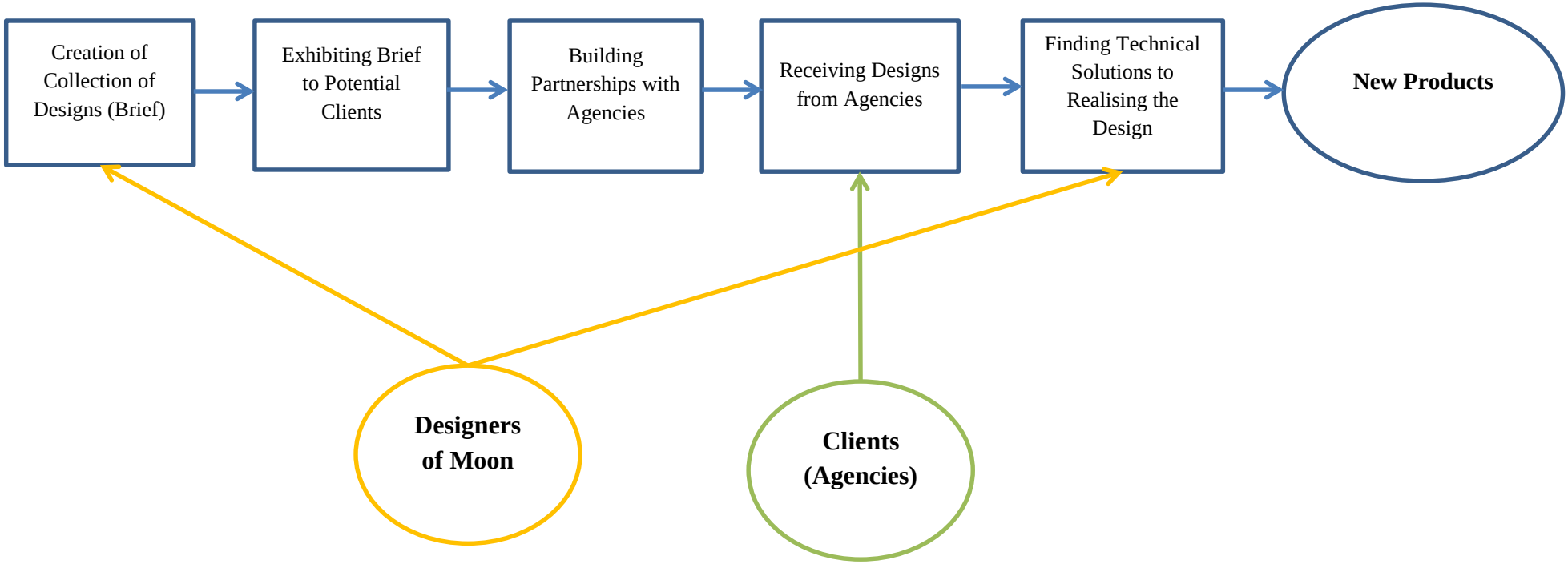

Figure 4-21: Development of Products in Branch 3 of MOON through Agencies

Both branches produce their clients' designs. However, as stated by Director of MOON, a direct relationship with some clients, recently built up through Branch 3, led to less speculation and more collaboration. This was because of mutual understanding and engagement. Such collaboration further resulted in more innovative designs (NSM7). The process is displayed in Figure 4-22.

> *'Director of MOON: However, in recent years we would be able to work more collaboratively with certain customers before releasing a collection (of Branch 3), work more closely and on the bespoke basis with the customer to understand more about what they're trying to achieve, and then Produce Development Assistance be design fabrics specifically for a compensation with a, if a particular field, particular broad design fabric of a particular wide, base colour, or fits of the design. Then we would be less speculative process, more collaborative process and a higher chance of convergence of that sale, that's happening more and more with, I would say, Produce Development Assistance is between half of dozen to a dozen key customers.'* (NSM7)

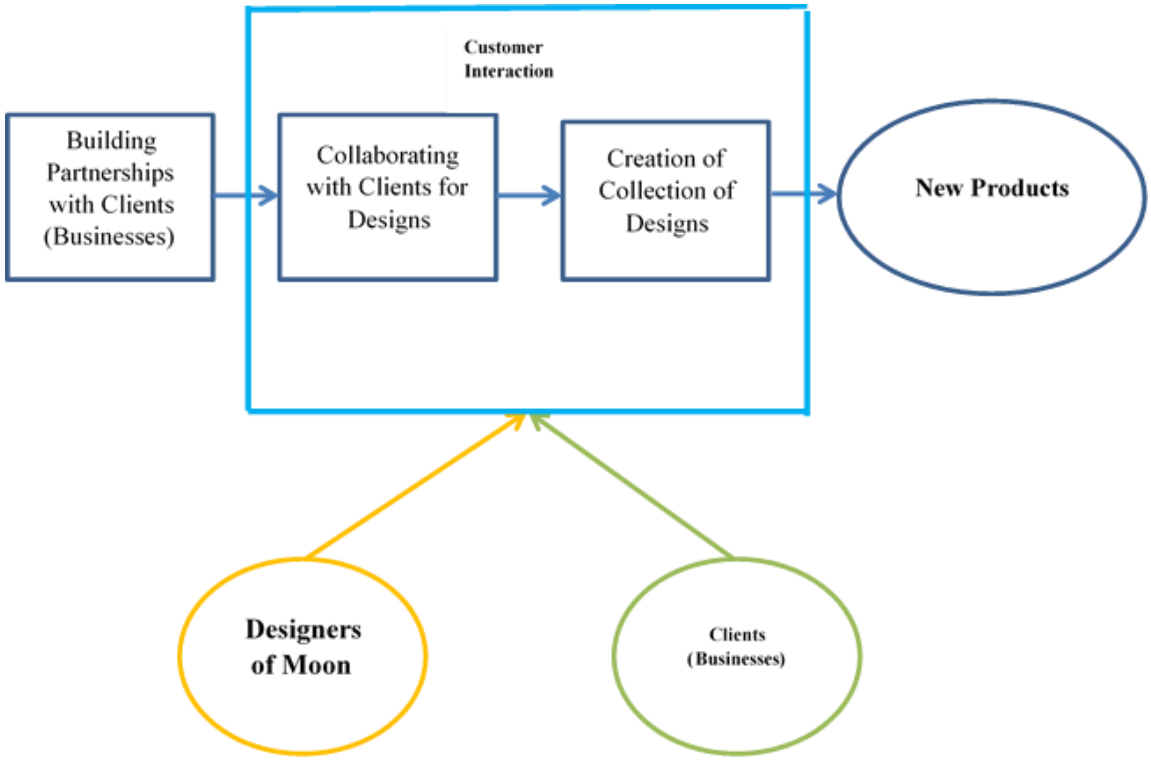

Figure 4-22: Development of Products in Branch 3 of MOON with Businesses

There is less collaboration when working through agents, as Director of MOON stated (NSM6):

> *'Director of MOON: So, what would be our frustrations is that we feel like we can add value, to any of our clients (of Branch 3), but at times we don't necessarily*

> *get that access, because the agents might automatically consider rather than giving us the opportunity to develop a fabric. They Produce Development Assistance already has a fabric, they could sell from a different manufacturer.'* (NSM6)

In Branch 3 and 4, a positive relationship is observed between MOON and its customers.

At Branch 4 MOON supplies textiles for industrial businesses, for railway companies and airlines. The process of product development is like that at Branch 3: proposals are offered to potential clients and as soon as the relationship is built; the manufacture of products proceeds in response to designs from the clients. In recent years, as stated by Director of MOON, MOON has been collaborating with interior design houses in designing and providing textiles. Like Branch 3, the partnership with these design houses enables MOON to collaborate with clients at a conceptual stage, which results in more innovative designs. The processes of creating products for both business partners are shown in Figure 4-23 and 4-24.

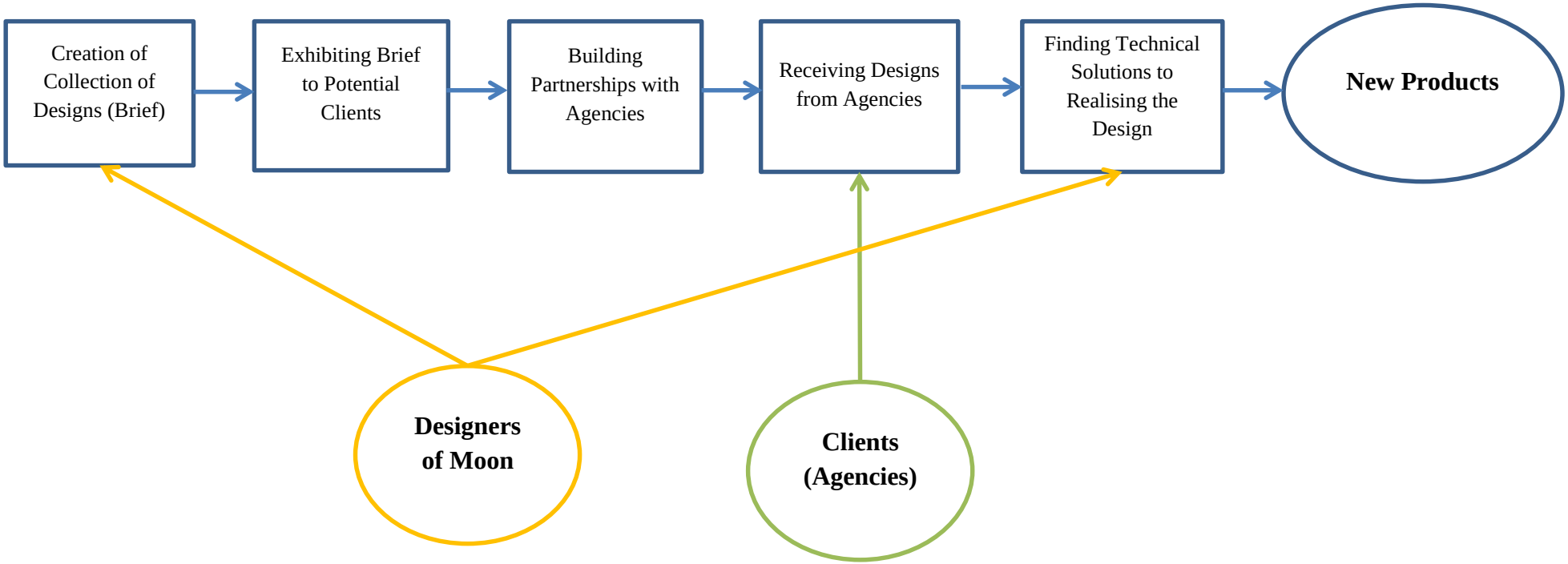

Figure 4-23: Development of Products in Branch 4 of MOON with Businesses

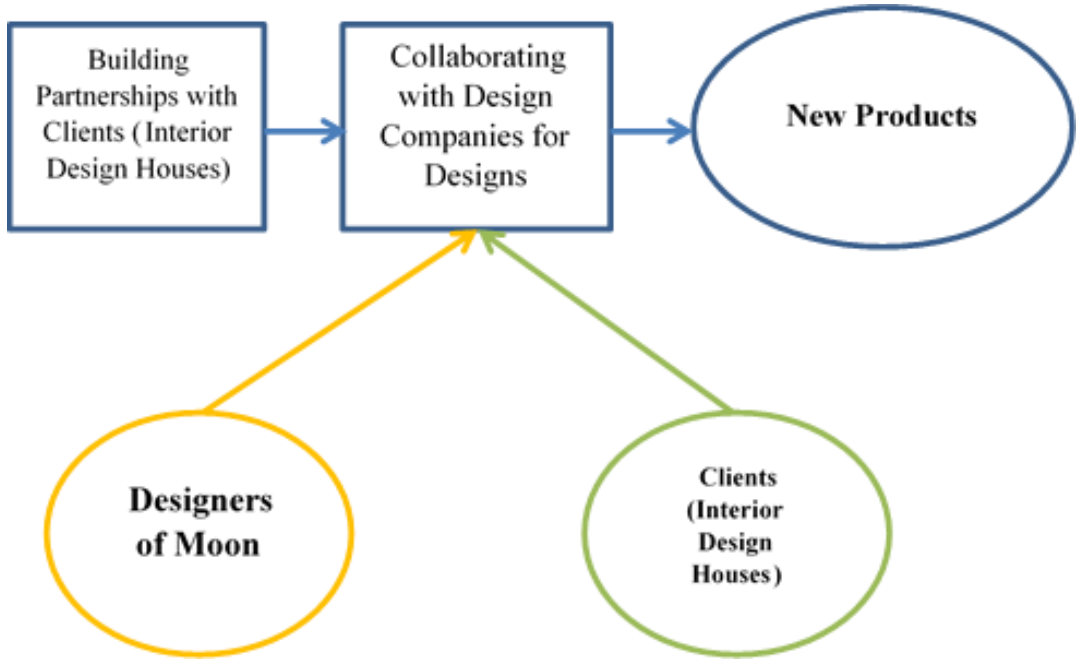

Figure 4-24: Development of Products in Branch 4 of MOON with Interior Design Houses

4.3.2.2 New Customer Interaction

Given the B2B nature of Branches 1, 3, and 4, MOON interacts with its clients through the design team. Customers of Branch 1 are international fashion brands. The interaction with those clients is entirely reactive: as the Figure 4-19 demonstrates, MOON's design team meets clients formally, not to engage them with the solution development but to understand what their designs and requirements are (NSM9, NSM10).

> *'Production Director of MOON: I suppose their responsibilities are taking the design brief, and creating the product, that is going to meet the customer requirement if you like. They have some very structured meetings. Often our designers will meet with customer designers, and they have their communications as well.*
>
> *BG: Do you mean the direct communications between the designers and the global brands?*
>
> *Production Director of MOON: Yes.* (NSM9)'

The customer interaction of Branch 2 differs in that it is a Business-to-Customer (B2C) relationship. As described by Production Director of MOON, the design (Figure 4-20) is proactive (KEM3).

> *'Production Director of MOON: Our customer (of Branch 2), never tells us what they want. You won't know what fashion is going to be next year. That's our job. So our consumers can't tell us what the fashion is going to be.*
>
> *BG: So what are their roles in the designing?*
>
> *Production Director of MOON: Not designing, but we do have groups we have insight from them, so we get people together, and we understand and explore decision making processes.*
>
> *BG: How is the process going?*
>
> *Production Director of MOON: So we Produce Development Assistance invite people together, have drinks, have somebody they… (BG: Brainstorming?) Not like a brainstorming because we don't have an agenda, but we got somebody facilitating it, and they will invite and lead the discussion, and we will get insights from the group discussion.'* (KEM3)

On the other hand, MOON interacts with customers through Branch 3 and 4. The company interacts with customers directly or through intermediaries. Branch 3 primarily responds to the requirements of agencies, shown in Figure 4-21, is like Branch 1 because the designers meet formally (NSM3).

For Branch 3, the relationship between MOON and the agencies, which is usually long-term, contract-based and driven not by design or collaboration but financial interest (NSM3), impedes collaboration.

> *'Director of MOON: Through historical relationship Produce Development Assistance be influencing to working more collaboratively. I think a lot of that relationship is very then sort of financially driven, rather than necessarily creatively or creatively or collaboratively driven.'* (NSM3)

The design impact is influenced by the point at which collaboration commences: earlier interaction stage enables MOON to have more influence (NSM4).

MOON recently switched part of the businesses of Branch 3 from agencies to direct clients to enable earlier collaboration. In this way, as stated by Director of MOON, MOON has more influence on the design (Figure 4-24).

Interaction between MOON and the customers for products at Branch 4, as Figure 4-23 is slightly different. MOON provides textile products to railway companies or airlines by responding directly to the requirements, just as it does for the agencies with the products of Branch 3. Similarly, the interaction with those customers is essentially reactive, and so MOON has limited influence.

On the contrary, as Figure 4-24 demonstrates, MOON also develops solutions to businesses through interior design houses at Branch 4. The conceptual, less specific requirements of the design houses enable MOON to have more influence on the design.

Therefore, the novelty of product design is subject to the stage at which the company interacts with customers: both branches have influences on more innovative product design by collaborating with agencies (Branch 4) or customers (Branch 3). On the other hand, by responding to the specific requirements, interaction with customers prohibits MOON from influencing the design of products.

4.3.2.3 New Value System

The new value system as defined by den Hertog *et al.* (2010) is a network that engages business partners to develop and deliver new services. MOON establishes partnerships with retailers internationally in order to channel its own branded products at Branch 2 (NSM11).

> *'Production Director of MOON: The only difference is, here you got global brand at this, so you got collaborations with customers, you could have viewed the global brand we supply here as yourself, so we respond to our own brief, rather than to our customers' own brief.'* (NSM11)

The collaboration, however, is not for design but selling. The relationship between MOON and those retailers is neither collaborative nor innovative, such collaboration is not recognised as a new value system.

Branch 3 is like 1 in the sense that both manufacture products in response to what clients demand. Branch 4 is essentially identical to 1 and 3 in the mode of business, but MOON has started to collaborate with agencies in addition to companies for business. The new relationship with interior design houses at Branch 4 enables MOON to intervene at the conceptual level of product design, which is, as described by Director of MOON, more innovative.

Therefore, from the descriptions of both Director of MOON and Production Director of MOON, MOON establishes partnerships with independent retailers for products of Branch 2, and agencies for products of Branch 4, to enhance its influence on the design of products based on existing businesses with fixed long-term relationships. The new partnership, or new value system engaging MOON and the interior design houses in the design stage enables MOON to create concepts for products that are more innovative (NSM7).

4.3.2.4 New Revenue Model

As Director of MOON stated, MOON shares revenue and costs with clients in two ways. For products of Branch 3 and 4, MOON does not have direct commercial relationships with clients *i.e.* airlines or railway companies. MOON alone bears the costs for designing and testing. However, in cases where MOON works as a supplier for its clients *i.e.* a seat manufacturer or airlines, it builds commercial relationships with the clients and negotiates with them about the sharing of costs and revenue. In the latter case, the sharing of costs is part of the process of relationship building (NSM5).

> *'BG: So how do you share the expenses and the revenues together with the agents you collaborate with?*
>
> *Director of MOON: The agents, the agents will affectively take a percentage of the selling price.'*
>
> *BG: That is to say, you have different ways of collaborating and the way of sharing the expenses and revenues (Director of MOON: Yes), according to different customers?*
>
> *Director of MOON: The benefits are shared equally, but generally not all so. The interior designing company is responding to a brief from a client, so they are being paid by the client to come up with an interior design solution. There they are not involved in the flow of an order, and the fulfilment of that order, so the Produce Development Assistance have the scope of the interior design. But then our relationships as a manufacturer would be with the either the airlines. At that stage we don't have any direct commercial relationship with the design house. Any product design, time and costs, (are) completely (consumed by) us. If we are working with potentially a seating manufacturer, then that might be different; so the seating manufacturer, or ourselves, might be responding individually to the brief, from the client or from the interior design company or we might be supply in collaboration so we do have two or three collaborative relationships with seating manufacturers, so in, on that bases, either we are in collaboration with selling fabric to the airline, and there they pay the they just pay the seating manufacturer for a service.'* (NSM5)

As is shown in Figures 4-25, 4-26 and 4-27, the cost of the development of products is shared.

The cost and revenue of products of Branch 2, namely own brand products, are covered entirely by the company (NSM11). MOON faces different risks associated with different modes of sharing costs and revenue. Branch 1, 3, and 4 provide products to order with little inventory required. On the other hand, the company must take the risk of low sales of its own brand products; as stated by Production Director of MOON, the level of production for this branch is speculative and the company needs to manage inventory. For Branch 1, the sharing of costs is like 3 and 4, namely by contract. Costs are fixed and shared, and generated by orders. For Branch 2's own brand it bears the costs on its own, fluctuating with the level of stock.

> *'Production Director of MOON: If we have control over the brands, we might make stock against our own risk, and then sell from our stock. So that model is different because we won't make stock of this, because we can't sell us. So we only make this to order, our brand equity, we make stock. So there are some differences but not on design site.'* (NSM11)

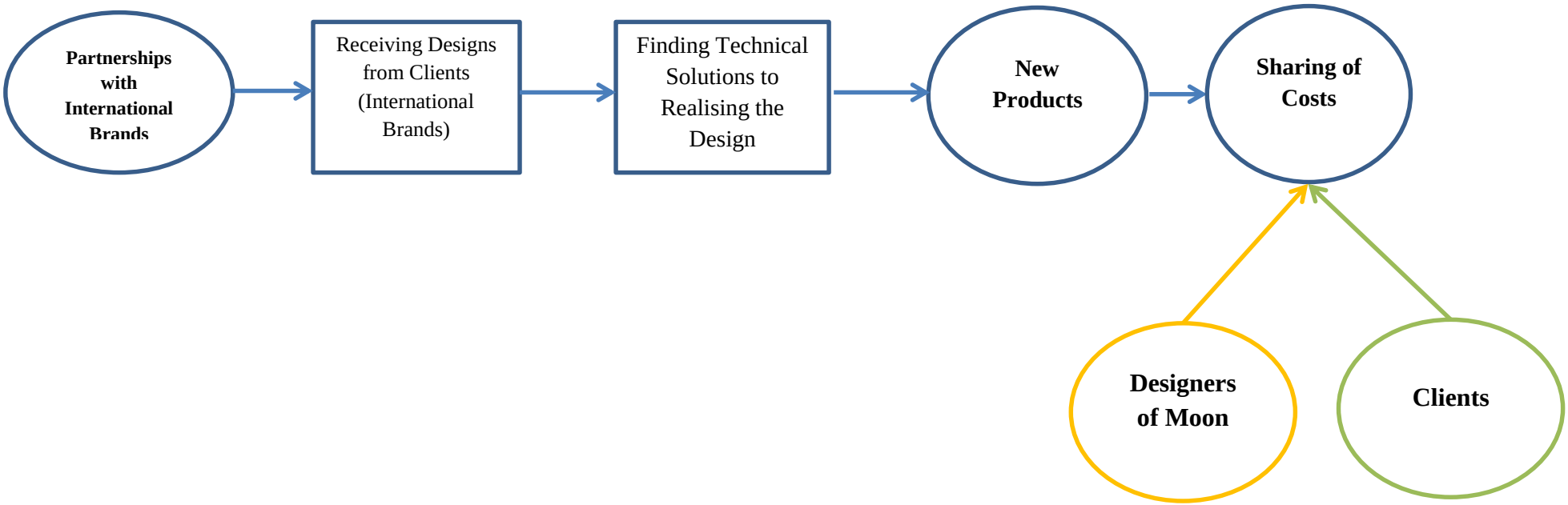

Figure 4-25: Cost-sharing Between Branch 1 of MOON and Clients

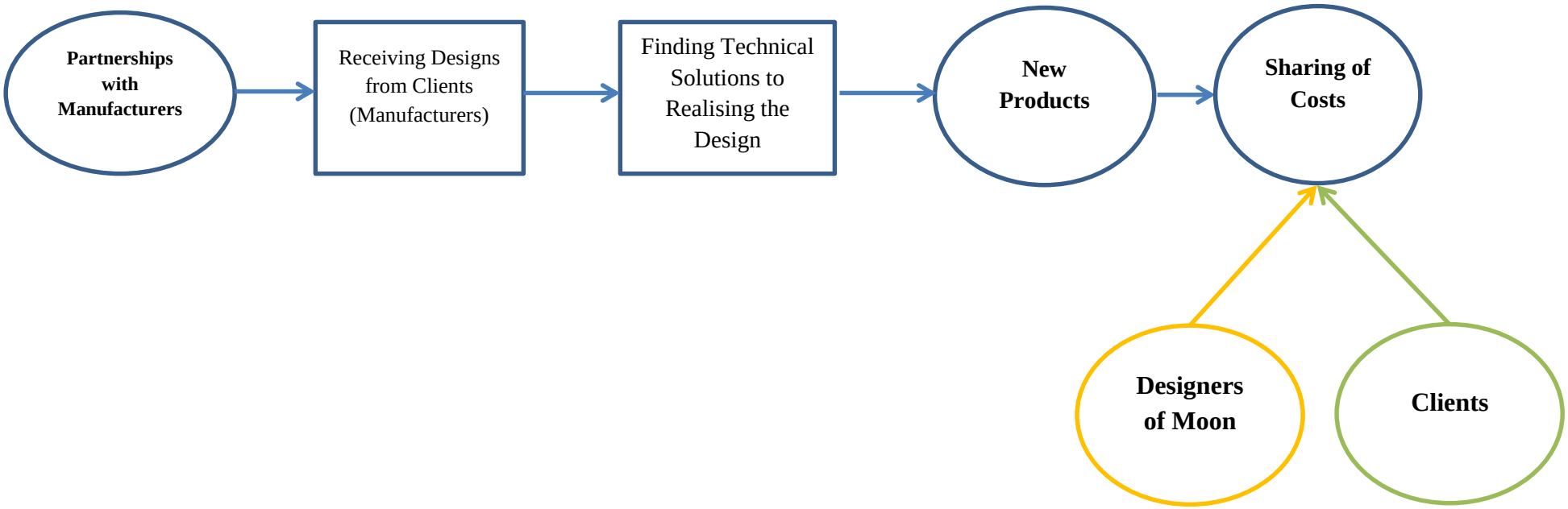

Figure 4-26: Cost-sharing Between Branch 3 of MOON and Client

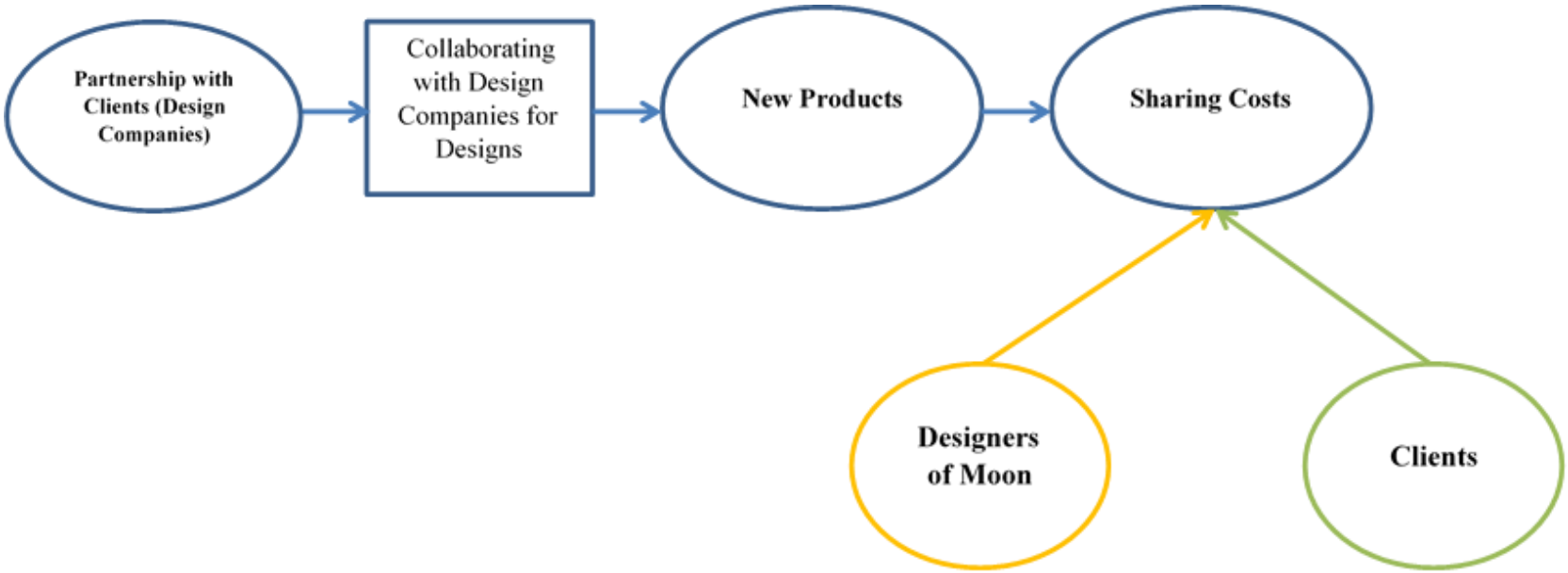

Figure 4-27: Cost-sharing Between Branch 4 of MOON and Clients

4.3.2.5 New Delivery System

Following the same protocol, researchers from the GSA attempted to implement design thinking in the company to enhance performance and creativity. A pilot group was formed by engaging staff from various functions and levels. Design tools developed by GSA were introduced to help them visualise ideas that would enhance knowledge exchange. This brought some successes in visualising and diagnosing problems, engaging staff in decision making and an creating innovative culture; however, the outcomes of CCoI, in contrast to STAR, were contained within the group (Johnson, 2015). Details of this project are discussed in the next section.

The new service delivery system, as a legacy of CCoI, was neither observed nor mentioned in the interviews. The traditional way of designing and working before the CCoI intervention remained unchanged. The intervention process did not appear to impact upon the designers and directors. The design team is responsible for both designing products and interaction with clients (NSM9).

Specifically, as a supplier for international brands, MOON primarily relies on a team of designers for technical solutions (NSM10, NSM11).

For own brand products, the same team is responsible for design (NSM11).

This situation is applicable to the other two branches of MOON: generally, all four branches share one team for designing, which is, as stated by both Production Director of MOON and Director of MOON, created internally among the director and designers, though occasionally, for technical reasons, the weavers are involved (NSM13).

4.3.2.6 New Delivery System (New Technologies)

ICT is not intensively used in MOON for the purposes of service innovation. Like STAR, MOON manages its own website to exhibit its products and publish information about the company. However, the products or designs, as solutions to their customers were not observed to have been developed with the assistance of ICT. On the other hand, design tools were inherited by the company from the CCoI project, as stated by Director of MOON. They are nonetheless not used as a part of the new service delivery system, as in STAR, but as a tool the design team can use to develop products (Johnson, 2015).

4.3.2.7 Summary of the Data Analyses about Service Innovation in MOON

Figures 4-28 and 4-29 display the dimensions of service innovation identified at MOON's two sites, for Branches 1 and 2 and Branches 3 and 4 respectively, as well as activities for the development of these dimensions. A summary is displayed in Table 4-3.

Dimensions of Service Innovation	Reference of Data	Findings
NEW SERVICE CONCEPT	NSM8, NSM10, NSM11, NSM12, NSM13, NSM1, NSM2, NSM4, NSM6, NSM7	• New service concept as a solution is only observed for the new designs developed by MOON and the interior design houses; • Designs for most of the businesses are exclusively from the customers, while MOON plays the role as a supplier; • Novelty in design is subject to the influence of MOON on the process of collaboration with clients; • Innovative solutions come from short-term relationship with new clients; • Only the design team play the role in the collaboration with the customers.
NEW CUSTOMER INTERACTION	NSM9, NSM10, KEM3, NSM3, NSM4	• MOON does not interact with most of its customers for solution development, as they primarily rely on the design team for product development; • The design team interact with the customer in a formal and exclusive way without involving other members of the organisation.

NEW VALUE SYSTEM	NSM11, NSM7	• MOON is not observed to have partnership with suppliers in the value network for developing services; • Partnership with clients for long-term is driven by financial interests; • Partnership with clients for shorter-term is more innovatively driven;
NEW REVENUE MODELS	NSM5, NSM11	• Costs are consumed by MOON to build relationship with new clients; • Costs are shared with clients for new solutions;
NEW DELIVERY SYSTEM	NSM9, NSM10, NSM11, NSM13	• No service delivery system is observed in MOON;
NEW TECHNOLOGIES		• ICT is not intensively used for purpose of service innovation but a channel to display the products; • Tools implemented in CCoI are preserved in the organisation for developing products.

Table 4-3: Summary of Service Innovation observed in MOON

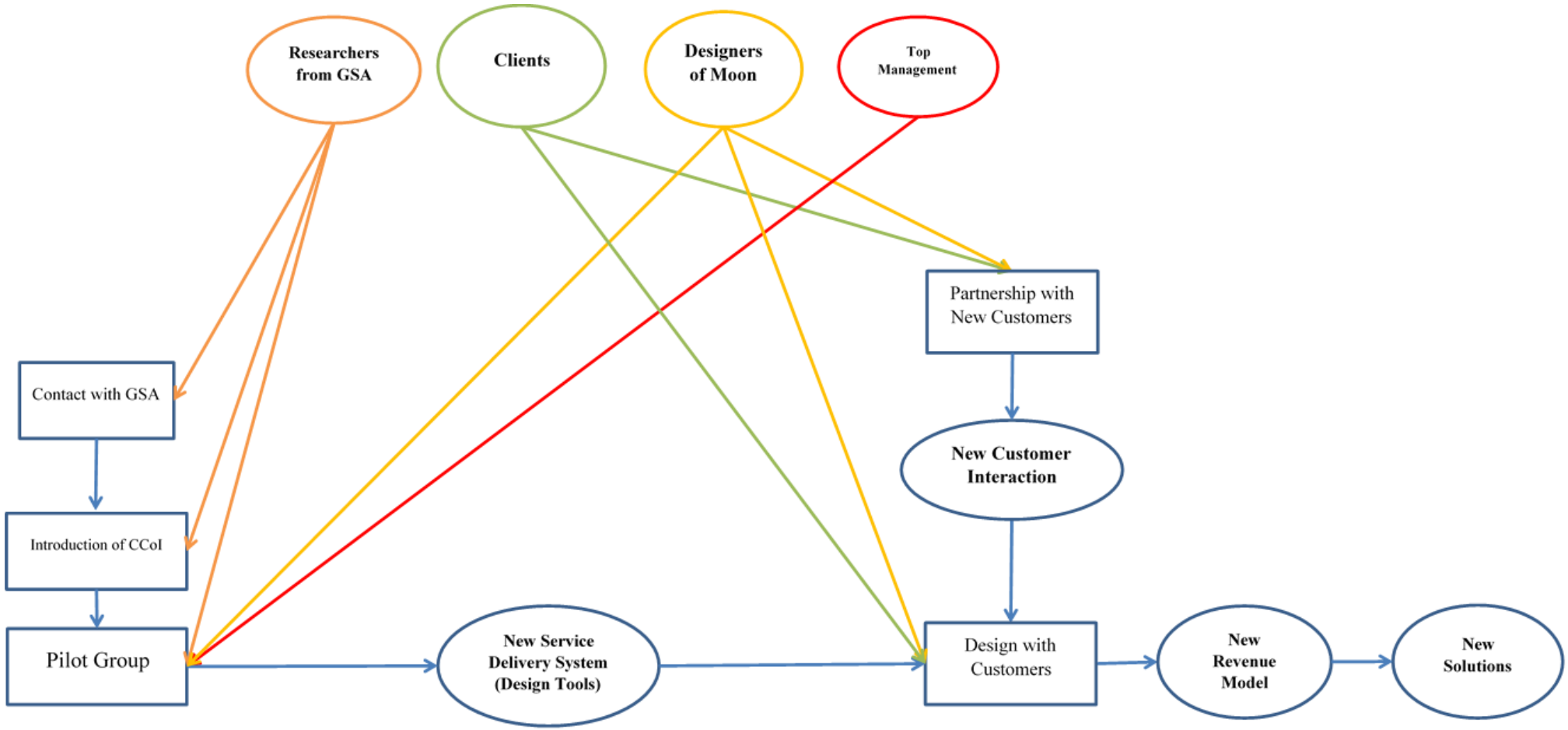

Figure 4-28: Dimensions of Service Innovation and Key Contributors identified in MOON

By combining the data from MOON with the 6-D model, the following points are highlighted regarding service innovation:

1) Products supplied for clients on contract are created on the basis of client designs and MOON has little influence; as such service innovation was not observed;
2) MOON's own brand designs are more innovative. As they are design team driven without customer engagement, they cannot be seen as being new service concepts;
3) Products offered to clients with which MOON has a newly built relationship are more innovative, since the process of development is collaborative and MOON can have greater conceptual influence, this can be identified as new service concept;
4) Three kinds of partnerships are identified: both long-term and newly developed partnerships with design-houses; they are not identified as a new value system because they are not part of the supply chain delivering new services. Therefore, external partnerships for service development and delivery, or new value systems, were not observed in MOON. On the other hand, in contrast to STAR, MOON relies only on its design team for solution development. Therefore, the internal network like the one that combines the capabilities of the staff in STAR, was not identified in MOON;
5) Managers and designers at MOON are responsible for interaction with clients of Branches 1, 3, and 4. Again, interaction with those long-term contract-based clients is essentially reactive rather than collaborative. On the other hand, for the collaboration with clients in the earlier stage, such as the interior design houses, the process of interaction is more collaborative, which eventually leads to novelty in designs. These interactions, by their collaborative nature, are identified by the research as new customer interaction for service innovation;
6) The design process in MOON is described as formal and exclusive. As new concepts of service were not identified for their contract-based, long-term customers or the end-customers of their own brand, no service delivery system was recognised. The relationship with the interior design-houses is an exception, but this focuses on product development. Therefore, service delivery systems, as a dimension of service innovation, were not observed;
7) MOON uses cost-sharing as a tactic both to attract new clients and to maintain the relationships. Cost-sharing is regarded by this research as a manner of financially supporting the collaborative relationship with clients. It remains questionable to regard such a way of sharing costs, which is identical to STAR, as a dimension of service innovation;

8) Finally, MOON does not apply ICT in developing or delivering solutions. Therefore, new service delivery system, in the technical sense, is not identified in MOON. However, MOON used the design tools and thinking it developed with the GSA, but did not expand usage beyond the pilot group. It is questionable if these can be recognised as new service delivery systems, as was the case in STAR.

The next section will look at the process of knowledge exchange behind those dimensions of service innovation identified above. Data was gathered by interviewing the two directors of MOON as well as the researchers from the GSA. Profiles of these interviewees from GSA are listed in Table 3-4.

4.3.3 Knowledge Exchange for Service Innovation in MOON

As noted by 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 suggest that, as 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, as demonstrated in Figure 4-29. 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. The following section will investigate the process of knowledge exchange behind those dimensions.

4.3.3.1 Knowledge Exchange for New Concept of Service

As stated by Production Director of MOON and Director of MOON, sharing the same design team, MOON develops products and designs using the implicit knowledge and experiences of the designers (KEM1, KEM2, KEM3):

'BG: Do you know how she (the director) gets this knowledge?

Production Director of MOON: We used mixed team of designs as well. But that's a typical creative process. You know that scarf there, we Produce Development Assistance design that scarf, we didn't know how it's going to feel, and there are quite lots of risks, and so that's why getting 75 per cent sales is exactly quite good.

BG: It sounds the process is quite implicit rather than explicit?

Production Director of MOON: Completely.' (NSM12)

'BG: How did you sift the best ideas from the…

Production Director of MOON: I don't think it's necessary to. The best is about trying work out what is the thing that is of representative of the market. What I was describing is called the qualitative research. And, so if you google qualitative research, that's focus groups, then it's trying to say by understanding by getting insight to how people behave, then you can better form your traces. What you don't have is data. And so what you need to be judging, is do you think the people you are listening to are representative of the market and their requirement.' (KEM3)

'Director of MOON: What our design team would do is they would take influences from external consultancy.' (KEM1)

'Director of MOON: Design of new products comes from the designers on the basis of their experiences and intuitions.' (KEM2)

Internally, the process of knowledge exchange between those designers is formally organised within design only; directors and occasionally the weavers are involved, there appears to be a view that collaborative knowledge exchange across the service provision is unnecessary (NSM9).

4.3.3.2 Knowledge Exchange for New Customer Interaction

MOON supplies products in Branches 1, 3, and 4 for clients by responding to their designs requirements. The interaction with those clients, including fashion brands, agencies, design houses, railway companies and airlines, is formal and contract-based (NSM3, NSM4). Knowledge exchange for customer interaction was not intensively discussed in the interviews. The novelty of the design is determined by their relationship and the stage at which they collaborated (NSM4). The different ways MOON interacts with its customers have been addressed in the previous sections (NSM9, NSM10, KEM3). The recent switch from a direct relationship with railway companies and airlines to relationships with design houses was a consequence of the desire of MOON to have more influence on the design at a conceptual level. The same thing also happens in Branch 3. MOON is building closer relationships with clients in addition to its partnerships with the agencies for Branch 3. As the design team primarily executes interaction with the clients, the process of knowledge exchange is fundamentally the same as the description in 4.3.3.1.

As for Branch 2, MOON produces products based on its own designs without involving customers. Therefore, knowledge exchange with customers for design does not happen in this Branch.

4.3.3.3 Knowledge Exchange for New Value System

The long-term partnerships with international fashion brands, agencies and businesses for products of Branch 1, 3 and 4 respectively are created with financial interests in mind rather than innovation. Moreover, MOON establishes its own brand as an extension of the businesses of Branch 1. The need for new value systems was determined by the top management through formal, closed processes.

Where MOON built partnerships with external design-houses (Branches 3 and 4), there was evidence of the desire to co-create value; this could be seen as service innovation. However, the knowledge exchange process for such partnerships was formal and closed – a top down approach.

4.3.3.4 Knowledge Exchange for New Revenue model

MOON shares the costs of production with clients on contracts at Branches 1, 3 and 4. Like STAR, MOON bears the costs of production at the design stage to attract clients into commercial relationships. The client relationship is determined and exclusive to the design team or the top managers of MOON and the clients in formal negotiations.

4.3.3.5 Knowledge Exchange for New Delivery System

MOON relies on the design team and the directors to manage its services, including new product concepts, new customer interaction, new value system as above, in a formal and traditional manner. The company is hierarchical, designers and directors are responsible for decision-making (NSM9, NSM10, NSM11, NSM13). Operational meetings take place regularly. Both the design team and management, as mentioned in the previous section, achieve knowledge qualitatively and intuitively based on their experiences. Therefore, no collaborative knowledge exchange process is detected in MOON’s service delivery system.

4.3.3.6 Knowledge Exchange for New Delivery System (Technologies)

The Internet was used by MOON as a channel for exhibiting its products. In addition, a website was created to exhibit and sell its products. However, ICT is not intensively used in MOON as a service delivery system.

The design tools and thinking instilled through the CCoI intervention will be discussed in the following section.

4.3.3.7 Summary of the Knowledge Exchange for Service Innovation in MOON

Based on the data analysis above, processes of knowledge exchange, as they are mapped in Figure 4-29, were identified in MOON for service innovation by the dimensions of new service delivery system (design tools); new concept of service; new interaction with customers of Branches 3 and 4; and new revenue sharing model. Results of the analyses are summarised below:

1) 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 for 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. Designs without involvement of customers are not recognised as service innovation by the 6-D model. Knowledge exchange for these businesses is formal and contract-based;
2) MOON established its own brand as an extension of its existing business to design, produce and retail independently. In this case, there is no process of knowledge exchange between MOON and clients;
3) A more open, collaborative method of knowledge exchange, which will be discussed in the next section, took place inside the CCoI pilot group (Johnson, 2015). However, these structures, culture and processes were exclusive to the pilot.

Therefore, it is necessary to study the pilot group in detail to see how knowledge was exchanged collaboratively, how the design thinking enabled the group to implement service innovation, and why it did not expand to the rest of company. Details of the discussion are articulated in the next section.

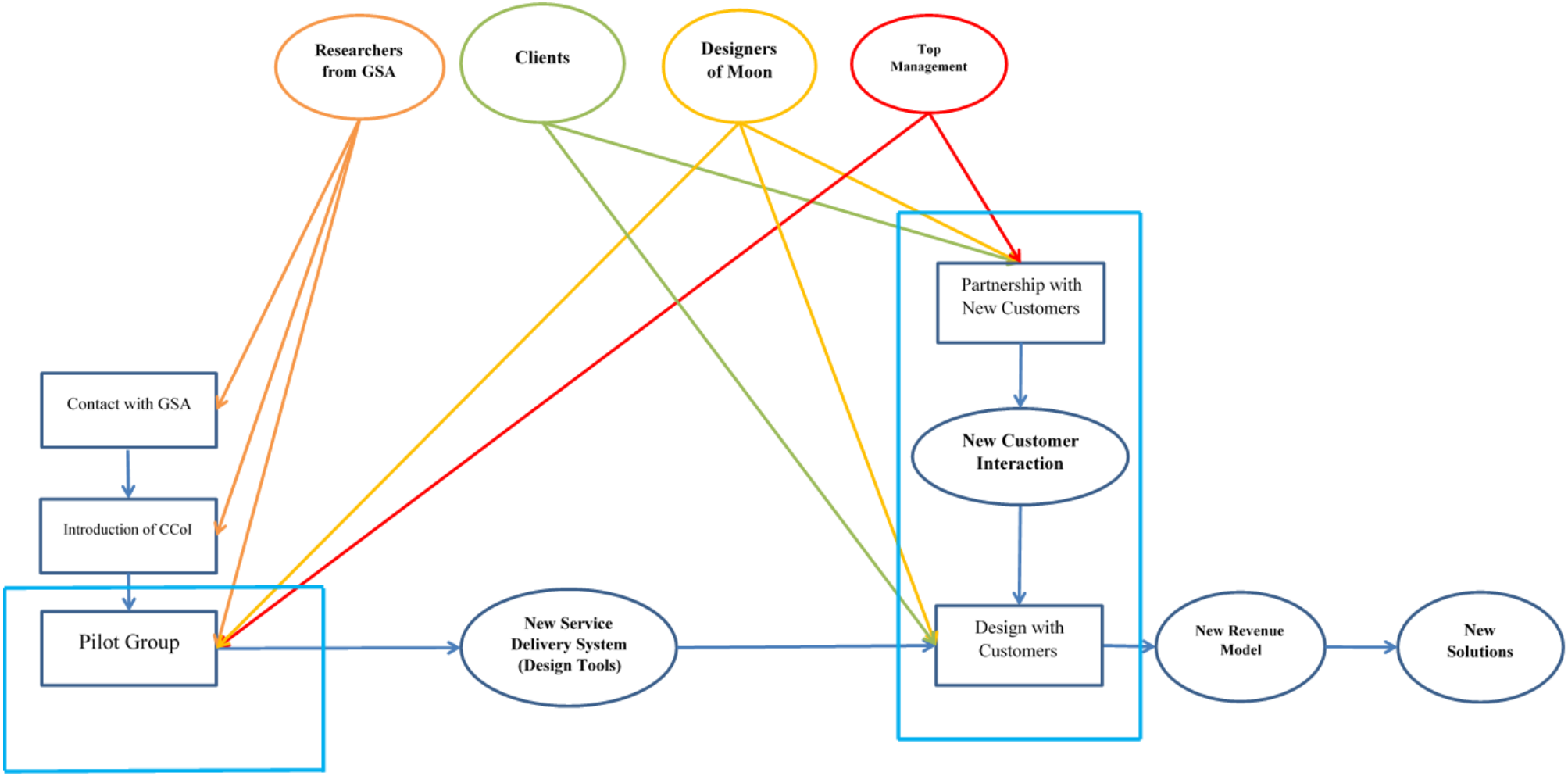

Figure 4-29: Knowledge Exchange for Service Innovation in MOON

4.3.4 CCoI in MOON

CCoI within MOON was not as successful in implementing design thinking throughout the organisation as it was with STAR (Johnson, 2015). Primary data about the knowledge exchange and CCoI in MOON were collected from the interviews with both the CEOs and the CCoI researchers. In addition, secondary data about the project was collected from the evaluation report by the researchers from the GSA.

Following the success in STAR, as Researcher 2 described, CCoI commenced in MOON (2014), aiming to create an innovative culture and enhance the productivity (KEM5).

> *'Researcher 2: (it was aimed at implementing) design methods that would look at the processes in the factory and look at the problems, the issues, by revealing the knowledge among the group. And (it attempted to conduct) visual creative ways of how you can capitalize that and address problems in the factory as they were reviewed. So there were a lot of those specific creative activities, and was about of (letting them) look at the bigger picture, activities as well.'* (KEM5)

CCoI implementation in MOON followed the same process and principles as in STAR: a workshop was organised engaging participants from across the organisation (KEM4).

> *'Researcher 2: At workshops, (there) were a chosen slice of the company, from 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 its low as 8 or 9, but generally there were all attendance. And we would deliver design methods. The two designers worked, with my support, to help design them.'* (KEM4)

This pilot group, as Researcher 2 stated, was like STAR; CCoI researchers intended to introduce design thinking to the organisation through the pilot to addresses problems, share knowledge and create an innovative culture (KEM4, KEM5). The pilot group aimed at showing the benefits of design thinking, building trust among people, and eventually expanding it to other parts of the organisation (KEM5). Researchers attempted to achieve this by organising a series of activities to help participants understand each other, the design thinking and their organisation (KEM9).

> *'Researcher 2: People were learning about their own organisations through it, and that was great; but they used to it as a sort of spring board, designed Quick Win project, and never came back to develop it. It was seen as a sort of leaving artefact and then they came back to it, printed what they learned about it and kept using it. It was a good site in which to do what was called 'The Deep Dive' project.'* (KEM9)

Design tools developed by the GSA were introduced to visualise the problems and release the creativity of the participants (KEM5).

> *'Researcher 2: And (CCoI introduced) visual creative ways of how you can capitalize and address problems in the factory as they were reviewed.'* (KEM5)

Members of the workshop were encouraged and enabled to exchange opinions equally and openly (KEM14); this provided a safer place for the participants to contribute their implicit knowledge.

> *'Researcher 2: They didn't feel as safe to do that kind of work in the factory. Because some of the persons did the work with very intimidated personalities. I think there was a member called Lyn who every week was questioning whether she should continue because she felt she was getting grief or problems from diagnosing her department. And I was trying to encourage her, because she always offers a good conversation. She looks very experienced, but in terms of leading an activity, she was very rarely doing that. If she was never one who was kind of learning to be a good participant, but at the extra layer of responsibility and sharing the process you would not expect that offer. So she especially needed a safe space to engage these activities and even then there is still fraud with issues.*
>
> *GB: It sounds like that they are used to following the commands.*
>
> *'Researcher 2: Exactly. That's why the changes were mostly in the slice, (be)cause they were given that flattened democratic platform to get involved and by the end, all of them were willing to engage in new discussion in this new project but in that safe space. And in that factory, they didn't feel that safe space.'* (KEM14)

The pilot group, as described by Researcher 2, succeeded in that some of the tools were embedded and participants actively engaged in the process of knowledge exchange and innovation (KEM6).

> *'Researcher 2: And because there were some wins, there were very effective tools, and then you saw them trying to develop. And I think these tools made this slice survived after we left as far as I know …'* (KEM6)

However, Researcher 2 and Researcher 3 observed that although the pilot group were engaged and endeavouring to cascade the initiative throughout the organisation, there appeared to be little external buy in (KEM6) and a new service delivery system (POD at STAR) failed to materialise (KEM17).

'Researcher 2: They didn't influence them as a factory as what we wanted it.' (KEM6)

'Researcher 3: I don't think there is any personal change. As far as I am aware there was not physical systematic change. (GB: How about the structure?) The structure did not change.' (KEM17)

The project was reviewed and evaluated after the pilot group was completed. The results of this evaluation are expressed in the internal report by Johnson (2015) who participated in and tracked the project:

1) The researchers started by creating a team with a specific identity to exemplify the design thinking and an innovative culture to the rest of the company, as they did in STAR (Johnson, 2015). In MOON, the pilot group members conducted an activity called 'The Yarn Journey'. They were asked to gather information about the process of production. The Journey was then displayed to all but was only partially successful in engaging others (Johnson, 2015);
2) Another activity, called the Honeycomb, was conducted in the pilot group to encourage sharing design thinking and to encourage an innovative culture. The rationale for the introduction of Honeycomb was to engage the whole company (Johnson, 2015). Regardless of its success in fostering the confidence of the pilot members in the project, the Honeycomb failed to engage others;
3) Like the 'Marble Runs' in STAR, an activity called 'The Dream Vision' was conducted in MOON, which allowed the participants to take risks, map their ideas, externalise their knowledge and diagnose the problems in the organisation. Though the 'Dream Vision' was not a part of the original plan, it was successful in engaging the members of the pilot group and other staff outside the group, but not necessarily the senior management team nor the design function (Johnson, 2015);
4) One of differences between MOON and STAR is that, as stated by Researcher 2, management and the design function appeared to remain aloof and disengaged. A strong central authority, based on an almost autonomous design function and hierarchical decision making, appeared to be blocking the service innovation initiatives coming from the pilot group (Lockwood *et al.*, 2012).

The targets of this project were not satisfactorily achieved because of the following issues, which were observed by the researchers from the GSA:

Firstly, the CCoI successes did not cascade upwards or outwards (KEM6, KEM8, KEM10, KEM17).

> *'Researcher 2: The slice was seen as a separated group to the rest of the factory rather than a resource that everyone could learn from.'* (KEM8)

> *'Researcher 2: the slice started its own project in the makers' market. They had completed that, and this was new sort of many projects they had initiated themselves and used a visual journey method basically. So it was something they were repeating for themselves because they saw it as a high value method, which was encouraging, but again it didn't ripple out to others other than they might have brought people to help them in certain aspects.'* (KEM10)

Second, poor external engagement resulted in passive participation. Unlike STAR, which engaged with GSA through the CEO prior to the CCoI intervention, MOON essentially were seeking an off-the-shelf solution to complex issues relating to staff engagement, productivity and business challenges. The initial workshop was organised primarily by GSA with modest assistance from top management (KEM7). Management recognised that the CCoI was performing and challenging the norm, but appeared most impressed with cost savings in inventory brought about by the pilot, rather than by the new ways of doing and thinking (KEM7).

> *'Researcher 2: the biggest problem we faced on this was based on the management. If the management people were valuing the project, they would have encouraged their departments to work with them, to encourage the project, the relationship with them and share more time and interest in the methods and approaches. This slice we would try to get the slice to perform, but management would not, from the very top, engage with us as much. So we were pushing from inward out, inviting people to come along ourselves to see if they would engage and that felt quite cold cause they had their own jobs their own departments to work with.'* (KEM7)

Moreover, the members of the design function did not recognise the wider dimensions of service delivery and interaction (KEM8).

> *'Researcher 2: One is the design department; we needed to get them on board but they thought the activities we were doing as, I don't know, I don't want to use the word 'patronising' but they thought they already knew the stuff, and they were asking 'oh, how much should we have,' as much as you think the company needs it. It's not some little training courses that we were doing. This is for the culture of the organisation and I don't think they quite embraced that idea. They had their own methods there, their own jobs in departments and approaches. And I think they prioritised that by trying to bridge the gap to other departments.'* (KEM8)

Finally, the CCoI participants found it difficult to disseminate CCoI outcomes and encourage wider buy-in. The functions and levels they belonged to seemed to sense that there was limited managerial and design buy-in and they kept a respectful distance from the CCoI (KEM7, KEM8).

> *'Researcher 2: Actually one management, for one department, cannot influence the management cross all the departments. It was seen as an extra work because the other factors there happened was this sort of the other workers, from the factory, there were cults from the slice members, ...there was few as sort of clique, as a sort of special group; they didn't have to do with the regular job all the time. The slice was seen as a separated group to the rest of the factory rather than a resource that everyone could learn from. I think that was a difficult thing to shift. It was a very complicated factory it's really interesting to look at it because there were individuals in this slice, it was a small fracture of the company that we were working with. And you need at least one representative to say from one department who worked as natural leaders who worked natural managers they were like young employees just arrived but they didn't have the capacity and authority to take this method to their department. They were essentially just being trained to be good participants, rather than people who represented this method. It's not naturally something they would do themselves anyway, cause the slice selection didn't discern about who had motivation to any change in the organisation; it's more like who was willing to take part. Lots of different complex problems were going on and the design team at the time didn't have the capacity to turn that into those methods and into how they move the intervention forward. But there was potential for designers to do that. But it might be much more in line with management, technique and skills.'* (KEM8)

MOON staff focused on their own departments, issues and ways of working. They had limited understanding of the company and there was some suggestion that there was a degree of dissatisfaction (KEM8, KEM12, KEM16). Within the pilot group design thinking helped them understand each other and the bigger picture. They also found benefit in identifying and solving problems together (KEM12, KEM15, KEM16). These changes in the culture of the group and the provision of an open platform for knowledge exchange in the group (KEM11) were believed by both Researcher 2 and Researcher 3 to be one of the most important achievements.

> *'Researcher 2: They've never been given the time to look at these problems across the board I guess. Because what we learned about the factory is like silos; in this sense each department has their own skill sets, has their own machinery, or has their own processes. And there were very few debates on how they communicate across the board. And that's why we do our own journey; we had all the departments to go to each of the stages of developing products. And here were loads of issues that you hadn't seen: none of them have known this. So here we made a connection. So that was the first thing that we realised that we do have to look at ourselves and how we could improve things. And the other thing was the management culture.*

They will do themselves far too busy to talk to each other about strategically how to approach it. (GB: As STAR did before the intervention?) Exactly. The first thing they would do is to share issues and spend time looking at the issue; try to understand it. But that's a harder thing to be translated into management level. As we have discussed earlier some of the issues came up in the communicating in working with managers.
The slice members was where I saw the most change, they were individually expecting different things from the organisation; they were demanding different things.' (KEM12)

'Researcher 2: During the intervention itself, there were simple skill gaps, they saw, for example, they had these things could be AX, computer system, so this was how they looked input, kind of fabric grounds, and that certain thing, I think, the weavers had real implicit knowledge about when or whether they are going to ran out of weft, to finish their run, whereas the computer would allocate them a certain amount and they knew that they are run out, but they didn't have the skill set to adjust the number to get more weft. So they think when it is run out we just have to stop, and you waste time and money. So they decided to train members of yarns to work with weavers together to get the weft in place, to train them. So it would reduce delays like a moment. And that was one of the Quick Wins did come out and that was just a connection of: there was a skill gap they need to know how to deal with these problems on site, because they would have minded if they have fewer workers, certainly fewer managers when you don't have the proper skill to deal with the problem.' (KEM13)

'Researcher 3: From my experience, there were lots of personal development in the team focused on that what was quite reserved in slice become (they were) lot more confident. I asked them for their opinions, they said that the relationship with management got a lot better, as they've got more visible, kind of more friendly relationship, more comfortable than just saying hello, good morning whereas before they were definitely split in hierarchy, and they feel comfortable even just saying hi. So that changed.' (KEM15)

'Researcher 2: But from what I've encountered, you saw a change in the individuals. I think the most tangible impression was when we started with them, they externalised some of their problems, they said 'our suppliers were not good enough, our clients were not good enough', or they got problems with the people they were dealing with, not with themselves. By the end, they realised they had started with themselves; they worked specially with that project about internal process that they could change. And that was the biggest change within the slice.' (KEM11)

'Researcher 3: I think some of them were a bit not friendly as if they were being told what to do.
GB: how did these staff resist this plan?
Researcher 3: I thought there were plenty of them they thought it was a bit silly. Because it's so different to the way they worked.
Researcher 3: On one hand you set up persistence whereby they had a drop in for ideas while other employees won't agree so to submit an issue or potential solutions to an issue. And then the group would assess that and then the percentage by the management. And that was successful in some people while others felt like the job was changing and they didn't actually want that change to

> *happen. So on one hand you had one action, one changed, it seemed positively from some and very negatively from others. (GB: Why it was negative from someone?) Because they were changing the job that they found was a good job, and was very clearly defined. They were quite happy with that. Then they were almost extended at this other strength which they were uncomfortable with or reluctant to, resistant to.'* (KEM16)

The failure of the intervention in MOON to instil an innovative culture in the rest of the company was also attributed to the lack of support at the managerial level (KEM7). The segregated and complicated structure of MOON weakened the authority and motivation of the participants to expand the pilot project (KEM8). Support from some managers, like Director of MOON was limited in the workshop (KEM9).

> *'Researcher 2: The Director of MOON was the highest-level manager who was part of the slice, and he saw the value, he was very much seen as a leader in a group sometimes to the problem of individual methods because the group always look to him to make decisions. When we were always encouraging the group mentality in a group decision but he understood the value it could have for everyone and so you see individuals converted if you want or willing to take on the method, but on an organisational level, the idea impact is a lot lower, and I think that's just down to the circumstances in the situation that the project went through.'* (KEM9)

The trust of the members of the design team in their current way of working and their sceptical attitude towards the design thinking led to a reluctance on their part to make changes in culture, and eventually discouraged them from collaborating, or as described by Researcher 2, *'patronising'* (KEM8), in the workshop. This was in line with the description by Production Director of MOON about the fashion status of their products, by asserting that their design exclusively came from the intuition of the designers, not recognising that design was simply part of a much bigger picture (NSM12, KEM3).

4.4 Findings from STAR and MOON

Findings derived from the discussions above are displayed in the following section concerning CCoI, knowledge exchange and service innovation in STAR and MOON.

4.4.1 Preview

This research is designed to answer four questions derived from the literature, which are discussed in Chapters 1 and 2. The next sections, as Figure 4-30 demonstrates, will discuss data by referring to the literature reviewed in Chapter 2. The discussion will commence

with the pilot groups of CCoI and how design thinking enabled knowledge exchange and service innovation. This is followed by a discussion of knowledge exchange and service innovation. Enablers of knowledge creation, defined by Krogh *et al.* (2000), are employed to measure how the design thinking enabled the two companies to exchange knowledge, both in the pilot groups and the organisations. Enhanced capabilities for service innovation, suggested by den Hertog *et al.* (2010) are used as evidence for service innovation being made possible by the design thinking in both cases. Differences between the two cases in both knowledge exchange and service innovation, and differences between pilot groups and the organisations in service innovation, will be highlighted in the results.

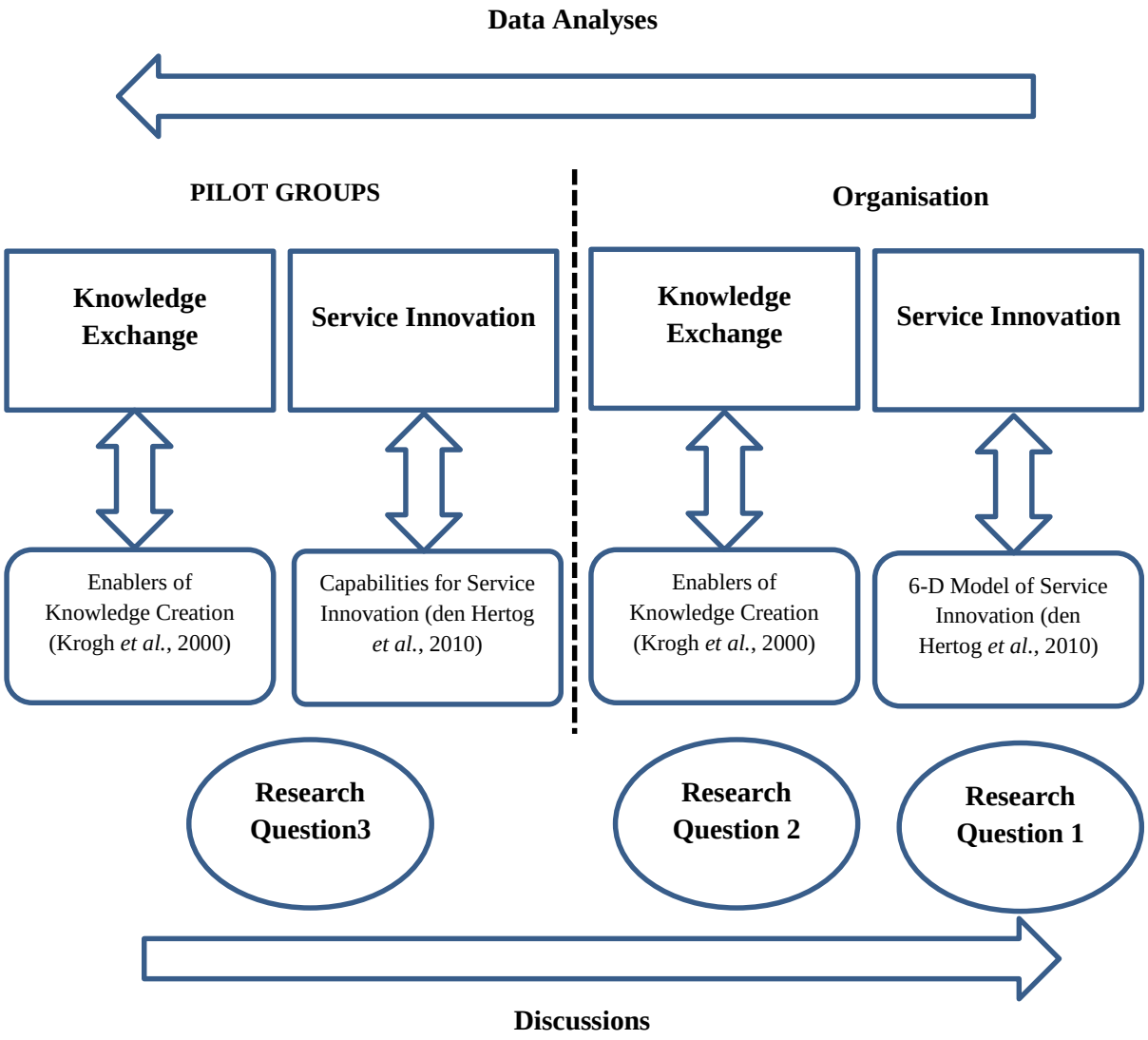

Figure 4-30: Structure of Discussion

4.4.2 Findings about the Pilot Groups of CCoI in the STAR and MOON

CCoI aims at enabling SMEs to improve their efficiency in operation and to release the potential of staff by implementing the design thinking (Lockwood *et al.*, 2012). The project started by engaging staff across both companies within pilot groups in order to familiarise them with the design thinking and their own businesses, and to begin cascading the benefits to the entire organisations (Lockwood *et al.*, 2012). Researchers from the GSA conducted a series of activities that engaged the participants in a studio-like space separated from the rest of the organisation. The following is the discussion on those activities in the two companies:

1) A conversation was established among the participants, which enabled them to extend their understanding and view the business holistically. Participants engaged across the organisations were encouraged to implement design thinking and tools to diagnosing problems and developing solutions. They were required to create an identity and consult members of the organisation to build a holistic view of the company, their businesses, and processes of production. The principles of design thinking and innovative culture were understood, accepted and welcomed by both the participants and the company. More importantly, as Lockwood *et al.* (2012) highlighted, NOW participants and management viewed success from a service perspective. In MOON participants focused on the 'The Yarn Journey' as a means of better understanding what the business was about and what challenges lay ahead. This was successful and provided a visual means of clarifying and communicating issues and opportunities. To drill further down another design influenced technique, the Honeycomb, was employed, however it proved to be less engaging for the company. Succeeding in building conversations, familiarising the members with the principles of design thinking, and engaging staff for solution development, the outcomes of CCoI in the two companies were nevertheless different. In MOON the project failed to convince both the design team and the top management to implement the design thinking across the organisation. Though members of the pilot group perceived the short-term, case-specific success of design thinking in developing a product, they doubted the necessity of using it in the long term in the rest of the company. Different to MOON, STAR saw the benefits of design thinking as being of great value in general: a means of cascading service innovation throughout the organisation;

2) The activity similar to ‘Marble Runs’ in STAR was also conducted in MOON by the name of ‘The Dream Vision’, which comprised a series of ‘Marble Runs’. In contrast to STAR, it was unplanned for the pilot group in MOON, but this activity was successful in motivating the participants to contribute their implicit knowledge to the development of solutions and to engage members outside the pilot group;
3) Lastly, design thinking was introduced by researchers to facilitate the conversations and knowledge exchange mentioned above. Design thinking that emphasises visualisation and simplicity successfully enabled participants in both pilot groups to externalise their knowledge about both their own business and their colleagues’, which would otherwise have remained implicit and hidden in their minds.

The purpose of this section is to discuss how the design thinking enabled the pilot groups by enhancing their capabilities for knowledge exchange and service innovation, and how it enabled effective knowledge exchange and service innovation across the organisation. Results of the discussions above will be compared to the knowledge enablers suggested by Krogh *et al.* (2000) in order to address the research interest. Findings are examined in the following section.

4.4.2.1 CCoI and Knowledge Exchange

Five enablers, as Table 4-4 demonstrates, are suggested by Krogh *et al.* (2000) on the basis of the SECI model for organisational knowledge creation.

Enablers of Knowledge Creation (Krogh *et al.*, 2000)
Instilling a knowledge vision
A good knowledge vision is characterised with commitment, from top to bottom of the organisation, to a direction; generativity of new thinking, ideas, phrasing and actions in a explorative and open-ended way; specific style matched with means of communication; focus on restricting the current knowledge system; focusing on restricting the current task system; external communication of values with all stake holders involved; and commitment to shaping competitiveness.

Managing conversations
A well-managed conversation is characterised with actively encouraged participation with a clear knowledge-creating purpose and understandable entry rituals; established conversational etiquette with order and chaos balanced; appropriately edited conversations and fostered innovative language with visual techniques applied.
Mobilising knowledge activists
A knowledge activist is featured as a catalyst of knowledge creation that travels across the boundaries within the organisation to expose him to new ideas, questions, insights, and opportunities. Moreover, a knowledge activist is responsible for creating a context, or ba, for knowledge creation. A knowledge activist is also a coordinator of knowledge-creation initiatives; his activity is shaped by the micro-community perspective, imagined communities and shared maps of cooperation. Finally, a knowledge activist is also a merchant of foresight who 'provides the overall direction for knowledge creation in different micro-communities'.
Creating the right context
The organisation must create a shared knowledge space with four kinds of interaction, namely face-to-face interaction, individual interaction, collective interaction, and virtual interaction, enabled. In addition, a right structure is selected for the right context that balances flexibility and control.
Globalising local knowledge
Globalising local knowledge is circulated among three phases, namely triggering, packaging and dispatching, and re-creating.

Table 4-4: Enablers of Knowledge Creation (Krogh *et al.*, 2000)

Findings from the case studies imply that design thinking enabled both pilot groups to create knowledge in the following regards:

1) It was found that, by implementing the design thinking, a vision of knowledge exchange was successfully instilled among the participants. The extension of such a vision to the rest of the organisations depends on the commitment of the top management. Moreover, as the case of STAR shows, it was the commitment of

those members to service rather than operational performance that enabled the company to develop. Krogh *et al.* (2000) notes the role of strategic vision in setting the scene for knowledge exchange culture. In STAR, a knowledge vision was developed in the pilot group with the assistance of the top management. Members of the company, from top management to frontline staff, were engaged with NOW. Top management was committed to improving performance from the beginning. This commitment was accepted by other participants through the collaborative, explorative, open communication made possible by design thinking. More importantly, the participants of STAR identified the necessity of transforming their company into a service provider, resulting in POD. The productivity vision was also embedded in MOON. Participants communicated collaboratively in order to diagnose problems and to develop solutions. The discussion in the pilot group revolved around tasks selected from the activities of the company. The design function of CCoI and the target of the intervention for enhancing the efficiency in operation were achieved in both pilot groups. Realisation of the importance of service among the participants in STAR generated a long-term vision for applying the design thinking to collaborative knowledge exchange. In MOON, however, participants, particularly designers and top management, did not perceive the value. Moreover, the extension of design thinking to the rest of company is dependent on the participants and their trust in it. The two cases highlighted the critical role that top management play in committing staff to the enhancement of performance. The role of top management in creating new knowledge is recognised by Nonaka and Nishiguchi (2001), arguing that the spiral process of knowledge creation is initiated by an organisational intention that refers to goals and strategies. They highlight the commitment of both top management and employees as essential for knowledge creation. The importance of entrepreneurship is also stressed by the classical economist Schumpeter (1939b) in implementing innovation. Researchers including Stokes and Blackburn (2002), Beaver and Jennings (2005) and Ahmad *et al.* (2010) note and confirm the role of entrepreneurs or owners of SMEs in determining how internal resources achieve success in the organisation;

2) It was found that conversations organised with design thinking in both pilot groups revolutionised the usual way of communicating between staff and across different layers of management. The second enabler of knowledge creation, as stated by Krogh *et al.* (2000), is the management of conversations. In STAR, the formally organised one-way meetings were replaced by informal and interactive workshops. Participants from different departments were encouraged to exchange opinions.

Though MOON did not extend collaborative methods of exchanging knowledge to the rest of the company, conversations featured as interactive and knowledge creative were managed within the pilot group. However, participants in MOON remained suspicious about the project. Even though the participants in the pilot group were more interactive and open-minded than before, they did not firmly trust in the organisation, as noted by Researcher 2, without the encouragement of top management, participants seemed only collaborated in the pilot group because they were told to;

3) The two cases highlight the role played by both researchers and top management as knowledge activists. It is noticeable that in STAR the roles of the top management and the researchers who worked as knowledge activists in the pilot group were replaced unexpectedly by the POD manager in the second phase. The third enabler of knowledge creation is the mobilisation of knowledge activists (Krogh *et al.*, 2000). Knowledge activists are catalysts who cut across organisational boundaries. Moreover, they create a context for people from different communities to exchange knowledge collaboratively and provide a direction for knowledge creation. In STAR, both the researchers and the top management partially played the role of knowledge activists. The top management, assisted by design thinking and researchers from the GSA, integrated staff across the company into a group to explore new opportunities and ideas. In this case, the CEO worked as a coordinator of knowledge-creation initiatives. Researchers from the GSA played the role of knowledge activists in creating a context in which the participants can communicate freely. The role of knowledge activist in the pilot group evolved into the POD manager, working as an intermediary between clients and staff, and as an organiser who is responsible for directing knowledge creation. Initiated by the POD manager, staff from different departments engaged in exchanging knowledge with clients to develop solutions. In MOON, the GSA researchers appeared to similarly act as activists, as did the participants within the pilot, however, this, only to a limited extent, transcended the pilot group. Autonomy, the ability for activists to transcend and act across the organisation, which is regarded by Nonaka and Nishiguchi (2001) as key to the emergence of new knowledge, did not occur in MOON. In STAR, collaborative knowledge exchange was extended via POD to engage customers in a service vision; no such developments occurred in MOON;
4) It is evident that CCoI succeeded in creating a knowledge context with the design thinking in both pilot groups. The forth enabler of knowledge creation is the creation of a context that enables the individuals to share, recreate, and amplify

knowledge (Krogh *et al.*, 2000). Participants were treated equally and were encouraged to air their opinions openly and freely by visualising them with the assistance of design tools. The hierarchised structures of both companies were replaced by a devolved, interactive and equal structure in the pilot groups. In STAR, this structure was preserved under the framework of POD, which further enabled the second phase of knowledge exchange in the company;

5) The last enabler of knowledge creation, according to Krogh *et al.* (2000) is the transformation of local into global knowledge. This was not the primary aim of the CCoI initiative; however, in STAR the embracing of the driving principles by the company provided, local, within the pilot, to transcend globally, through POD, to the company.

The discussion above suggests that CCoI successfully enabled knowledge exchange in both pilot groups. The next section will investigate the service innovation perspective.

Enablers of Knowledge Creation (Krogh *et al.*, 2000)	**CCoI in STAR**	**CCoI in MOON**
Instilling a knowledge vision	ACHIEVED	Achieved in the pilot group
Managing conversations	ACHIEVED	Achieved in the pilot group
Mobilising knowledge activists	ACHIEVED	Achieved in the pilot group
Creating the right context	ACHIEVED	Achieved in the pilot group
Globalising local knowledge	NOT APPLICABLE	NOT APPLICABLE

Table 4-5: Comparison between STAR and MOON in Enablers of Knowledge Creation

4.4.2.2 CCoI and Service Innovation

Table 4-6 compares the two pilot groups with regard to how CCoI enhanced their capabilities for managing service innovation:

1) By engaging the participants with NOW and the Yarn Journey, CCoI encouraged them to put themselves in the position of their customers and identify a potential for developing solutions. Scholars such as den Hertog *et al.* (2010) suggest that service innovation answers unmet needs of actual or potential customers, or translating a technological option into a service proposition. Such capabilities, as Table 4-6 demonstrates, were achieved;
2) As den Hertog *et al.* (2010) states the intangibility associated with the service dimension requires conceptualisation through prototyping to engage stakeholders and provide understanding. The original purpose of conducting activities such as Marble Runs was to identify the problems and to test the potential solutions developed by the participants. Researchers cultivated a risk-taking attitude and collaborative learning among the participants. This target was achieved as both pilot groups were motivated to share their knowledge and to learn from each other;
3) Service innovation is referred to by den Hertog *et al.* (2010) as a solution that configures existing elements in a new context. This statement is congruent with Schumpeter (1939b) who defined innovation as a combination of existing resources. Literature on innovation from a technical or resource perspective concentrates on the capability of unbundling and bundling existing resources (Sirmon *et al.*, 2007; den Hertog *et al.*, 2010). Participants were able to work together with people from other departments; exchanging opinions and ideas to create solutions. In MOON, the pilot group engaged suppliers in developing solutions assigned to them and in STAR the whole company was mobilised in POD to develop solutions with customers. The literature usually ascribes this bundling capability to ICT technology (den Hertog *et al.*, 2010), but in the case of CCoI it was achieved through design thinking and tools. Lastly, the literature notes the need for a committed and engaged senior management team (den Hertog *et al.*, 2010), a fact evidenced by the success in STAR;
4) The collaborative nature of service innovation implies that firms must be capable of engaging various stakeholders across a value network, in co-producing and orchestrating value (Teece, 2007; den Hertog *et al.*, 2010). Kindstrom (2010) highlights two dynamic capabilities for service innovation, namely capability of

understanding the value network and of orchestrating the service system. By implementing the design thinking in the pilot groups, participants were engaged across the organisation, and beyond, to co-produce solutions. At least initially the emphasis was on internal collaboration, which is in line with current thinking that in manufacturing SMEs initial activity will centre on internal networks according to Laforet (2012);

5) The capability of scaling and stretching refers to the standardisation and dissemination of service throughout an organisation (den Hertog *et al.*, 2010). It is difficult to introduce service innovation in a uniform way due to its intangibility (Lyons *et al.*, 2007). MOON failed to capitalise on its success within the pilot and the service innovation failed to become embedded. In contrast, STAR embedded pilot outcomes, such as prototyping, collaborative knowledge exchange, innovative culture and design thinking, through POD. Further, STAR standardised, involving external stakeholders, the innovation process through POD. STAR stretched the NOW initiative and MOON failed to build on the Yarn Journey; a determining factor being senior management engagement and a more holistic view of product delivery (service innovation);
6) Finally, learning and adapting as a meta-capability (den Hertog *et al.*, 2003) was fostered by the implementation of design thinking. The NOW and the Yarn Journey created a context and conversation for participants to learn across the organisation. The Marble Runs, similarly, motivates the participants to contribute their knowledge and share opinions with each other. Lastly, the design tools facilitated the externalisation of the implicit knowledge stored in the minds of the participants. In summary, the design thinking not only created a context for learning but also combined staff from various backgrounds to adapt themselves to the tasks of solution development.

The discussion above, as displayed in Table 4-6, indicates that, though CCoI was not aimed at service innovation, it enabled the pilot members in both cases to achieve the ability to manage service innovation, except the ability to scale and stretch the empathy, experimentation, culture, and other qualities across the organisation. However, it is such a capability that enables the development of an organisational ecosystem which further engages actors to produce service innovation (Lusch and Nambisan, 2015). The findings also suggest that the creation of the new service delivery system as well as the new customer interaction, such as POD, is critical for both collaborative knowledge exchange and service innovation in the organisation. Moreover, the success of design thinking in reforming the entire organisation in STAR is attributed both to the enhancement in

efficiency, which took place in both cases, and to an awareness of service among the participants of their business and innovation. Specifically, the success of implementing design thinking, as it was evidenced in STAR, lies in the creation of an ecosystem and platform that enables and engages actors across the organisation for value co-creation. The transformation of the organisation from pure manufacturing company into a service provider, as happened in STAR, unveils the potential value of design thinking in fostering SMEs not only in operations, but also in service innovation. In a manufacturing context as the two cases were chosen from, the results above also imply that design thinking is potential for addressing the challenges for servitisation, which include transformation of organisational culture, improving internal communication and engagement of staff from different departments for collaborative knowledge exchange (Alghisi & Saccani, 2015; Zhang and Banerji, 2017). Lastly, as the case of STAR suggests, by creating the service delivery system such as POD, design thinking enabled the company to develop service (Cooper, 1994), not as an output in the forms of products, technologies or services, but in form of a process that engages actors for knowledge exchange and value co-creation (Lusch and Nambisan, 2015).

Capabilities for Managing Service Innovation (den Hertog *et al.*, 2010)	Design-centric Culture and Challenges (Kolko, 2015)	Examples of CCoI in STAR	Results	Examples of CCoI in Moon	Results
Signalling user needs and technological options	Create models to examine complex problems;	NOW	Achieved	Yarn Journey	Achieved in Pilot Group
Conceptualising, visualising, prototyping and testing	Use prototypes to explore potential solutions;	Marble Runs	Achieved	The Dream Vision	Achieved
(Un)binding capability	Interactions with technologies and other complex systems to be intuitive and pleasurable.	Marble Runs/ NOW	Achieved	The Dream Vision/ Yarn Journey	Achieved in Pilot Group
Co-producing & orchestrating					
Scaling and stretching	Spreading empathy, experimentation, design smarts and other qualities that help create interactions with other complex systems to the whole organisation.	NOW	Achieved	Honeycomb	**Unachieved**
Leaning and adapting		Design Tools, NOW, Marble Runs	Achieved	Design Tools, Yarn Journey, The Dream Vision	Achieved in Pilot Group

Table 4-6: Relationship between Participants to the Knowledge Exchange and Service Innovation in STAR

4.4.2.3 The Summary of the Findings about CCoI in Pilot Groups

Table 4-7 compares the two pilot groups by how they were enabled by the design thinking to exchange knowledge.

Enablers of Knowledge Creation (Krogh *et al.*, 2000)	In the Pilot Group	
	In STAR	**In MOON**
Instilling a knowledge vision	ACHIEVED	ACHIEVED
Managing conversations	ACHIEVED	ACHIEVED
Mobilising knowledge activists	ACHIEVED	ACHIEVED
Creating the right context	ACHIEVED	ACHIEVED
Globalising local knowledge	N.A.	N.A.

Table 4-7: Comparison between the Two Cases in Enabling of Knowledge Creation by Design Thinking in the Pilot Groups

The discussion on how the design thinking enhanced the capabilities of participants to the pilot groups in knowledge creation and in service innovation is displayed in Figures 4-31 and 4-32.

Regarding the service innovation, capabilities for service innovation suggested by den Hertog *et al.* (2010) they were leveraged by implementation of the design thinking in both pilot groups, with the exception of the scaling and stretching of these capabilities to the rest of the organisation in MOON.

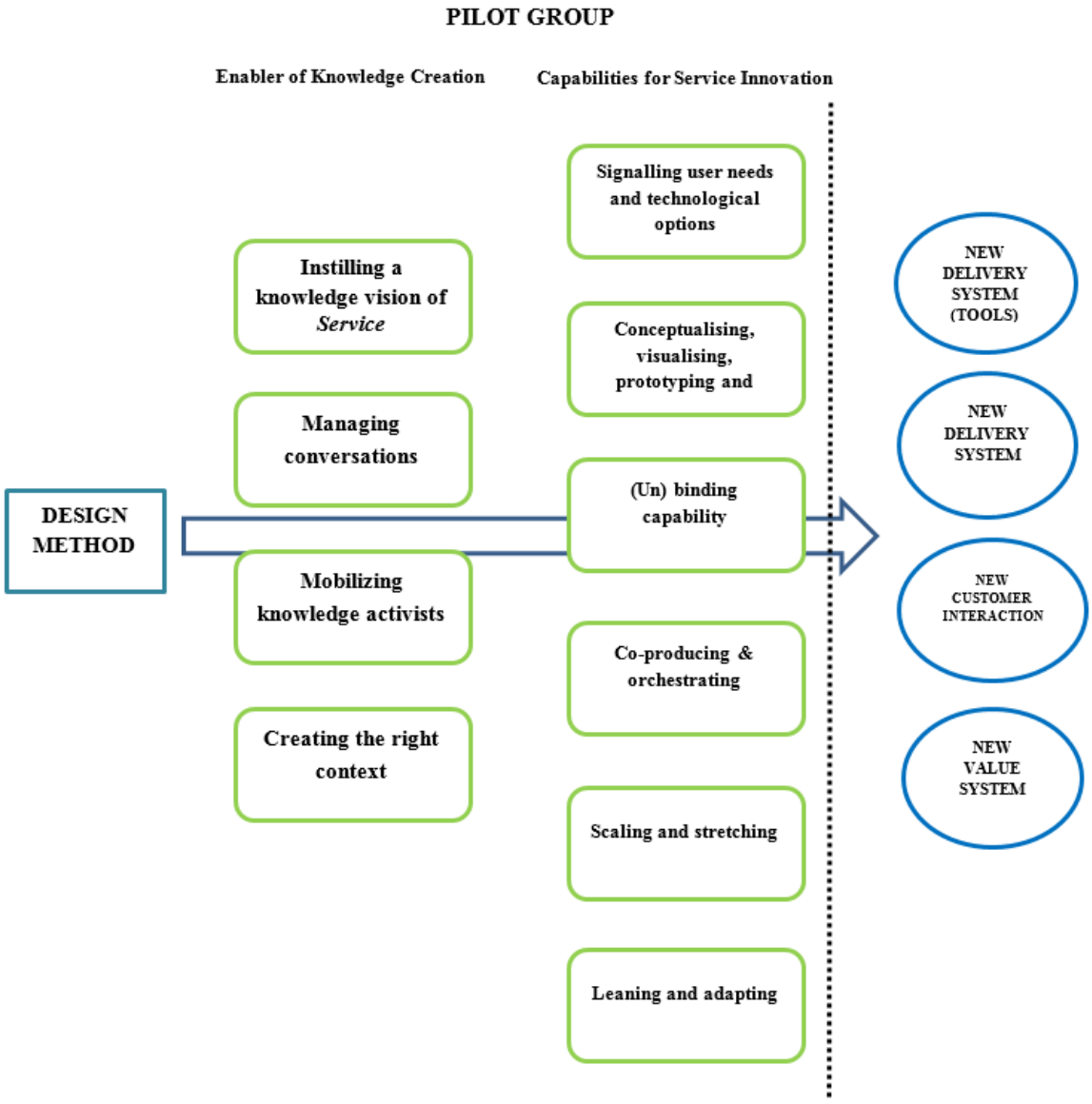

Figure 4-31: Knowledge Creation, and Service Innovation enabled by Design Thinking in STAR

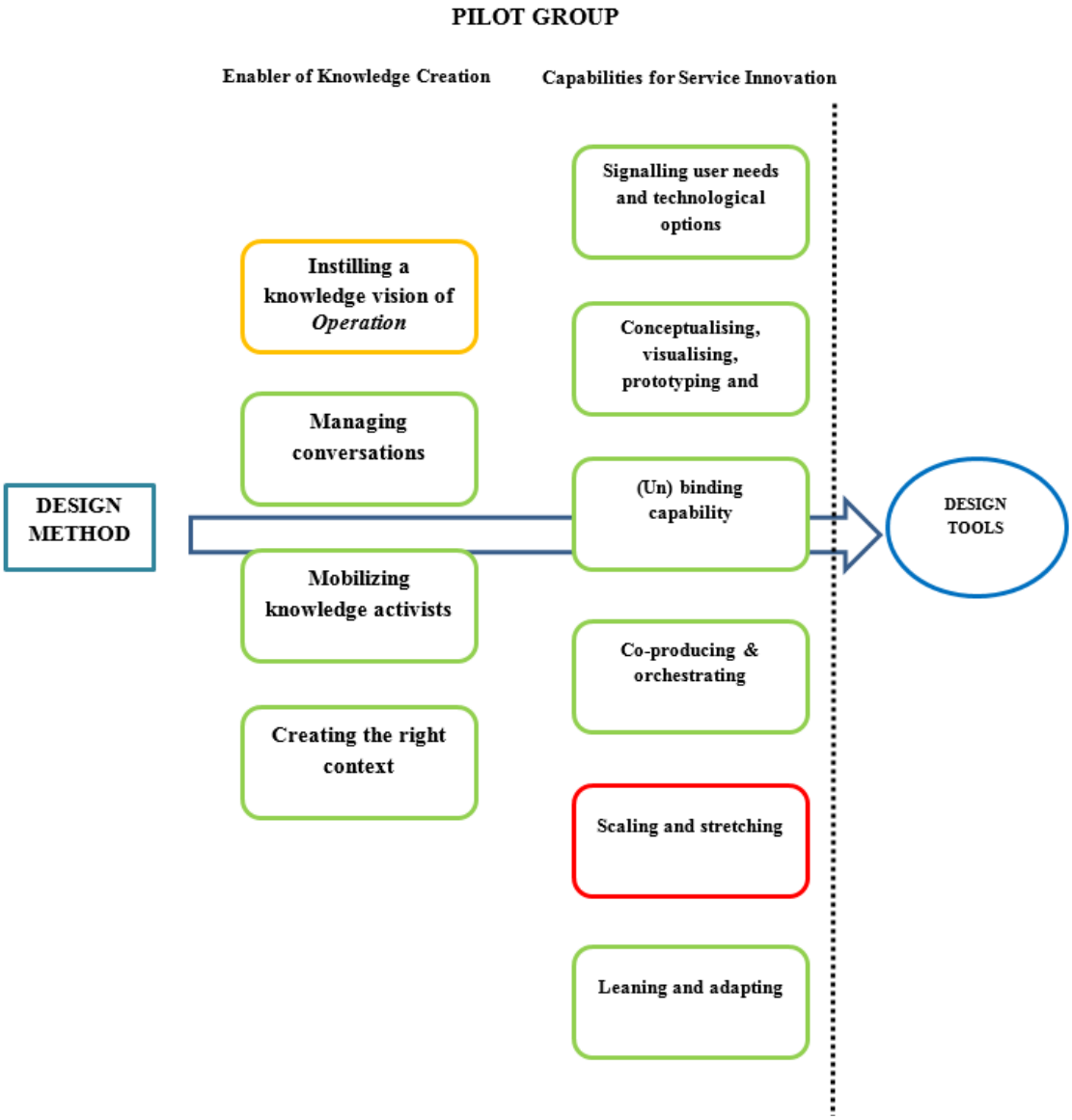

Figure 4-32: Knowledge Creation, and Service Innovation enabled by the Design Thinking in MOON

The results suggest that, except for the enabler of globalising local knowledge, participants were enabled to use the design thinking to exchange knowledge in both pilot groups. However, these two pilot groups were different in the knowledge vision resulting from the intervention of CCoI. Indeed, the same vision for this project, which was to improve the performance of the company by enhancing the efficiency of operation, was created in the beginning. However, the service vision was created unexpectedly only in STAR, which further encouraged the company to implement the design thinking across the organisation in the long-term.

Regarding the capabilities for service innovation enhanced by design thinking, value that CCoI created through service was not promoted to the participants with a product or

process perspective. This finding echoe the literature, in which prototyping is studied by the researchers into manufacturing and technological innovation contexts more than service contexts (den Hertog *et al.*, 2010). On the other hand, prototyping is mentioned in service literature as a critical step in developing service innovation (Zomerdijk and Voss, 2010). The service value in entrepreneurship, process of working together and open service innovation culture were however not highlighted in both groups as the enhancement in efficiency. This perception of value in operation eventually resulted in the containment of the outcomes within the pilot group in MOON.

The finding that the recognition of service as a value is critical for translating design thinking into dynamic capabilities for service innovation across an organisation corresponds to Kindstrom *et al.* (2013). They suggest that when a manufacturing firm transforms into a service-based business model this capability cannot be achieved until the participants perceive the value of service rather than product. Findings from both cases support this assertion; the long-term value of the design thinking in service must be revealed in order to expand the achievement of the pilot group to the entire organisation in the long-term.

The next section will concentrate on knowledge exchange across the organisation in both cases.

4.4.3 Findings on Knowledge Exchange

As mentioned at the beginning of this section, two phases of knowledge exchange were identified in both cases.

The first phase of knowledge exchange, discussed in 4.4.2.1, took place in the pilot group because of the CCoI intervention. Key participants included the staff across the companies, top managements and researchers from the GSA. Facilitated by the design thinking and design tools, various activities were organised to visualise problems, understand the design thinking, cultivate confidence among the participants, and provide an open, equal, interactive space within which the participants could exchange knowledge.

The second phase of collaborative knowledge exchange for service innovation took place only in the case of STAR. Each member of STAR was transformed into a knowledge activist who contributed his or her knowledge about products, marketing or other issues

relevant to the development of solutions. The POD manager mediated and motivated internal knowledge exchange specifically to each client in order collaboratively to develop solutions. This process comprised two stages. In the first stage, staffs from various departments were invited to a POD to exchange knowledge with clients. The second stage of knowledge exchange engages the members of the organisation internally to develop and filter potential solutions. Assisted by the design tools developed in the pilot group, potential solutions are prototyped and compared against evaluation criteria. The most efficient and feasible solution is selected by participants before implementation. The development of those solutions is based on the implicit knowledge of staff. This finding embraces the assertion by Krogh *et al.* (2000), Nonaka and Nishiguchi (2001), Kenney (2001), and Andreeva and Kianto (2011) that knowledge and skills are critical to the provision of distinctive service, which is defined in this research ss solutions co-created with customers. Moreover, this finding also corresponds to the statement by Lusch and Vargo (2008) that 'solution offerings are co-produced by involving shared inventiveness, problem solving, co-design, or shared implementation with customers and other partners in the network'.

In addition, both cases primarily rely on the implicit knowledge of staff for developing new concepts of service. In the case of STAR, members of the organisation contribute not only their professional knowledge but also their implicit knowledge derived from their everyday understanding of clients, markets, or products. This finding confirms the conclusion by Andreeva and Kianto (2011) that non-knowledge-intensive companies 'will benefit more from knowledge sharing for their knowledge creation purposes and ultimately innovation'. The findings from both cases agrees with the statement made by Andreeva and Kianto (2011) that companies which are less knowledge intensive will explore the explicit and implicit knowledge already existing in the organisation for innovation.

Collaborative knowledge exchange in STAR is facilitated by design thinking through POD. The critical role of new delivery system in terms of culture, structure and personnel in enabling effective knowledge creation underpins the emphasis of Nonaka and Takeuchi (1995) on the importance of collaboration and a culture of knowledge creation. STAR is market-led and service-oriented with each solution co-created as a service.

Additionally, service innovation in STAR, resulted directly from the first phase of knowledge exchange. Failing to create new service delivery system, the second phase of

knowledge exchange between the internal networks, however, did not take place in MOON.

Finally, the success of STAR in constantly conducting service innovation by engaging staff in the process of knowledge exchange underpins the Personal Knowledge Network (PKN) articulated by Chatti (2012), who positions the individual as a focal point of the network for knowledge creation. POD provides a mechanism and space for the staff to inquire, test and adjust their solutions continuously and efficiently by positioning them in the centre of a network. Therefore, the self-organising, collaborative, open, bottom-up and self-directed method of knowledge creation, as stated by Chatti (2012), is verified in STAR and is proved to be more suitable for SMEs in creating knowledge, and leads eventually to constant service innovation.

4.4.4 Findings on the Service Innovation

Findings from the two cases regarding service innovation, under the framework of the 6-D model, are displayed in Table 4-8. Identified dimensions of service innovation are marked in green, while unachieved dimensions are marked in red. Dimensions of service innovation that are partially achieved are marked in yellow.

Dimensions of Service Innovation (den Hertog *et al.*, 2010)	Results of STAR	Results of MOON
NEW SERVICE CONCEPT	• New products were solutions specified to clients' requirements; • New solutions were developed from collaborations between STAR and the clients; • More innovative products were resulted from short-term relationship; • New solutions are developed and filtered in POD.	• New service concept as a solution is only observed for the new designs developed by MOON and the interior design houses; • Designs for most of the businesses are exclusively from the clients, while MOON plays the role as a supplier; • Novelty in design is subject to the influence of MOON on the process of collaboration with clients; • Innovative solutions come from short-term relationship with new clients; • Only the design team play the role in the collaboration with the customers.
NEW CUSTOMER INTERACTION	• Staff interact with customers through POD for solutions.	• MOON does not interact with most of its customers for solution development, as they primarily rely on the design team for product development; • The design team interact with the customer in a formal and exclusive way without involving other members of the organisation.
NEW VALUE SYSTEM	• No external partners are involved in the delivery of new services; • Internal collaborations were found among the staff for developing and delivering new solutions in POD.	• MOON is not observed to have partnership with suppliers in the value network for developing services; • Partnership with clients for long-term is driven by financial interests; • Partnership with clients for shorter-term is more

		innovatively driven;
NEW REVENUE MODELS	• Costs are consumed by the company to establish partnerships; • Costs are shared with clients for solution development.	• Costs are consumed by MOON to build relationship with new clients; • Costs are shared with clients for new solutions;
NEW DELIVERY SYSTEM	• POD is the hub of communication between the clients and internal team of staff; • POD is an open place for internal knowledge exchange and development of ideas. • POD is a cohort of employees from different departments for solution development; • POD is marketing channel; • POD is a consequence of CCoI project.	• No service delivery system is observed in MOON; • Hierarchised, separated structure of the company;
NEW TECHNOLOGIES	• ICT is not intensively applied except for exhibition of the company; • New tools as a part of POD, introduced by GSA through CCoI project, are employed to assist the solution development.	• ICT is not intensively used for purpose of service innovation but a channel to display the products; • Tools used in CCoI project are preserved in the organisation for product development.

Table 4-8: Comparison between STAR and MOON by Dimensions of Service innovation

The process of knowledge exchange and its relationship with service innovation by the 6 dimensions in STAR and MOON are displayed in Figures 4-33 and 4-34 respectively.

The collaborative nature of service innovation by Vargo and Lusch (2006), is highlighted by the value co-created between providers and users. The 6-D model is adopted by this research to define service innovation and to frame data analyses. This research, upholding a service dominant logic, focuses on innovation in service rather than on product or process. Service innovation is recognised as a solution resulting from collaboration among key stakeholders. Based on the two cases, the following conclusions can be made about service innovation:

1) The most innovative solutions result from collaboration that takes place at the conceptual stage. The long-term relationships between both companies and their clients are more financially orientated, prohibiting them from being innovative;
2) Interactions between both companies and their long-term clients are more stagnant, formal, and less innovative than those with short-term clients. Though MOON collaborates with its interior design house or business partners in developing designs, it does not interact with these customers through a new interface like POD, but in formal, exclusive meetings. For this reason, new customer interaction is not detected in this company;
3) New value system, by this definition, was not detected. Both companies do not collaborate with external partnerships in order to provide service or products. This finding partially contradicts the statements by Terziovski (2003), Cricelli and Grimaldi (2010), Westerlund and Rajala (2010), Ampantzi *et al.* (2013) that SMEs rely on external business partners and clusters for innovation and knowledge creation, but agrees with Krogh *et al.* (2000) and Nonaka and Nishiguchi (2001) on the internal interaction for knowledge creation. However, because of its collaborative nature, the internal network engaging the staff, as it is in STAR, also plays the role of a new value system in developing and delivering solutions;
4) Both companies attract new clients by bearing the costs of potential solutions alone. The costs development and production, however, are shared by both the companies and the clients for financial reasons, and in order to manage collaboration with clients;
5) The new service delivery system provides both a place for new customer interaction, and a milieu for co-creating the concepts of service. SMEs identified as separate, formal and product-oriented need to transform into businesses that are

collaborative, informal and service-oriented in order to innovate in services. MOON, by contrast to STAR does not extend the innovative culture and collaborative knowledge exchange that it achieved in the pilot group to the rest of the company. Therefore, this new service delivery system does not occur in MOON. The finding from STAR contradicts the statement of Laforet and Tann (2006) that SMEs are less willing to use cross-functional teams for innovating, which is nonetheless supported by the finding from MOON;

6) Neither company employs ICT to deliver new services. However, defined by den Hertog *et al.* (2010) as a manner to facilitate 'multi-channel management, customisation of services, introduction of self-service concepts and virtual project teams', this dimension can be extended to other tools, as far as they enable and support other dimensions of service innovation. In both cases, the design tools, introduced by GSA and adapted by staff in the pilot group, were applied in developing new solutions. Therefore, design tools are treated as a part of the new service delivery system.

By comparing the service innovation identified in both cases, it is apparent that whether CCoI can foster service innovation (by the six dimensions that den Hertog *et al.* (2010) suggest) is dependent on the creation of a service delivery system, which not only combines the dimensions of new customer interaction, new value system and new tools, but also transforms the company into a customer-oriented and collaborative business, by instilling the principles of CCoI throughout the entire organisation. From the SDL perspective, the success in service innovation is dependent on the ecosystem and platform to motivate, enable and engage actors across the organisation for value co-creation (Lusch and Nambisan, 2010). In the case of STAR, such roles are played by the POD, which is translated into the service delivery system being the personnel, culture and organisational structure under the framework of the 6-D model. Putting the six dimensions of service innovation under the inspection of SDL, the new service delivery system is recognised as service innovation resulting from a process of collaborative knowledge exchange engaging internal actors, whereas other five dimensions, from new service delivery technology to new concepts of services, are seen as outputs of such as process.

Moreover, the design tools introduced by the GSA are preserved in both cases. They are employed to develop the products in both companies. In MOON, however, the design tools do not make any apparent difference to the other activities managed by the design team.

Therefore, these design tools are employed to deliver service innovation on the condition that it is integrated into the new delivery system.

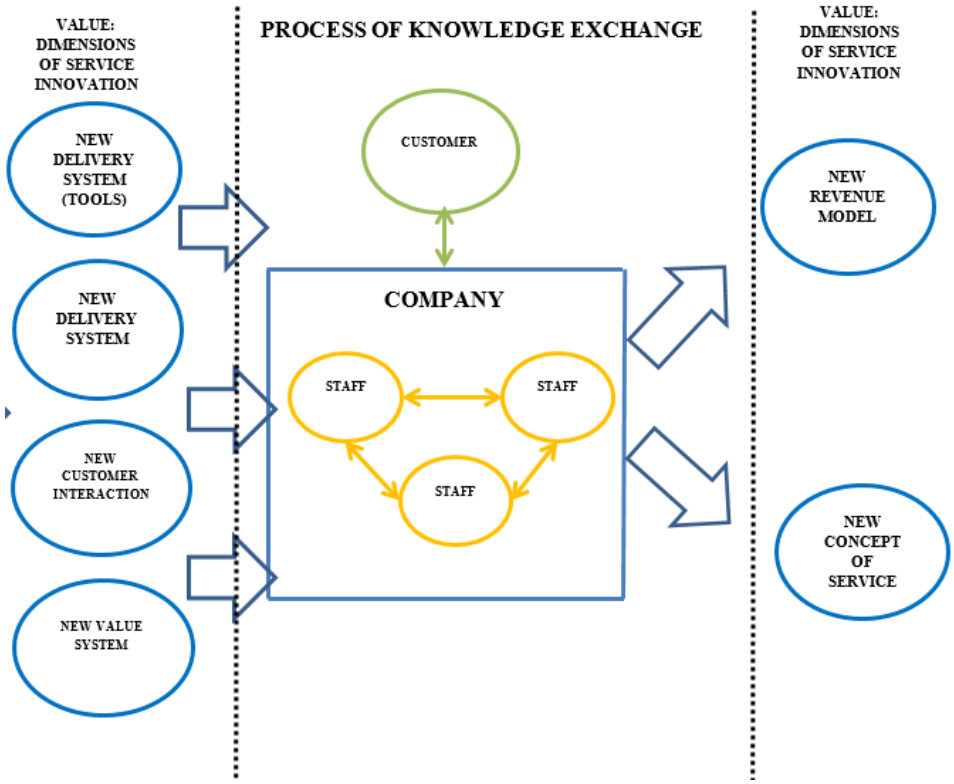

Figure 4-33: Service Innovation identified in STAR

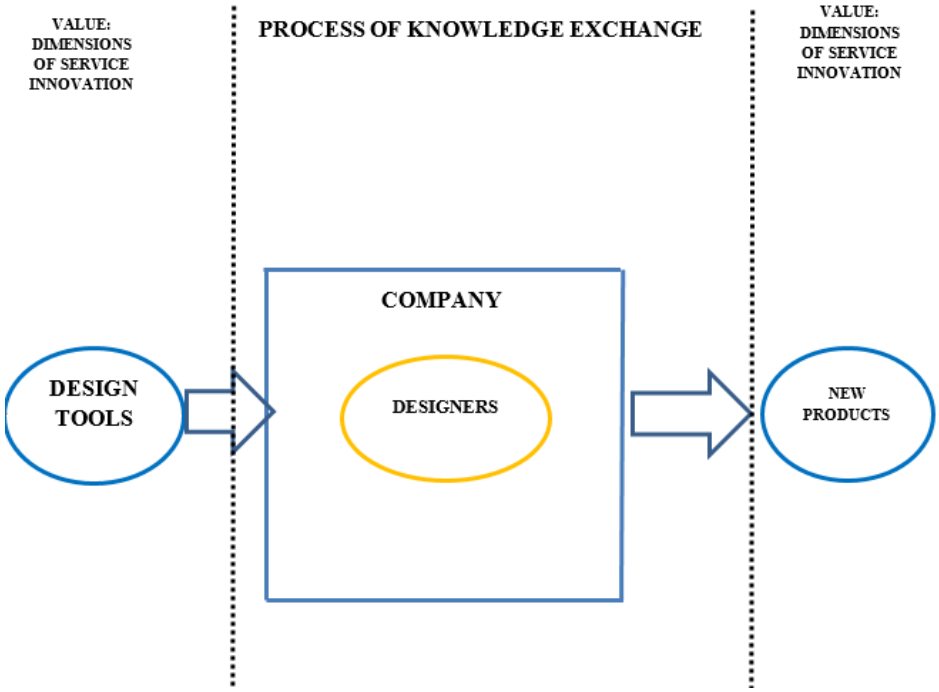

Figure 4-34: Process of Production Development in MOON

Figures 4-35 and 36 illustrate the relationships between knowledge exchange, service innovation, CCoI and the key contributors.

Apart from the improved performance in operation that both pilot groups accomplished, as Figure 4-35 demonstrates, STAR extended the pilot group to the rest of the company. The company was further transformed from a hierarchised, separated company into a flattened, market-oriented and collaborative organisation for effective knowledge exchange. Most of the solutions it now provides are a result of co-development, both between the company and the clients, and between the staff. In contrast, the structure and culture of MOON, as Figure 4-36 shows, remained unchanged after the pilot. For this reason, service innovation, being a process of knowledge exchange for value co-creation instead of an output as Lusch and Nambisan (2015) defined, is not observed to constitute the majority of MOON's businesses.

On closer inspection, it is noticeable that the second phase of knowledge exchange is subject to the creation of the service delivery system. The creation of the service delivery system is dependent on whether the design thinking practiced in the pilot group is incorporated into the entire organisation. From an SDL perspective, the service delivery system needs to evolve into an ecosystem and platform, which engages actors across the

organisation to co-create value (Lusch and Nambisan, 2015), thus enabling service innovation on an organisational-level.

The first phase of knowledge exchange, three actors are identified to have played critical roles in the pilot group, namely the staff, top management and the researchers from the GSA. As CCoI succeeds in STAR but fails in MOON to influence the entire organisation, it is necessary to identify how those actors contribute to the success or failure of both the project and to the development of service innovation. The next section is a discussion on CCoI. The role of top management in developing service innovation will be further reviewed in the case of GALAXY.

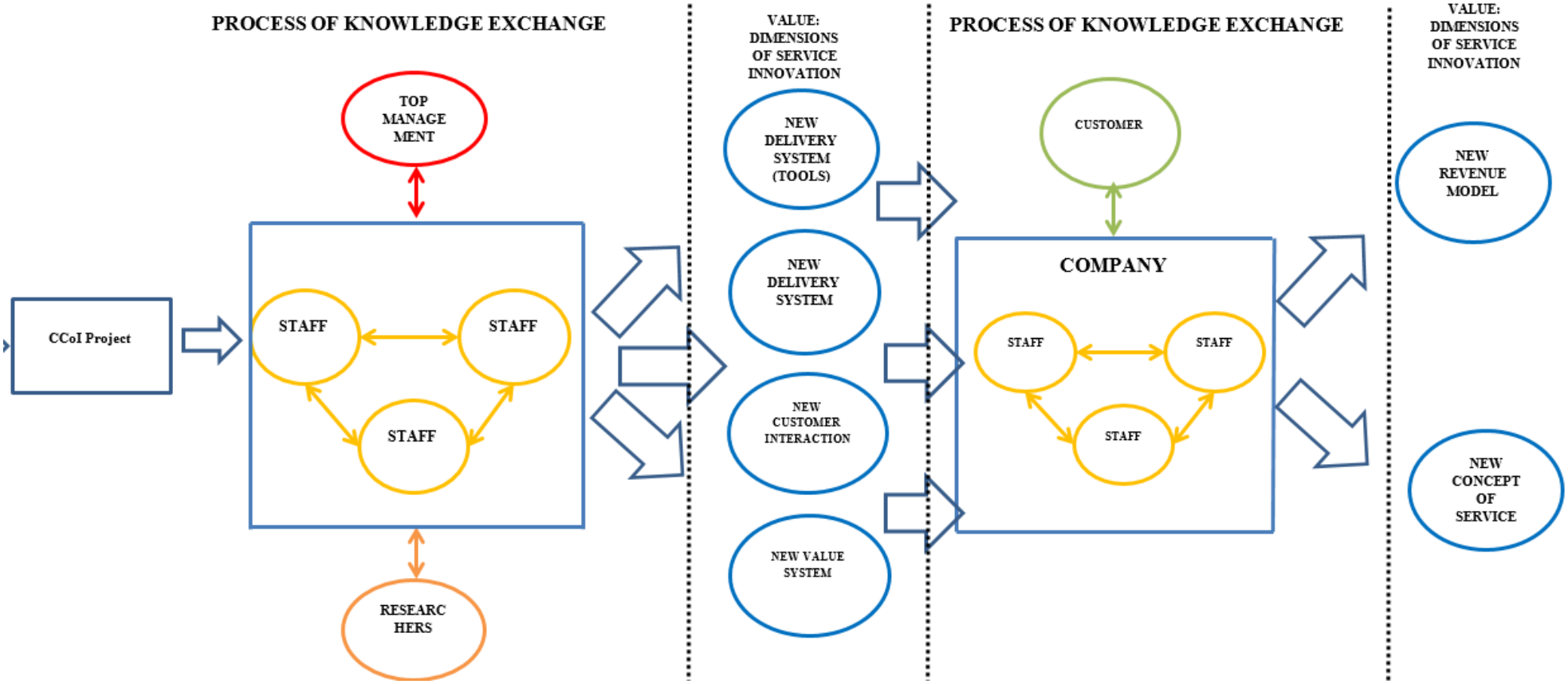

Figure 4-35: Relationships between Knowledge Exchange, Service Innovation, CCoI and Key Contributors in STAR

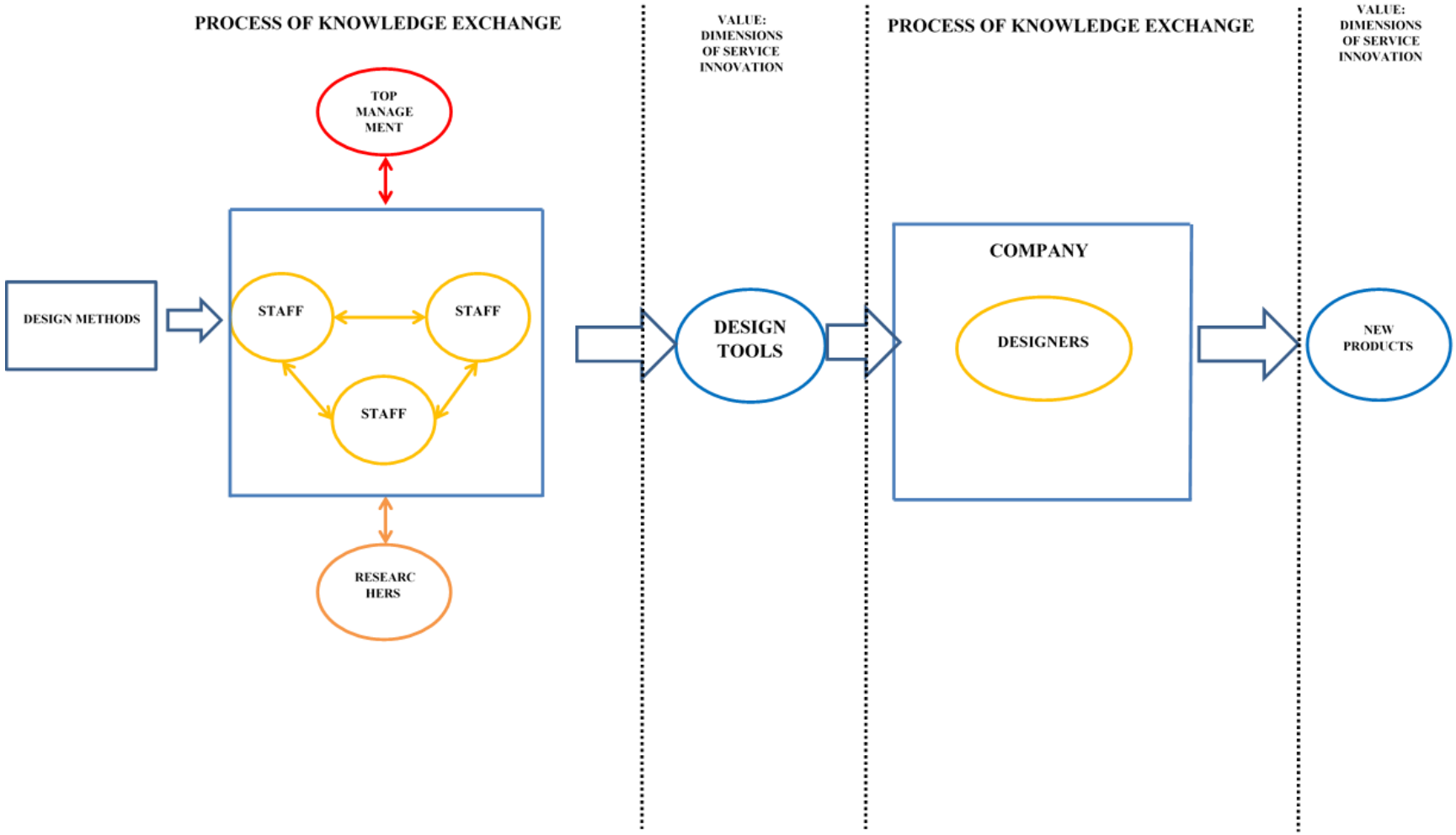

Figure 4-36: Relationships between Knowledge Exchange, Service Innovation, CCoI and Key Contributors in MOON

The findings about service innovation and knowledge exchange in the pilot groups of CCoI and knowledge exchange in the companies, are discussed in section 4.4.4. By referring those findings back to the literature about knowledge creation and capabilities for service innovation, the following points are highlighted, demonstrated in Figures 4-37 and 38, regarding the impact of the intervention of CCoI on the two companies:

1) New concept of service is developed based on knowledge exchange between the company and customers, as well as the knowledge exchange among staff inside the company. The supportive dimensions of service innovation are the direct, though unexpected consequence of CCoI intervention. The absence of such dimensions leads to an unchanged organisational structure, culture, and knowledge exchange, and eventually to the prevention of CCoI from influencing the entire company;
2) Service innovation and collaborative knowledge exchange are made possible by the design thinking in the pilot groups in both cases. However, the short-term and product-focused vision of the pilot group in MOON impedes the company from extending design thinking to the rest of the organisation. In contrast, the service-focused vision created in STAR encourages and enables the participants and directors to disseminate the design thinking to the rest of the organisation, which further influences the entire company collaboratively to exchange knowledge and eventually undertake service innovation;
3) Therefore, the capability of the design thinking to foster collaborative knowledge exchange and service innovation in the pilot groups is justified by the two cases. However, a service vision for knowledge exchange, and the mobilisation of top management as knowledge activists are highlighted as critical factors in ensuring organisation wide dissemination.

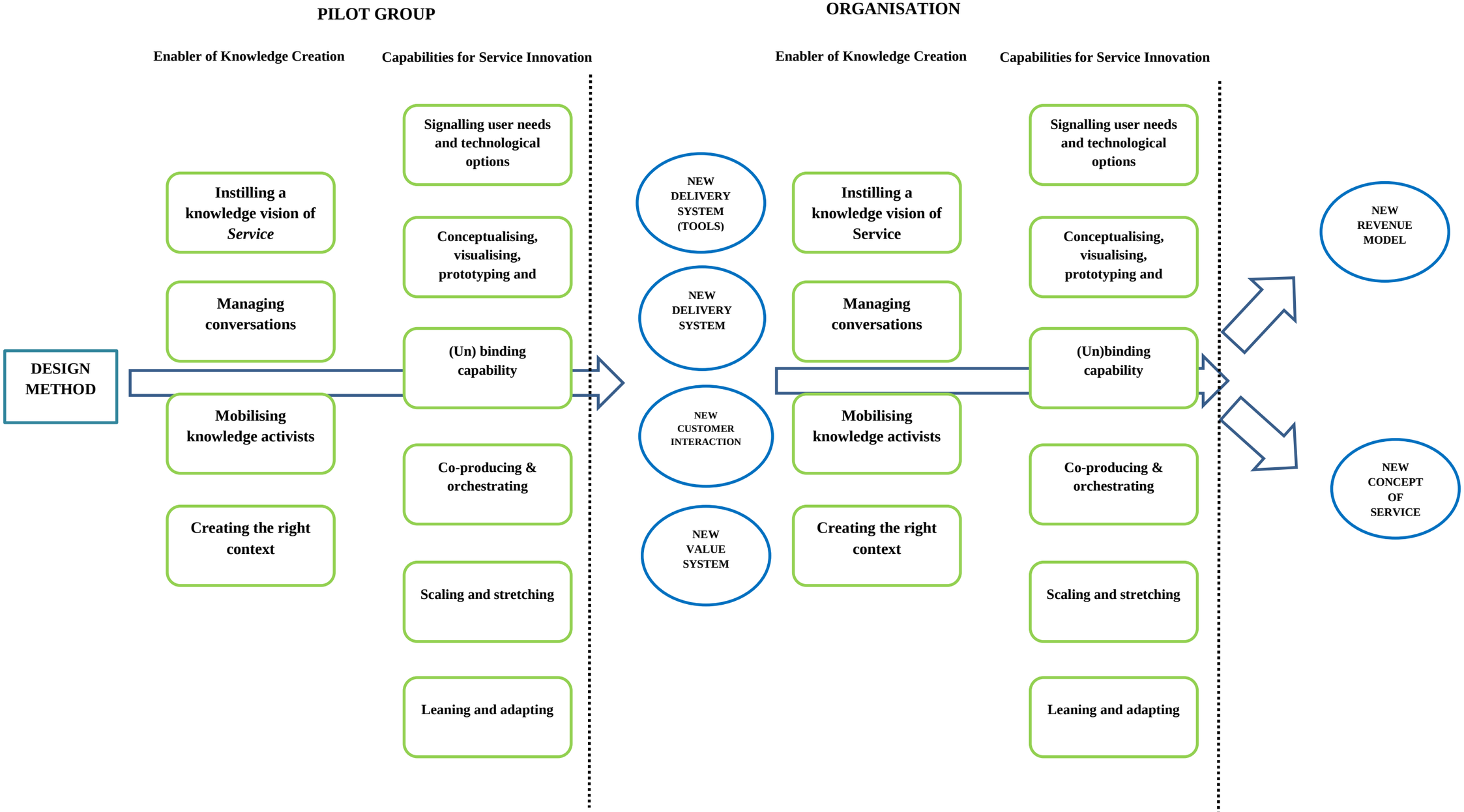

Figure 4-37: Enabled Pilot group and Organisation for Knowledge Creation and Service innovation by Design Thinking in STAR

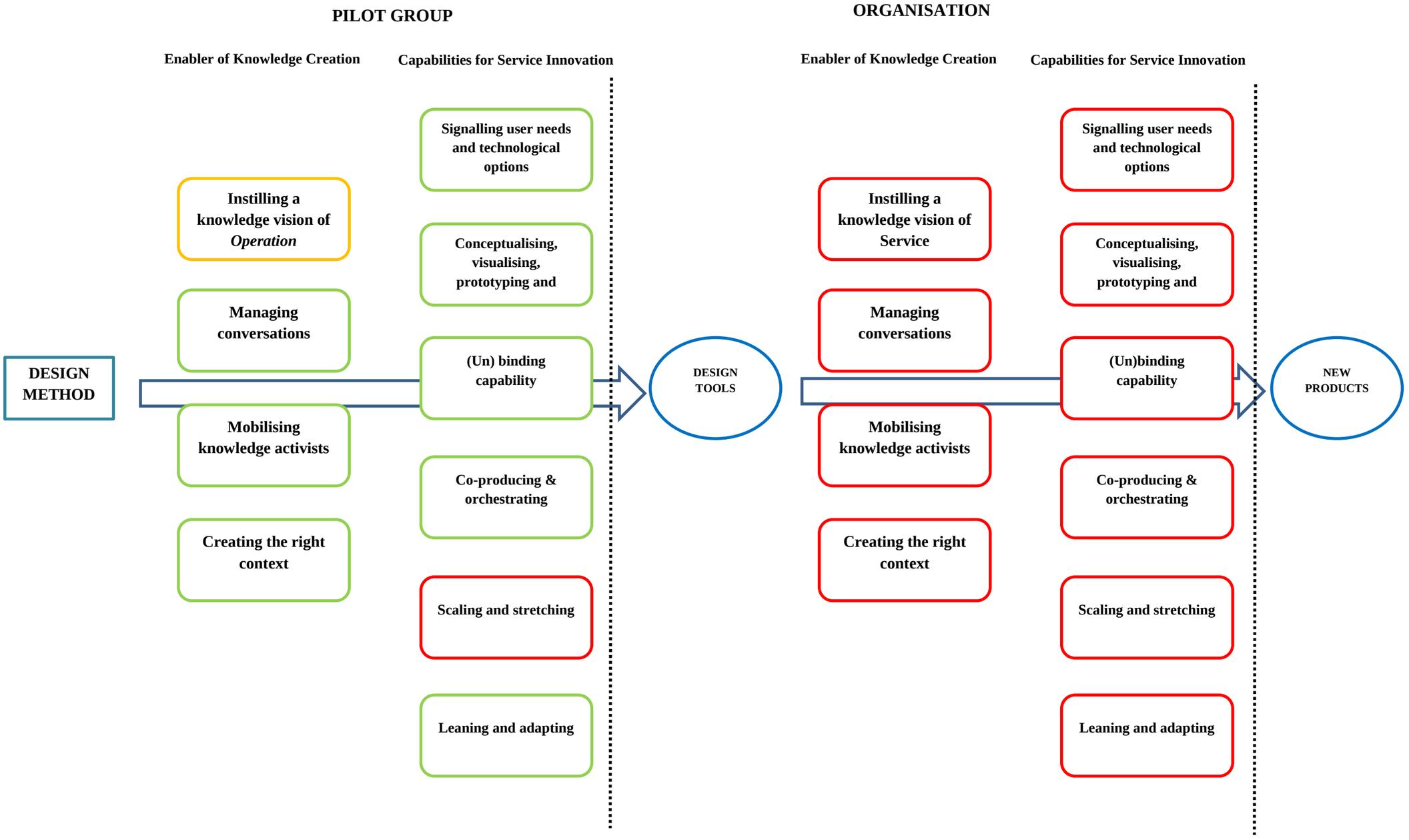

Figure 4-38: Enabled Pilot group for Knowledge Creation and Service innovation by Design Thinking, and Unchanged Organisation in MOON

The findings and discussions based on the cases of STAR and MOON primarily responded to the first four questions developed in 1.4. By doing so, the following issues in association with the research intention remain unaddressed:

1) The new value system, defined as a dimension of service innovation that encompass the partners in the network, is not fully covered by either case, as neither were designed to engage with business clustering as such;
2) The highlighted factors for the extension of knowledge exchange and service innovation to the entire organisation, namely the role of top management in adapting the capability of service innovation and the role of the design thinking in enabling firms to innovate on service, needs to be validated in the service sector;
3) The service vision for knowledge exchange as a decisive factor for the design thinking, which was explored by both cases in manufacturing sector, needs more data in service context;
4) Collaborative knowledge exchange among SMEs within a cluster for service innovation needs to be addressed to respond to question 4.

To address the above, the explorative study will be extended to the case of GALAXY before conclusions are drawn in Chapter 5.

4.5 Case of GALAXY

The GALAXY case study will be presented in two parts; in order to address the unsolved issues which are identified in 4.4.4. The first part will discuss service innovation identified in Hotel A, which is a member of a tourist cluster, called GALAXY. Knowledge exchange in Hotel A for service innovation will be discussed to validate the role of top management. Another rationale for looking at Hotel A as a part of GALAXY is to highlight the role that design thinking plays in enabling knowledge exchange as well as service innovation. Process of data collection and participants profiles were provided in 3.5.2 and 3.5.3.

Sponsored by the local enterprise council, in 2014 the GSA intervened in the businesses in this area, most of which are SMEs, 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 intervention aimed at developing existing offers from local businesses, exploring new opportunities, boosting business incomes, identifying clusters of local businesses, catalysing creativity of the participants, and cultivating creative, entrepreneurial environments in the network (McNally, 2010). The project was initiated by engaging twelve members (KEG1). The number of participants has now increased to seventy (NSG8). Like STAR and MOON, design thinking and tools were applied in the pilot group. An organisation, called GALAXY, was founded because of the intervention. The manager of Hotel A, which is also the chairperson of GALAXY, the Owner of Hotel A and Researcher 1 being the intervention-led were interviewed. In addition to the primary data, reports on the project, finished in 2016, are cited as secondary data.

Profiles of the participants are outlined in Table 3-5.

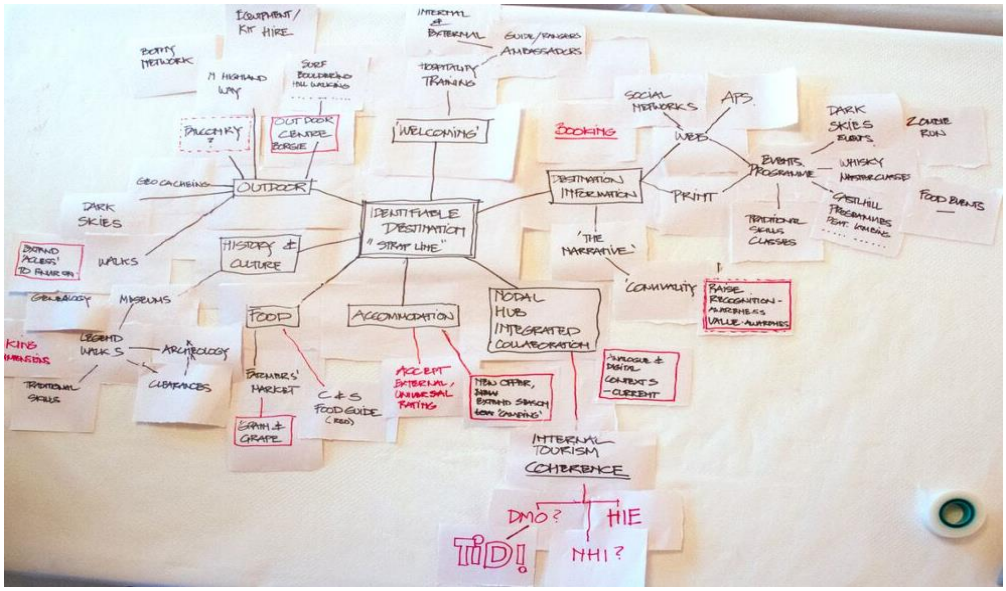

Figure 4-39: Activities in GALAXY

4.5.1 Data Analysis: Dimensions of Service Innovation in Hotel A

Results of the analysed data are displayed by following the 6-D model of service innovation. The coded data can be found in Appendix 1.

4.5.1.1 New concept of service

The owners of hotel A explicitly showed their interest in exploring opportunities to provide a unique service that adds value to their existing business by observing and responding to the needs of clients (NSG1).

> *'Owner of Hotel A: We always look to see how we can have value to anything that would provide in the restaurant, you would be imagining, from wines to the food…'* (NSG1)

Customers are not involved in the development of those services. Chairperson of GALAXY described how they spotted a gap in the market by citing an example. Three years ago, they noticed that business travellers needed vehicles for their trips in this area, but the rental service was closed at the weekend. So, chairperson of GALAXY negotiated with the local garage to rent its cars at a lower rate when they were not being used (NSG1).

> *'Chairperson of GALAXY: Three years ago you (Owner of Hotel A) noticed a gap in the market, for (car) rental. So we bought one vehicle (service), which is rented to, you know, to customers… So someone came to the area and said 'I want to hire a car.' There wasn't a service. So the partnership (with the local garage) came about as a result of that. We said to them, because they are shut on the Sundays, we said to them 'you give us a couple of cars and we'll keep them working; make sure it's filled in for you.' So we did that. As well as we buy the car (service), we rented out to people.'* (NSG1)

As well as the rental service, they mentioned another case where they added value to their business by collaborating with partners to provide a swimming facility. They identified a customer demand for leisure facilities, so they collaborated with a local swimming pool and gym (NSG1).

> *'Chairperson of GALAXY: We were the first hotel in the area to have local swimming pool. It would cost us quite a lot of money to put up a swimming pool… So we built a relationship with the pool; so we pay the pool at a reduced rate and we have cars. (Customers) can access the local pool and local gym.'* (NSG1)

Owner of Hotel A argued that these examples testify to a desire to provide a better service, delivered by collaborating with local businesses (NSG2).

> *'Owner of Hotel A: If there was anything more we could do for them. Hire a car came about, we've been also in partner with the local garage, and we can have the cars delivered here to whatever they want at any time, because people find it not very easy to get hired cars. So we thought about a gap on market. So we do speak to other businesses whether we can try to add value to our business.'* (NSG2)

4.5.1.2 New Customer Interaction

The hotel primarily relies on informal interaction with customers for accessing information about their needs (NSG2).

'Owner of Hotel A: By speaking to them, by interacting with them, and asking them about what they needed, if there was anything more we could do for them.' (NSG2)

In addition, both traditional media, such as customer feedback forms, and social media *i.e.* Facebook, are used by the customers to leave feedback and for the hotel to advertise (NSG2).

'Chairperson of GALAXY: A lot of this is done because people here know that we provide the high quality, good service and we really look after them well; so that's really a word of mouth… we do advertisements on local paper, we do it quite a bit in social media, Facebook, Twitter… we do mail and emails; we built up-of-date base of people.' (NSG2)

4.5.1.3 New Value System

Hotel A collaborates with local businesses to provide services that it cannot provide on its own. As well as the examples of car rental and the swimming pool, it has built a long-term partnership with a local whisky distillery and family firms which collaboratively provide authentic experiences to business travellers, and promote local tourism (NSG3).

'Chairperson of GALAXY: We promote the local produce. So that's the whiskies, we actually have our own bottled whiskies.

GB: So you have the relationships with the local businesses for offering these services and products. Are they permanent or temporary, I mean these relationships with these local businesses?

Chairperson of GALAXY: I think they are permanent. It's been there for 60 years.

Owner of Hotel A: We also have relationships with other suppliers, whisky supplier, family firms involved. We have the relationships with them as suppliers of whisky as well, and they don't just sell us whisky, we have selected whisky for us, we will select together (with the distilleries).' (NSG3)

4.5.1.4 New Revenue Models

No explicit evidence shows that Hotel A shares revenue or costs with its partners in the provision of new services. As the partnerships with the local businesses, temporary or permanent, are neither contract-based nor formal, Hotel A paid the partners for costs associated with their facilities. Consequently, Hotel A plays the role of intermediary without charging any commission. (NSG5).

'GB: Do you share the revenues and costs with these partners on contract?

Chairperson of GALAXY: We don't share any revenues. We just pay them for six cars, and our residences use the cars. So it's added extra for hour. So added extra hour our guests, but it also showing them what it is in the area. A part from the benefit that people thinking 'yeah it's really great to stay in MC hotel because they do all these things for you', there is no perceivable they look for us.' (NSG5)

4.5.1.5 New Service Delivery System: Personnel, Organisation, and Culture

Chairperson of GALAXY expressed disappointment in not managing to effectively convey to staff the need for a quality service provision (NSG4).

'GB: Regarding your staff, how do you organize your business and staff, to promote your service? To boost your service?

Chairperson of GALAXY: That's probably one of the most disappointing aspects of the hotel Bin. Because we have tried to use trainings to promote the business for every person … and they are not really interested in it. But on other hand I would say is, we've just gone through the assessment in the people process and the assessor asked me if I have any questions, particularly I wanted that, then I wanted to know, if they were money-oriented. And she came back to me and she said 'no, they just love working here.' They don't really work with incentives; they don't really bother about it. So it's still working on.' (NSG4)

Staff appear unwilling to deliver the better services the owners are trying to promote (NSG4). The principles that the owners of the hotel want their staff to follow are neither effectively accepted nor understood.

'Owner of Hotel A: If I could add, you would be interested in a way you could install within the people, but it's trying to have the staff understanding what we are trying to achieve is very difficult. We found it's very difficult to take people install these ideas believes in them just in a classroom situation. We don't have the time, the facilities, and the type of person where that would work in a classroom situation. It's more on job training where people see. We have some staff that are better than the others, in dealing with people…We do train and encourage other staff to do that. Some other staff are not as comfortable at doing that…so it's the theory is fantastic but the delivery is taking a while.' (NSG4)

4.5.1.6 New Service Delivery System: technological

Even though social media is employed to advertise the hotel and to get feedback from the customers, ICTs are not used intensively for service innovation (NSG6).

'GB: Regarding the Facebook and social media you hire for accessing the information of customers, do you use it intensively or occasionally? How do you build the database of the customers?

Chairperson of GALAXY: That's two different things to me. The database for the mailings, we gather that information because we have our feedback forms, when people check in we pick up their emails. When people are dinning in here, there is a little feedback form they fill in for us as well.' (NSG6)

4.5.1.7 Findings about Service Innovation in Hotel A

The roles of the owners, staff, and local partners of Hotel A, including short-term and long-term partners, as well as their relations to the services provided to the customers, are displayed in Figure 4-40.

The interview identified three categories of services that Hotel A provides to their customers:

1) Standardised everyday services;
2) *Ad hoc* services provided in collaboration with local services;
3) Permanent services provided in collaboration with local businesses to promote local tourism.

The owners of the hotel play a critical role in identifying and developing these services. Customers are not engaged in the process of service development. However, such services are recognised as new concepts of service, which is a dimension of service innovation as defined by den Hertog *et al.* (2010) for four reasons:

First, though these services are not developed with the engagement of customers, they are created primarily through the staff and the owners.

Second, the provision of such services is based on the collaboration between the hotel and other partners, for the services that the hotel does not provide.

Third, the *ad hoc* services are provided by temporarily collaborating with local business such as the local garage or swimming pool. These services are realised by paying the local collaborators at a reduced rate, with Hotel A as an intermediary. The new way of sharing the costs in this case supports the service of Hotel A, and it is hence recognised to be a new revenue model as a dimension of service innovation.

Moreover, permanent services, such as the Whisky trial, are provided by collaborating with local businesses. This collaboration is more service-driven than finance-driven since for these services to be provided, Hotel A neither pays nor is paid. Hotel A co-develops these services with local business, and therefore the relationship is also identified as a new value system because of its collaborative nature.

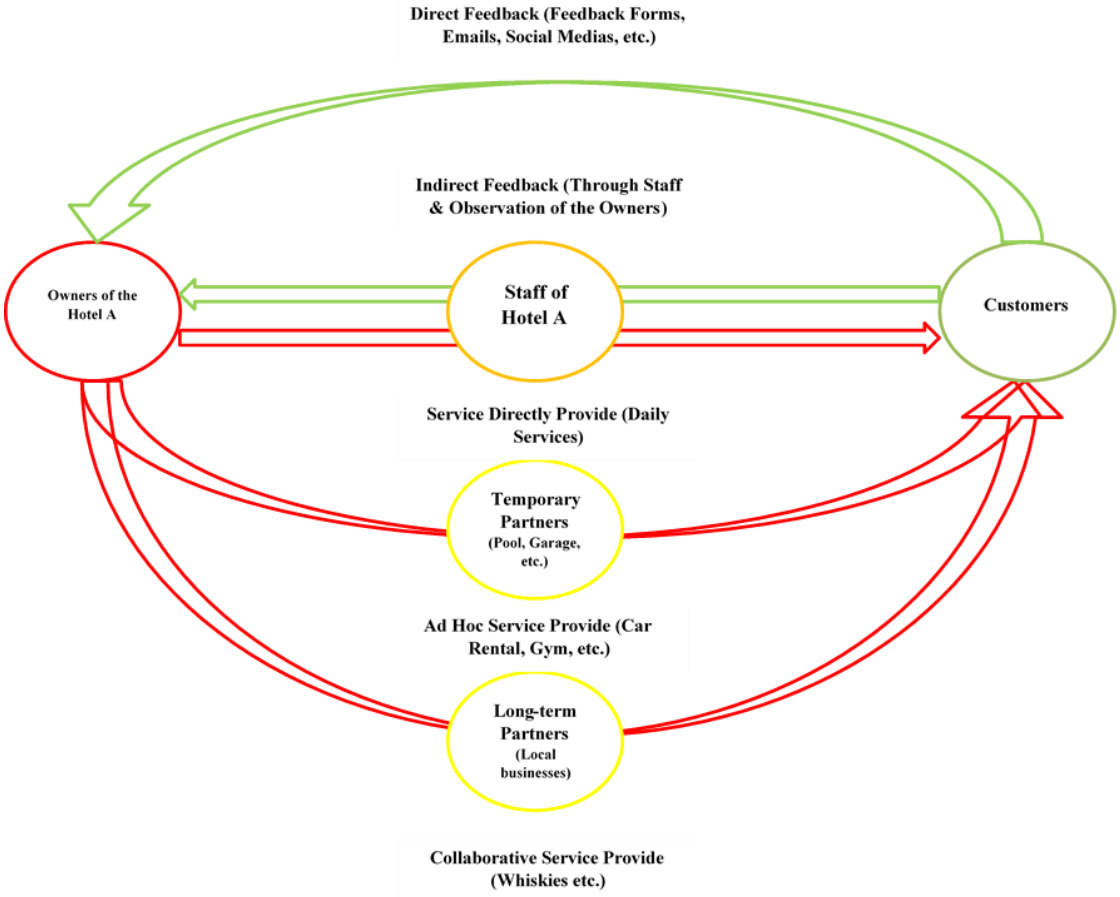

Figure 4-40: Process of Service Provision and Key Actors Involved at Hotel A

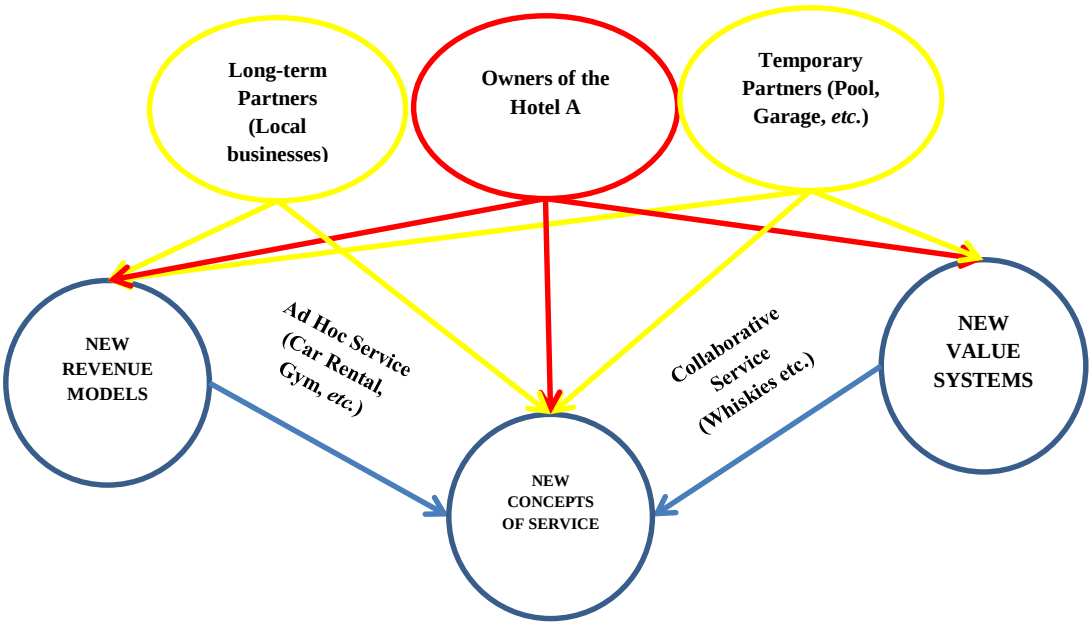

Figure 4-41: Dimensions of Service Innovation Identified at Hotel A

Based on the analyses above, the process of knowledge exchange for service innovation identified in Hotel A is discussed in this section. Three dimensions of service innovation, namely new revenue model, new concepts of service, and new value systems are identified. The following discussion will focus on how knowledge is exchanged between the critical contributors to realise the new services in Hotel A.

In terms of the new service concept, the owners of Hotel A attempt to add value to their business by providing an authentic and unique experience to their customers through service. However, they primarily rely on feedback from customers, formally through the internet or feedback forms, and informally through the staff of the hotel, to develop and provide *ad hoc* services, *i.e.* car rental or swimming pool. This process is highly informal and incidental; largely dependent on the intelligence they receive from customers by the ways mentioned above. The interviewees believed that the staff are aware of owners' intention for providing the best services to the customers by citing a case of how they fulfilled one customer's requirement for a special Scottish pastry (KEG1):

> *'Chairperson of GALAXY: Just a setting example Bin…the staff just know that what we want to do is to provide the best service. So if someone, for instance, they could find out that someone was a vegetarian, and we do have vegetarian dishes but that person likes particular things so they would come through to ask them saying 'is it alright? If we are going to do such and such.' And we would say 'yes.' We had another example from few years ago while a conversation here led the waitress to tell the kitchen that someone here has never tasted tattie scone, as it is called in Scotland, potato scone, they called our staff at the time to came*

> *through and she said 'we haven't made any but you might find to get some from Tesco tomorrow so they can have them for breakfast.' So that was a kind of the waiting staff telling the kitchen and then the kitchen staff coming to us because they wanted to do something great for the customer.'* (KEG1)

However, such knowledge remains implicit; therefore, the service provided based on this knowledge is highly incidental (KEG2, KEG3). From the instance in KEG1, the staff need permission of the owner to respond to the needs of the client, while the owners expect greater efficiency, constancy, and punctuality (KEG3).

> *'Owner of Hotel A: There is very open line of communication. (Chairperson of GALAXY: Too open sometimes (laughing)) But it's not successful, as we would like. Because sometimes the staff don't realize how important is the little things people tell. We are trying to make them aware of listening to what customers tell them, so they can use that information and… it's… we are very flexible. But we could only do and react to the information that was given. And in certain cases, we find that we don't get it early enough or, we don't get it at all. So it's really trying to find a way to encourage the staff to be as proactive as we are in adding value or finding out what someone really wants.'* (KEG2)

As mentioned in 4.5.1, Hotel A also collaborates with local businesses to develop *ad hoc* or permanent services. In the former case, the local garage and local gym do not play a role in developing these services. Hotel A does not exchange knowledge with these partners but pays them for those extra services. In contrast, as a part of its permanent services for promoting local tourism Hotel A actively collaborates with others in developing the service offering (NSG3).

In the absence of a new service delivery system, the hotel is traditionally organised with a hierarchised structure. Staff follow the instructions of the owners to provide services (KEG3). New services are fundamentally developed by the owners based on intelligence feedback directly from the customers or indirectly from the staff. The knowledge exchange process is one-way and formally organised, engaging the staff regularly with meetings. Though the owners show an interest in constantly providing the best services, they are prevented from effectively doing so because access to information about the needs of customers is limited (KEG3). Moreover, Hotel A is struggling to instil a principle of best service provision proactively in the staff (KEG3).

> *'Chairperson of GALAXY: We work with them; they see us how we are doing they see us how we interact with the customers.'* (KEG4)

4.5.2 Findings about Knowledge Exchange for Service Innovation in Hotel A

Based on Figure 4-41 the knowledge exchange process for the service innovation in Hotel A is mapped in Figure 4-42.

The three dimensions recognised as service innovation in Hotel A are: its *ad hoc* services, the new revenue model between the hotel and its temporary partners for services, and a new value system of the long-term partnership between the hotel and other local businesses. In the former case, as the services provided to the customers are determined by the owners of the hotel, the partners are not involved in the process of developing these services, but in supplying facilities. In terms of the *ad hoc* services, however, they are developed on the basis of knowledge about the needs of customers. A process of knowledge exchange between the staff and the owners is essential for those services to be developed.

On the other hand, the services for promoting local tourism and creating distinctive and authentic experiences are developed and delivered collaboratively with local partners. These services are neither temporary nor financially driven as are the *ad hoc* services.

The next section will look at service innovation and knowledge exchange in GALAXY, which is a result of the intervention of CCoI, in order to examine how service innovation is conducted in a cluster of SMEs, and how knowledge is exchanged in a network.

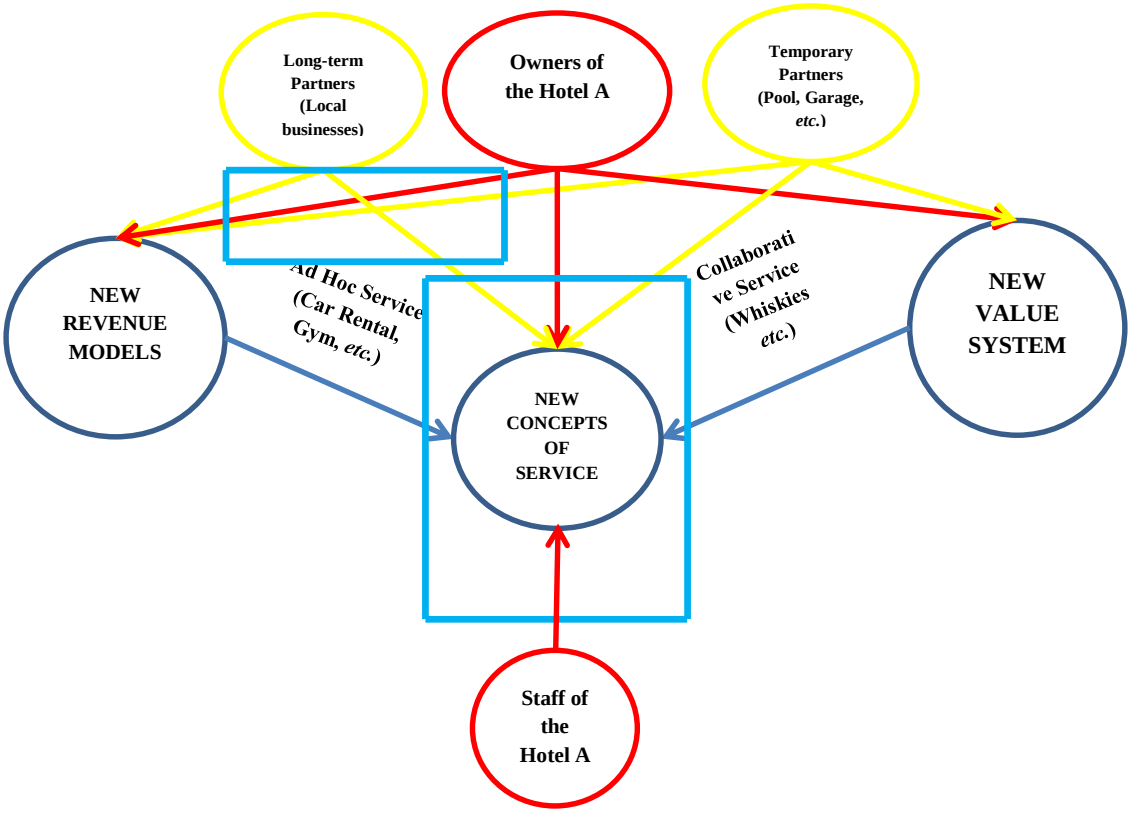

Figure 4-42: Process of Knowledge Exchange for Service Innovation in Hotel A

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, develops and manages those events by combining its existing services and products.

> *'Chairperson of GALAXY: GALAXY, the role is, GALAXY brought together some different businesses within this area. And what we want to do is, because some people say we want to increase the tourist footfall in this area. And we are doing that so for instance we've had a conference in the area, which was on social media. There is an archaeological festival on this weekend we sponsored that partly. And there is a food and drink festival on Oct. 10th, and GALAXY's organising that.'* (NSG7)

GALAXY plays a coordinating role and represents the cluster in regional forums (NSG10). Customers, however, were not found to play a direct role in developing services.

> *'Researcher 1: GALAXY at the moment is beginning to put together the coordinated offer, web offer and developing into paperwork work offer on tourism in this area.'* (NSG10)

A website was created as a portal for exhibiting services and interacting with customers (SIG5).

'GB: Can you give some specific examples about what they offer?

Researcher 1: There's a website called GALAXY, and next month I am going to a weekend festival which is to exploit and extol local projects and food and drink.' (NSG10)

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).

'Researcher 1: Our role was to build up a group of businesses that would begin to work together and use creativity and design methodologies; begin to develop something of significance to improve tourism in this area. And we had no idea how to do that, and what eventually happened in the name and everything came out of it was the work of the people who are members of that group, the twelve members.' (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 events they organise (NSG8).

'Chairperson of GALAXY: We, the revenue we generate are purely from membership fees. We have 70 members now. We also are funded. We have funding from (local enterprise council), we have funding from (local government), and we have funding from heritage lottery funding.' (NSG8)

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)

'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)

ICTs, as implied by Chairperson of GALAXY and Researcher 1 in NSG9 and NSG10, are employed to deliver a service by displaying the company identity, interacting with customers, and exhibiting their offers. In addition, social media is also employed.

4.5.3 Findings about the Service Innovation in GALAXY

Findings about service innovation, 6-D Model, are listed in Table 4-9 and Figure 4-43.

Dimensions of Service Innovation	Reference of Data	Findings
NEW SERVICE CONCEPT	NSG7, NSG10	GALAXY initiates, develops and conducts new services by combining products and services that are offered by the businesses scattering across this area. However, customers are not found to directly play a role in these processes.
NEW CUSTOMER INTERACTION	NSG10	GALAXY interacts with customers through the website, which is developed in the organisation by the members collaboratively.
NEW VALUE SYSTEM	NSG7, NSG10	GALAXY engages enterprises in this area for planning, developing, and implementing new concepts of service, including conferences and other events, to leverage the local tourism.
NEW REVENUE MODELS	NSG8	Apart from the sponsor of local councils and charities; the members share costs of GALAXY together.
NEW DELIVERY SYSTEM	NSG9, NSG10	Members of GALAXY collaboratively develop services, including events and other activities, with the shared identity of GALAXY. These processes take places in the organisation with members

		involved.
NEW TECHNOLOGIES	NSG9, NSG10	Design thinking derived from the pilot group of CCoI is employed for knowledge exchange. Information technologies are also hired for communications.

Table 4-9: Summary of Service Innovation observed in GALAXY

All six dimensions of service innovation, as Figure 4-43 demonstrates, are identified in GALAXY. Collaboration is featured in GALAXY by the development of new service concepts. However, customers are not directly engaged in the process of collaboration. On the other hand, the members of GALAXY are found to be contributors to the collaborative development. Moreover, the role of CCoI in the development of service innovation is highlighted in the findings, as dimensions of service innovation result from practice gained in the pilot group. Finally, the pilot group, which engaged 12 businesses in this region, is organised by the CCoI intervention.

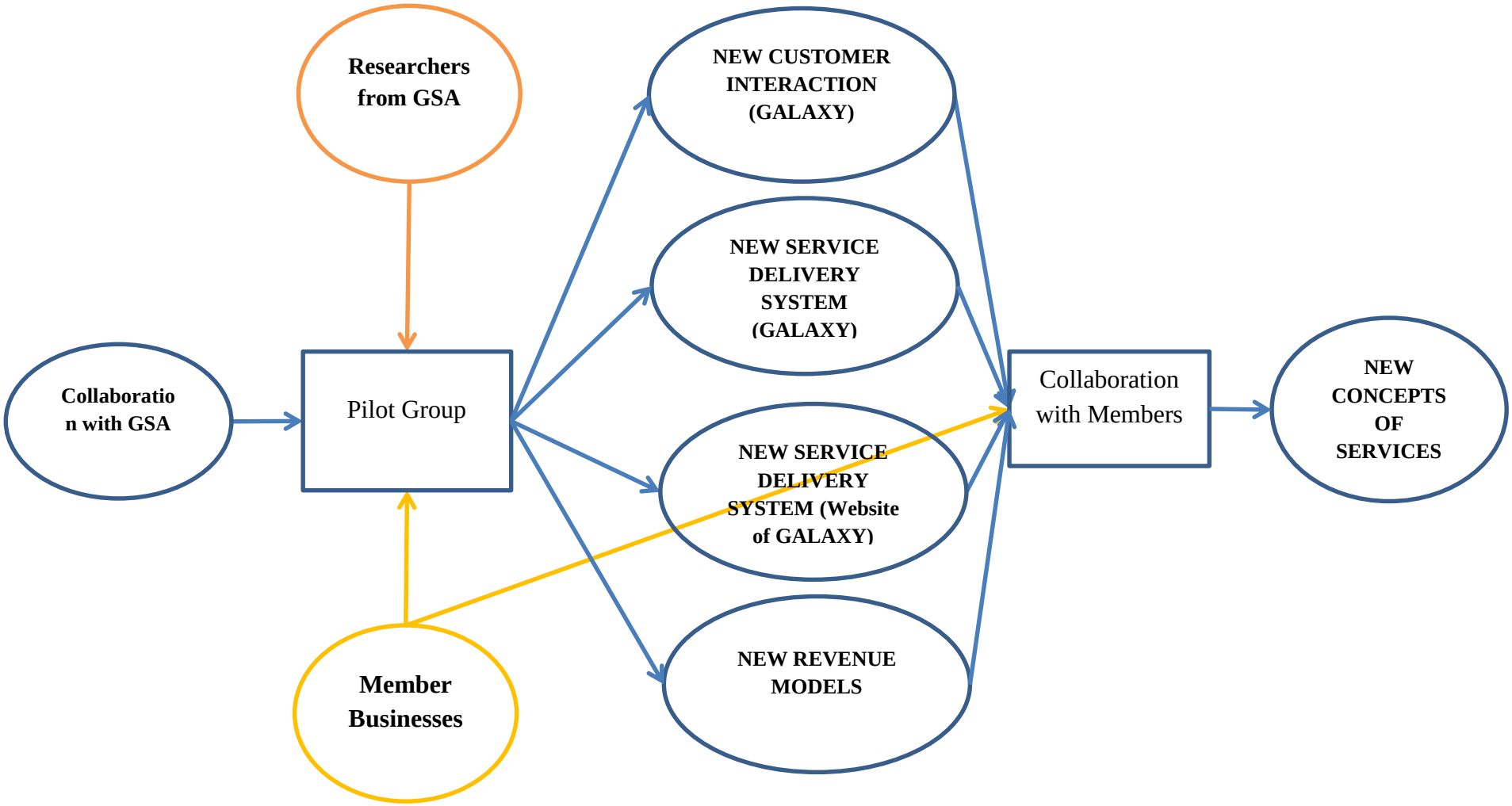

Figure 4-43: Dimensions of Service Innovation identified in GALAXY and the Key Contributors

Knowledge exchange in GALAXY for service innovation, as Figure 4-44 demonstrates, can be divided into two phases: knowledge exchange among the GALAXY members for developing new services and knowledge exchange in the pilot group, which together resulted in the other four supportive dimensions of service innovation.

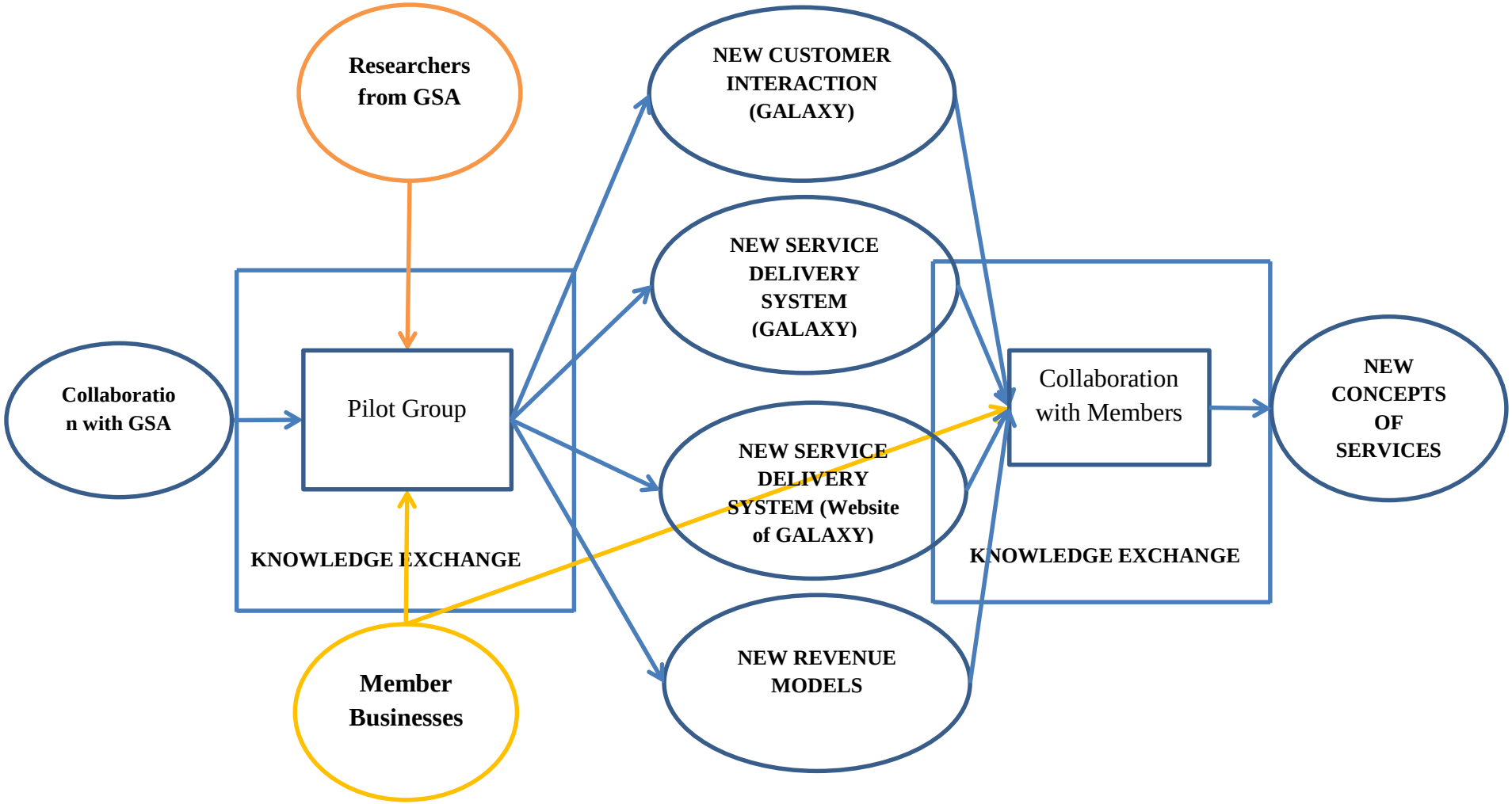

Figure 4-44: Service Innovation, Knowledge Exchange and CCoI Intervention in GALAX

CCoI was conducted in GALAXY by following the same principles, methods, and rationale as adopted in the cases of STAR and MOON.

In the beginning, five themes were identified by participants through reflecting on their existing businesses. Those members were further required to jointly create 'tourist stories' in association with the identified themes, and to contribute their insightful knowledge about the region and their businesses. Those activities were repeated until the participants had sufficiently explored their potential and all opportunities.

Regarding the motivation for participation, Chairperson of GALAXY and Owner of Hotel A highlighted their commitment to a long-term interest in service, local tourism, and community as their rationale for taking part (NSG11).

> *'Chairperson of GALAXY: I think that's a great idea (GALAXY). For our business, I would honestly tell you Bin: there is not really a benefit. It's a cost to our business, because the amount of time we put into GALAXY. But we know the area needs it, and we don't actually look to benefit from GALAXY. We didn't get involved with GALAXY to benefit from it in anyway. What we want to get involved for was for the whole area to benefit.*
>
> *Owner of Hotel A: We believe the community growth and our businesses growth, but ultimately our community needs it. The community would go to us, so we want to give something back (to the community). It's interesting; it would be good to explore your thoughts or your analysis of those businesses. Because many businesses are in a long-term growth to survive, many businesses can do something in short term. You can be a star overnight, and do something and a lot of money will disappear, whereas to be consistently good over a long period of time takes a lot more organisational skills, marketing skills, for your product, to be adapted, changed to your market, whatever. And one way of doing that is by adding to the community. You are not doing it looking for something coming back but you're doing it knowing it is worthwhile from your organisation…But it's not just a hotel, it's not just tourism so for instance, …And that's why a lot of people alike here. Some others aren't. But … People want to do their best for the community. It is the attitude.'* (NSG11)

Results of the pilot group were summarised and reviewed in the internal report written by the researchers from the GSA. The evaluation of the six-month project shows a positive effect in enhancing individual skills, forming a coherent cluster and identity for the area, and reorganisation (Johnson, 2015). According to the report, the potential of the participant businesses for innovation was identified and released as a result of the intervention. More importantly, an unexpected commitment of the participants to local tourism was created during the process of the pilot group (Johnson, 2015), which is underpinned by the primary

data collected from Chairperson of GALAXY and Owner of Hotel A who attributed their participation to their commitment to the community (NSG11).

4.5.4 Discussion on GALAXY

The collected data and the analyses address the questions of service innovation and knowledge exchange in GALAXY as well as the CCoI intervention. The following sections will discuss the findings by referring to the literature and the purpose of this case study mentioned in 4.5.

The sequence of the discussion, key literature referred to, and the research interests, are demonstrated in Figure 4-45. The discussion begins with how data from Hotel A addresses research question 1. Moreover, as a member of both the pilot group of CCoI and a member of GALAXY, data from the Hotel A will also address the research questions 2 and 3. The following part will discuss how design thinking empowers the enterprises participating in the CCoI and the result will address research questions 2 and 3. Finally, GALAXY will be discussed to address research question 4.

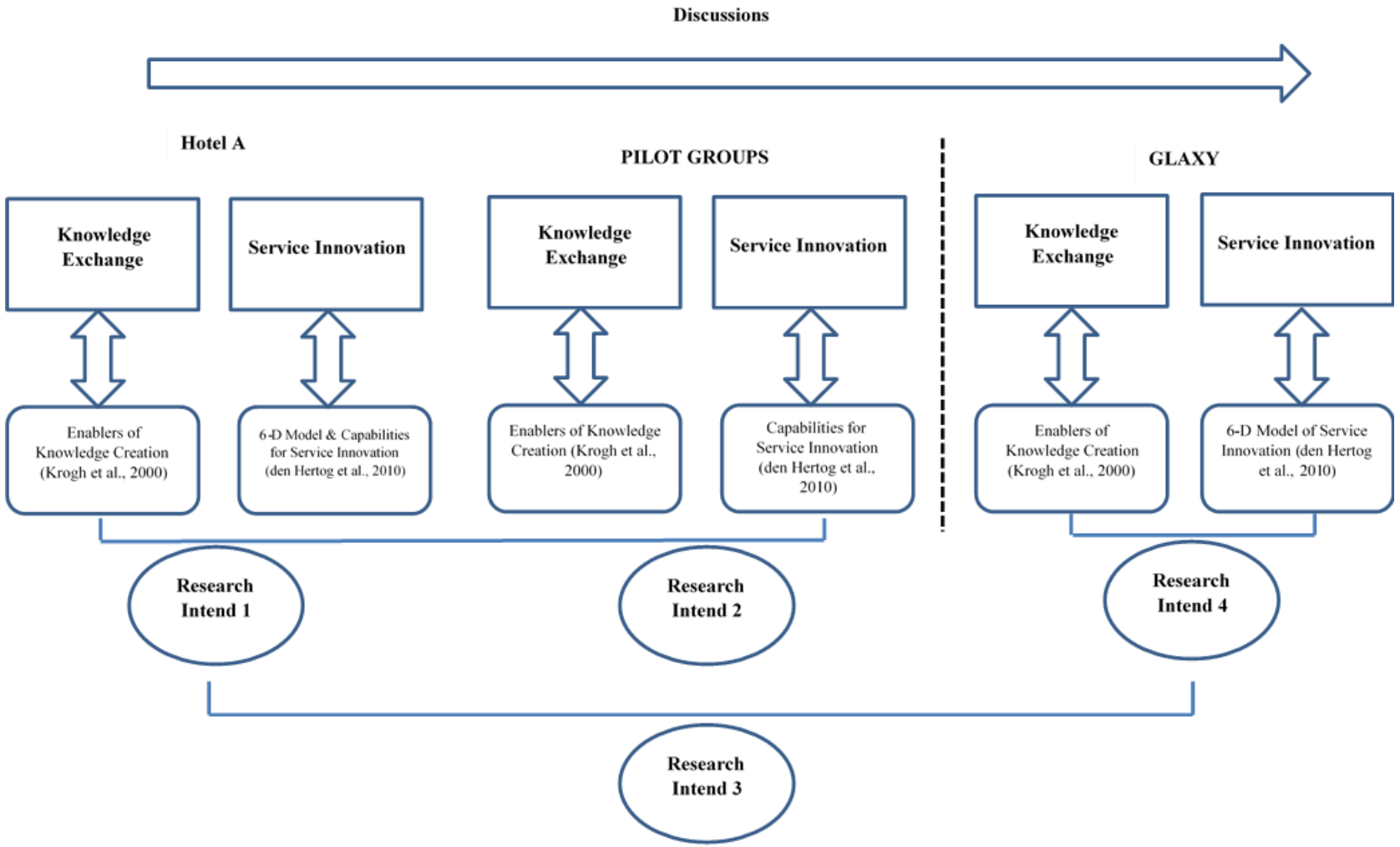

Figure 4-45: Structure of the Discussion on Case 3

Research into Hotel A was undertaken to confirm that knowledge vision is a critical factor for implementing design thinking in the long-term. Moreover, as a member of GALAXY, it also provides insight into how design thinking enables companies with a similar background to exchange knowledge and eventually to innovate in service.

The following discussion is composed of two parts. The first part is a discussion of the knowledge exchange in Hotel A, and the second part addresses identified service innovation under the framework of the 6-D model. The enablers of knowledge creation by Krogh *et al.* (2000) and the capabilities for service innovation by den Hertog *et al.* (2010) are employed.

4.5.4.1 Discussion on Knowledge Exchange in Hotel A

Three dimensions of service innovation, shown in Figure 4-46, are identified in Hotel A. Hotel A does not exchange knowledge with them because these *ad hoc* services result from customers' requirements identified by the hotel. On the other hand, Hotel A collaborates with local businesses in developing long-term services because of the hotel's commitment to local tourism. This dimension of new service results from the collaboration between the hotel and its partners. The process of knowledge exchange is informal, as the hotel does not have financial or contract-based relationships with those businesses.

Regarding the internal knowledge exchange, owners of Hotel A find it is difficult, if not impossible, to motivate their staff to contribute their knowledge about the needs of customers. In contrast to the directors of MOON, the owners of Hotel A recognise the importance of the implicit knowledge that their staff possess about the needs of the customers. Training, meetings and financial stimuli fail to motivate the staff to contribute their knowledge. Therefore, the staff in Hotel A work both as deliverers of the services offered by the owners and as access to information about the requirements of the customers. However, with a service vision for knowledge exchange, how to instil this vision in the staff and engage them in the knowledge exchange is a challenge for service innovation.

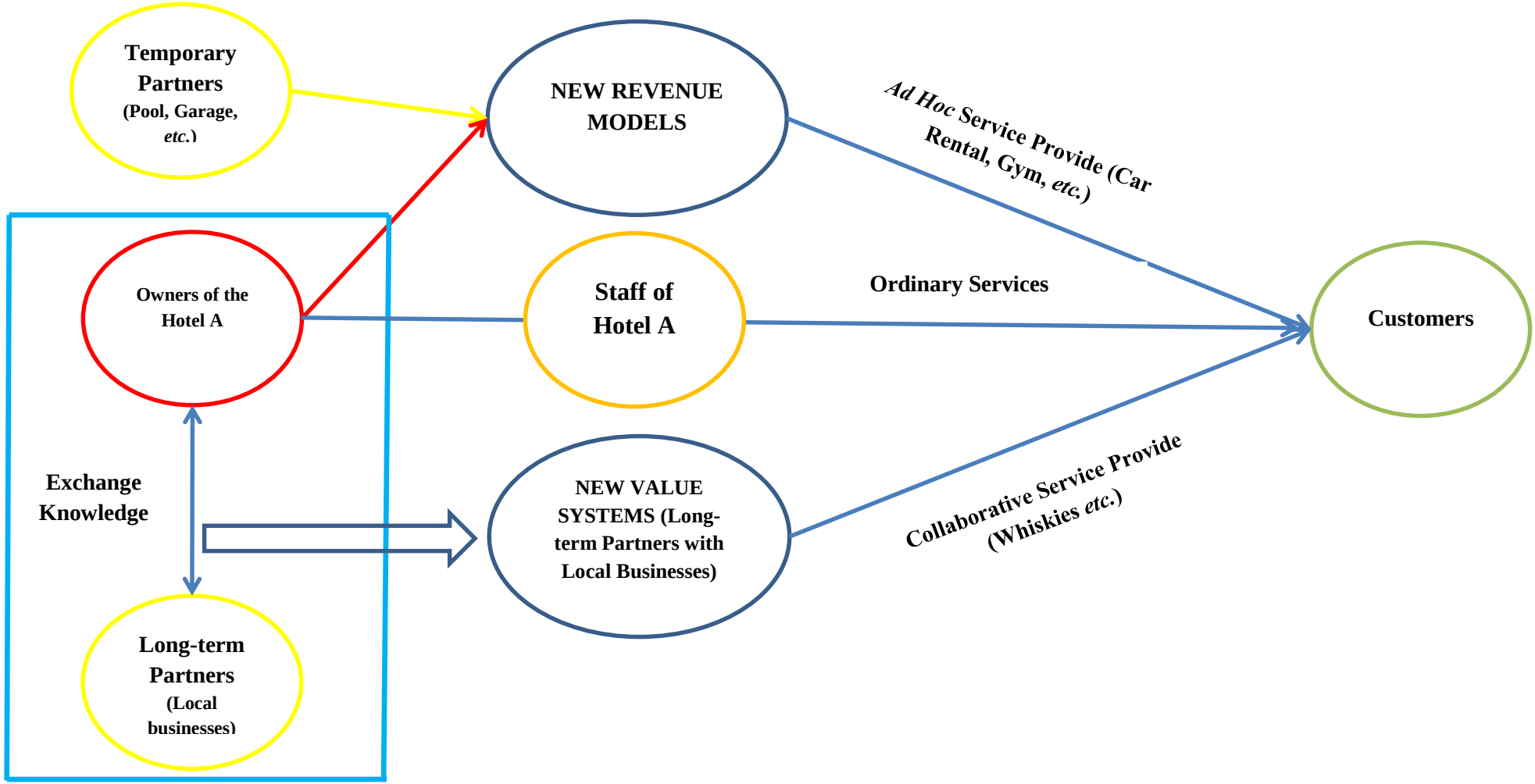

Figure 4-46: Knowledge Exchange Identified in Hotel A

The study of Hotel A attempts to address research questions 1 and 2. Thus, by comparing the data about knowledge exchange in Hotel A and the enablers of knowledge creation, as Table 4-10 demonstrates, though its owners have a service vision for knowledge, Hotel A is unable to create knowledge. There is an absence of any mechanism and lack of motivation in the knowledge actors to contribute their knowledge to develop and deliver new services.

Enablers of Knowledge Creation (Krogh *et al.*, 2000)	**Results in the Hotel A**
Instilling a knowledge vision for Service	**UNACHIEVED**
Managing conversations	**UNACHIEVED**
Mobilising knowledge activists	**UNACHIEVED**
Creating the right context	**UNACHIEVED**
Globalising local knowledge	N.A.

Table 4-10: Results about the Enablers of Knowledge Creation testified in the Hotel A

The next section will discuss the service innovation identified in Hotel A and the capabilities they possess for service innovation.

4.5.4.2 Discussion on the Service Innovation in Hotel A

Table 4-11 displays a summary of identified service innovation in Hotel A. Discussion of service innovation in Hotel A is given below:

1) New concept of service is developed in collaboration between the hotel and its partners. The everyday service, being not collaborative, is not recognised as a new service concept by its definition mentioned in Chapter 2. The short-term, incidental *ad hoc* services, due to their collaborative nature, are recognised as new service concepts, though the customers are not directly engaged in their development. It underpins the findings from the cases of STAR and MOON that most innovative solutions result from short-term collaborations. However, different from STAR and MOON, Hotel A hires services from other local businesses, supporting Ampantzi *et*

al. (2013), Terziovski (2003), Cricelli and Grimaldi (2010) and Westerlund and Rajala (2010) that SMEs collaborate with external partners for innovation. Such a situation was not observed in the cases of STAR and MOON. Lastly, the long-term services of Hotel A are different from the long-term businesses of STAR and MOON in three ways:

a) They are not financially driven;
b) They are not an essential part of the businesses of hotel A but complement the authentic experience the hotel hopes to offer;
c) They are not developed by the hotel itself but are co-created with local partners.

2) Hotel A interacts with customers for their feedback by informal daily communication. Staff play a critical role in interacting with clients and collecting intelligence. However, the owners of Hotel A showed their concerns about their inability to motivate the staff to implement the discipline of high quality service;
3) The new value system, which is the focus of this case addressing research question 4, was identified in Hotel A as it employs external resources to provide new service;
4) New revenue/cost sharing mode was found as a supportive dimension for Hotel A, combining the services of their local partners in the provision of *ad hoc* service. Regarding the long-term relationship with partners, a difference between Hotel A and MOON or STAR is that the former does not have any financial relationship with its long-term partners;
5) The dimension of service delivery system was not observed in Hotel A. The result implies that the owners of Hotel A embrace a customer-oriented culture and intend to instil the principles of providing high quality service in the staff. However, they are prevented from achieving this goal due to the reluctance of staff to accept and implement a service culture, tardy feedback of customers' requirements, and inefficient training;
6) Hotel A is the only company of the three that employs social media to interact with customers. However, the hotel primarily relies on staff for perceiving the needs of customers and delivering service accordingly;
7) The gap between the reliance on staff for customer feedback and delivery of service; and, the reluctance of the staff in complying with the intent of the hotel owner; made it difficult to implement the service strategy;

Dimensions of Service Innovation	Findings in Hotel A
NEW SERVICE CONCEPT	• Long-term services were developed in collaboration with local businesses out of commitment to local tourism. • *Ad hoc* services were provided in collaboration with local businesses for short term to meet the requirements of customers, which were received through the staff. • No collaboration with customers for new service;
NEW CUSTOMER INTERACTION	• Interaction with customers through social medias; • Interaction with customers through staff;
NEW VALUE SYSTEM	• Temporary partnership with local businesses for *ad hoc* service; • Long-term partnership with local businesses for authentic experiences;
NEW REVENUE MODELS	• Sharing costs with temporary partners for *ad hoc* service; • No financial relationship with long-term partners.
NEW DELIVERY SYSTEM	• **New delivery system is not detected;**
NEW TECHNOLOGIES	• Social medias are used to interact with customers;

Table 4-11: Summary of the Dimensions of Service Innovation Identified in Hotel A

The following discussion will focus on the pilot group of CCoI and its result, GALAXY, to show how they exchange knowledge and innovate in service. Twelve SMEs, including Hotel A, were invited to participate in CCoI. Those participants, whose businesses range from hotels to golf clubs, are spread across the same region (McNally, 2010).

The other three research questions are addressed by studying the pilot group and its outcome, namely the creation of GALAXY. The second research question has already been addressed by studying Hotel A for how the company collaborates with external partners to provide new services. The study of GALAXY, however, focuses on how the participant

companies, implementing the design thinking, collaborate within a cluster to exchange knowledge and support new services.

According to the results of the data analyses, companies such as Hotel A participated the pilot group out of a commitment to the communities in this area to enhance local tourism (Johnson, 2015). The pilot group was composed of activities designed and organised by the researchers from the GSA under the disciplines of CCoI.

Like POD, GALAXY was founded because of the CCoI intervention. The participants developed this cluster collaboratively by implementing the design thinking introduced by CCoI. Three dimensions of service innovation are identified as the outcome of the pilot group:

1) New service delivery system - in the technological sense. A website was created by the participants during the pilot group to act under the same identity as an interface with customers and as a window for all the participants;
2) New service delivery system - in the organisational sense. GALAXY was created at the end of the pilot group with all participants engaged. This is an organisation that represents tourism in this area and a mechanism for the members to collaborate and deliver services;
3) The organisation is also a new value system because it combines the capabilities and functions of the members to offer a complete and authentic experience to customers.

The three supportive dimensions of service innovation enable the members of GALAXY such as Hotel A, as the report of the CCoI project concludes, to exchange knowledge and release their creativity and abilities to develop and deliver the service concepts as another dimension of service innovation.

The processes of the pilot group, the critical participants, the dimensions of service innovation, and the process of knowledge exchange discussed above, are displayed in Figure 4-47.

Based on the results from the pilot group, GALAXY, and the identified service innovation, the following sections will discuss how the design thinking helped those SMEs create enablers for knowledge creation and capabilities for service innovation.

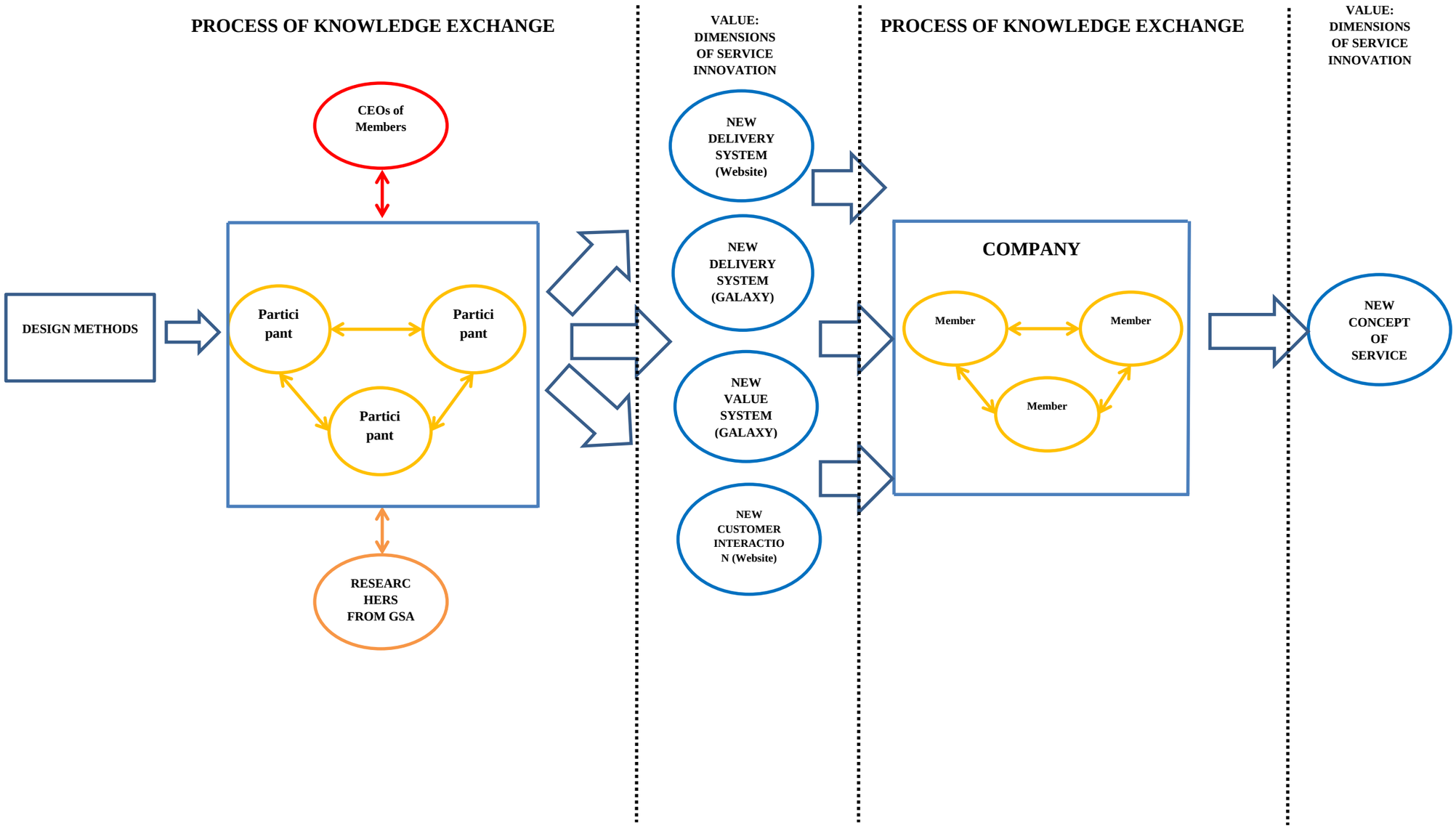

Figure 4-47: The Processes of the Pilot group, Key Participants, Identified Dimensions of Service Innovation, and the Process of Knowledge Exchange in GALAXY

A service vision for knowledge is recognised by the owners of Hotel A as essential for the hotel to develop and deliver new services efficiently. Hotel A is nonetheless unable to instil this vision in the organisation, as the process of knowledge exchange amongst the key contributors is believed to be insufficient, inactive, and inefficient.

The pilot group engaged with companies like Hotel A in fostering local tourism. They were encouraged and enabled by activities that followed the disciplines of the design thinking, collaboratively to release their potential, unleash their creativity, and create an identity for tourism in this area.

A service vision for knowledge exchange is the proposition that this case study attempts to confirm. The vision for knowledge in line with SDL is accepted by the members. The twelve participants were encouraged and guided to develop their own identity as GALAXY. Since GALAXY was created to boost local tourism by offering quality services, it created and instilled a service vision from the very beginning.

The other three enablers of knowledge creation suggested by Krogh *et al.* (2000) , as the Table 4-12 demonstrates, were achieved in the pilot group through the implementation of the design thinking.

Collaborative conversation was managed in the pilot group to combine businesses in this area aiming at attracting more tourists. Design tools introduced by the researchers from the GSA were applied to visualise the problems, potentials, and opportunities. A collaborative and equal context with a mission derived from real business was created for members to contribute their knowledge and creativity. Moreover, they were encouraged to take part and to share their opinions with the assistance of the design thinking. Globalising local knowledge as an enabler for knowledge creation, as in the cases of STAR and MOON, was not applicable to GALAXY.

All these enablers for knowledge creation are inherited by GALAXY from the pilot group and are continuing to support the participants to innovate in service, which will be discussed in the following sections.

Enablers of knowledge creation achieved in the pilot group and GALAXY are displayed in Table 4-12, in contrast to those in Hotel A.

Enablers of Knowledge Creation (Krogh *et al.*, 2000)	Results of the Data		
	In Hotel A	**In Pilot Group**	**In GALAXY**
Instilling a Service vision for Knowledge	**UNACHIEVED**	ACHIEVED	ACHIEVED
Managing conversations	**UNACHIEVED**	ACHIEVED	ACHIEVED
Mobilising knowledge activists	**UNACHIEVED**	ACHIEVED	ACHIEVED
Creating the right context	**UNACHIEVED**	ACHIEVED	ACHIEVED
Globalising local knowledge	N.A.	N.A.	N.A.

Table 4-12: Findings about the Enablers of Knowledge Creation achieved in the Hotel

Capabilities for managing service innovation, as demonstrated in Table 5-6, were achieved in the pilot group and sustained in GALAXY.

Researchers from the GSA implemented design thinking in the pilot group by following the same disciplines as CCoI (Johnson, 2015). Similar activities, including the creation of the same identity, to those that tailored the CCoI journey and NOW, were practiced in the pilot group to engage the members in exchanging knowledge, cultivating entrepreneurship, identifying their potential and releasing creativity (McNally, 2010). The findings indicate that capabilities for managing service innovation were achieved in the pilot group as in STAR and MOON. However, with a service vision, the pilot group naturally evolved into GALAXY, which is, like POD, recognised as a new service delivery system.

Different from both STAR and MOON, a website was created in the pilot group as a part of GALAXY not only to exhibit services and products but also to interface with customers.

In addition, design thinking helped the pilot group create a value system to engage companies from region in a cluster to both exchange knowledge and deliver services collaboratively, whereas MOON and STAR only engaged staff to do this.

Finally, as the research question 3 is addressed by both the study of Hotel A and GALAXY, one difference must be noted: both Hotel A and GALAXY collaborate with

external partners to deliver new services. However, Hotel A collaborates with local businesses to provide *ad hoc* services. On the other hand, collaboration between the members of GALAXY is like the collaboration between Hotel A and local businesses that provides services unrelated to its core business. In other words, the two kinds of collaboration are driven by their commitment to the community, rather than by economic interests. CCoI, according to Johnson (2015), reinforced the commitment of the members to local tourism by prioritising the shared interest.

This finding supports Giuliani (2007) that SMEs can benefit from clustering for collective learning. The collective advantage, however, lies beyond financial and individual interests. The collaboration between Hotel A and local businesses in order to deliver *ad hoc* services also underpins the findings of Lamprinopoulou and Tregear (2011) and Adebanjo and Michaelides (2010) that by networking with external partners, SMEs can overcome constraints of abilities and resources.

Capabilities for Managing Service Innovation (den Hertog *et al.*, 2010)	**In Hotel A**	**In the Pilot Group**	**In GALAXY**
Signalling user's needs and technological options	ACHIEVED	ACHIEVED	ACHIEVED
Conceptualising, visualising, prototyping and testing	**UNACHIVED**	ACHIEVED	ACHIEVED
(Un)binding capability	ACHIEVED	ACHIEVED	ACHIEVED
Co-producing & orchestrating			
Scaling and stretching	**UNACHIEVED**	ACHIEVED	ACHIEVED
Leaning and adapting	**UNACHIEVED**	ACHIEVED	ACHIEVED

Table 4-13: Results of the Capabilities for Managing Service Innovation Achieved in Hotel A, the Pilot Group and GALAXY

4.5.5 Findings about GALAXY

Discussions above are summarised in Figure 4-48 by configuring Hotel A, the pilot group and GALAXY to demonstrate how the design thinking helped them exchange knowledge and conduct service innovation. The following points are highlighted in association with the research interest.

Firstly, this case study confirms the findings that service vision of knowledge is a critical factor in long-term implementation of design thinking and collaborative knowledge exchange. Oriented to service, the value and potential of design thinking is perceived and accepted by the participants. They were further enabled to exchange knowledge collaboratively and realise the benefits. Therefore, the finding from STAR, that the value of design thinking is revealed by looking at it from a service angle, is confirmed by the case of GALAXY. With such perception of value in services, design thinking was more widely accepted.

Secondly, this case study further reveals the potential of design thinking for fostering knowledge exchange by engaging multiple stakeholders. Figure 4-48 demonstrates that, with a service vision, Hotel A is constrained from effectively motivating knowledge actors, creating knowledge context, efficiently accessing intelligence, and instilling a vision of service. Those constraints were overcome in the pilot group by implementing design thinking, which was also applied in STAR and MOON. Dimensions of service innovation derived from the pilot group, such as the new service delivery system and new value system, further enabled the members effectively to exchange knowledge in GALAXY and eventually led to the creation of new service in a collaborative way.

Thirdly, the GALAXY case addresses the new value system as a dimension of service innovation, which is missing from the cases of STAR and MOON. This dimension was examined GALAXY and its member, Hotel A, respectively. In Hotel A, the *ad hoc* services are provided by borrowing the services from other businesses to meet the extra needs of customers. Those services are usually incidental and only a temporary value is added to the existing services of the hotel. The motivation for providing those services is the desire of the owners to provide quality services in this area. On the other hand, Hotel A also collaborates with local businesses in the long term to provide service unconnected to their core activities. And such partnerships are not driven by financial interests, but by a commitment to the local community. Such a commitment further motivated Hotel A to participate in CCoI and to form GALAXY. GALAXY is a cluster of the businesses and is regarded as a new value system, which engages the SMEs in a network collaboratively to provide new service.

Finally, this study examines how the SMEs in a cluster exchange knowledge for service innovation. Findings from this case support the mainstream literature with a territory perspective for the clustering of SMEs: firms within clusters perform better in innovation

than isolated companies (Giuliani, 2007; Giuliani, 2011). The performance of the case organisation is nevertheless not measured by financial interests but by commitment to the community, implicit knowledge and potential for service innovation. Moreover, the results of the case at the same time contradicts the statement that SMEs gain advantage due to the randomly pervasive knowledge in the cluster as a consequence of the knowledge spill-over effect (Turner, 2010). On the other hand, the findings of this research underpin the conclusion of Giuliani (2011) that knowledge is diffused purposefully and selectively within clusters. In GALAXY, knowledge is exchanged among the members for the single purpose of boosting local tourism. The findings from Hotel A and its participation in GALAXY demonstrate that the clustering of such businesses does not need to pertain to financial interests. The implementation of the design thinking helps SMEs explore internal knowledge, which is believed by Giuliani (2007) and Hervas-Oliver *et al.* (2011) to be a prerequisite for exploiting knowledge in the network. Lastly, findings about the motivation of the SMEs to form a cluster, namely their commitment to local tourism rather than to their own interests, agrees with Huber (2012) who notes that individual companies do not benefit financially from clustering. However, at the same time, this finding contradicts Huber (2012) who attributes unbeneficial networking to the possession by the individual companies of internal resources. By researching GALAXY as a cluster of SMEs, this case study reveals the potential of design thinking for engaging businesses, particularly clustered SMEs with a commitment to service, to overcome constraints by collaboratively exchanging knowledge, configuring their capabilities, and eventually innovating in service.

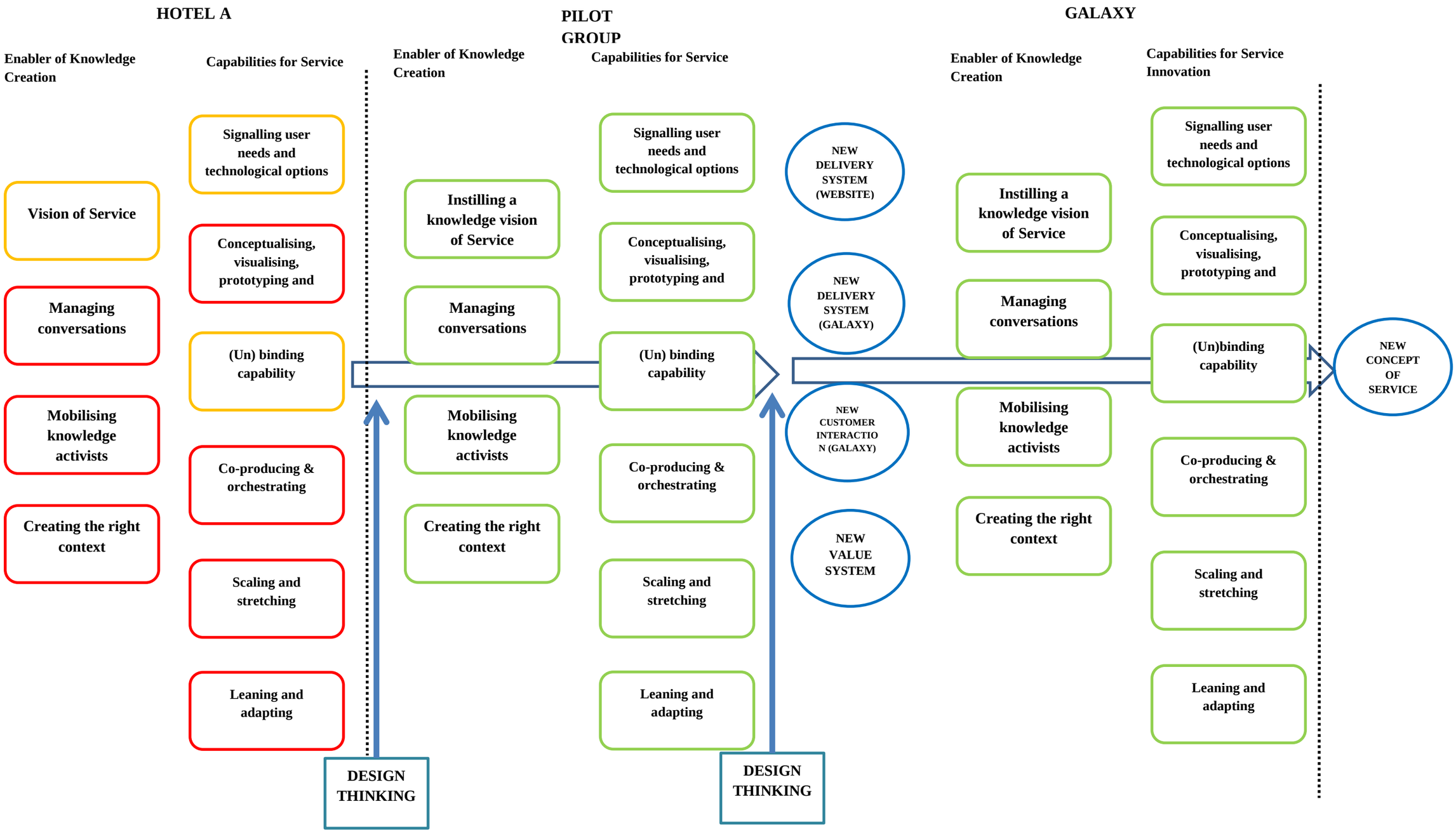

Figure 4-48: Comparisons between the Hotel A, the Pilot Group and GALAXY in the Capabilities for Service Innovation and the Enablers of Knowledge Creation Enabled by the Design Thinking

4.5.6 Summary of Chapter 4

Chapter 4 discussed the findings from the three cases, namely STAR, MOON and GALAXY, based the on the analyses of data collected from the participants who are identified to have contributions to knowledge exchange and service innovation in their companies/organisation. The discussion was organised under the framework developed in Chapter 3 to address the three themes of this research, which are service innovation, knowledge exchange and design thinking. Chapter 5 will aggregated the findings from the three cases to correspond to the four research questions developed in Chapter 2, before conclusions are drawn in Chapter 6.

Chapter 5: Aggregated Discussion

The research intent, namely studying of service innovation, knowledge exchange and impact of design thinking in SMEs, has been addressed in terms of data collection, presentation and analysis. . The chapter 5 discusses on across-case basis the findings; these will be discussed under three major themes derived from the research questions, namely service innovation, knowledge exchange and design thinking.

5.1 Service Innovation

The discussion on service innovation is organised under the framework of the 6-D model of service innovation, namely service concept, customer interaction, value system, revenue model, and delivery system (in terms of personal, culture and organisation and technology).

The new concept of service can be realised and provided through both internal and external collaboration. In relation to knowledge, as the cases illustrate, staff or members are an essential resource required to understand the needs of customers in developing new concepts of service.

The new service concept is defined by den Hertog *et al.* (2010) as a solution with value co-created by the service provider and the customer. However, this definition of new service concept, does not address the difference between concepts resulting from the combination of internal capabilities and external capabilities. The collaborative feature of the new service concept, in the case of STAR, is reflected in individualised solutions co-created with the customers. The product development in MOON, which builds its business primarily on its relationship with several big clients on long-term contracts, is by contrast less collaborative. Both companies rely on their internal resources to develop new solutions without engaging with external partners. This situation is applicable to the service sector as well, as Hotel A does not engage customers in the process of developing new service concepts. Though their *ad hoc* services do not result from direct collaboration; they meet the definition of the new service concept through collaborating with other businesses for the provision of customer service. Findings from STAR and MOON in the manufacturing sector conform Bustinza *et al.* (2017) findings that manufactures servitise internally. The same situation occurs in GALAXY, which combines the capabilities and services of the members to develop services attractive to the clients without engaging

them. Thus, knowledge about the needs of the customer is recognised as essential for the development of the new service concept.

Moreover, findings from the three cases imply that the provision of a new service concept is short-term, *ad hoc* and customer-specific. New concepts of service provided by STAR are designed case-by-case in POD, facilitating collaboration between each customer and the company as *per* specific requirements. In Hotel A, the *ad hoc* services it provides at the request of customers can be recognised as new service. Those findings support den Hertog *et al.* (2010) who suggested that the most innovative services are customer-specific. Moreover, these findings agree with Laforet and Tann (2006) that SMEs prefer making incremental changes to current products based on the specific customer requirements .

The new customer interaction as a dimension of service innovation is defined as the interface between the provider and the customer for value creation (Gallouj and Weinstein, 1997; Den Hertog *et al.*, 2011; Durst and Edvardsson, 2012; Santamaria *et al.*, 2012). As an essential source for service innovation (den Hertog *et al.*, 2010), new customer interaction is examined through STAR and GALAXY. Among the three cases, only STAR, because of CCoI intervention, directly interact with and engage their customers in the process of knowledge exchange and service development. Moreover, the case of GALAXY indicates that the internet and social media are also a way to interface with the customers.

POD were developed as an interface between staff and customers for developing solutions as a component of services the company intentionally provides, whereas GALAXY enables its members to interface with customers through a website and an organisation with the same identity, and motivates its members to commit to the services and local tourism. Facilitated by the design thinking, STAR and GALAXY are enabled to better interact with customers and discover their needs. This finding implies that the proximity of customers is an advantage, not only for SMEs in the manufacturing sector, as identified by Laforet and Tann (2006), but also for SMEs in the service sector.

In addition to new business partners, this research recognises the internal network of staff as a new value system due to its collaborative nature. The new value system emphasises the collaborations that combine the functions of business partners throughout the value network to form and provide a solution (Gawer and Cusumano, 2002; den Hertog *et al.*, 2010). The cases of STAR and MOON imply that enterprises in the manufacturing sector

are more likely to provide services by the coalitions of the departments and staff into an internal network; while the case of GALAXY, on the other hand, indicates enterprises in the service sector engage external businesses in developing and delivering new services. Those findings support den Hertog *et al.* (2010) who acknowledges the importance of networking and service innovation in the context of manufacturing. This research also found that, with SDL and the intervention of design thinking, as STAR suggests, SMEs are willing and enabled to form cross-functional teams to develop new products. This conclusion is in contrast to Laforet and Tann (2006) in their manufacturing-based study of innovation in SMEs. MOON primarily relies on the design team for developing the products. As STAR is transformed from a product-focused manufacturer to a service-focused business, a broader approach was adopted to developing service solutions. Lastly, the three cases reflect the conclusion of Terziovski (2003) and Ampantzi *et al.* (2013) into the service sector, namely, that SMEs are more likely and able to innovate through cooperation with partners in a network. SMEs in manufacturing, such as STAR and MOON, are more dependent on internal resources for developing new products, as Laforet and Tann (2006) suggest.

The customer-specific and cost sharing features of new revenue models are highlighted in all cases. The cases of STAR and MOON share the costs generated by the solutions with their customers. In the case of GALAXY, expenses are shared by the members in the form of membership fees. Those ways of sharing costs promote continuous service innovation. This finding reflect the statement by Laforet (2011) and Chang *et al.* (2011) that SMEs are constrained by weakness of financial power. On the other hand, the success of the cases above indicate that such a constraint can be alleviated by sharing the costs with stakeholders, including both partners and customers, in innovative ways.

All the cases imply that SMEs can rely on the staff or their members to obtain knowledge required for service innovation. The engagement of those who share and make use of knowledge, and eventually deliver new services, requires innovative culture and collaborative, informal organisations.

The fifth dimension of service innovation, according to den Hertog *et al.* (2010), looks at the human resources and organisational side of the firm. Structure, culture, and teamwork skills are recognised by scholars including Heskett *et al.* (2008) and Edvardsson *et al.* (2011) to be essential to perform service innovation successfully. Moreover, the change of internal structures to support business transformation, change of culture and mind-set from

product to service-centric, the engagement of staff is believed to be critical (Martinez *et al.*, 2010; Salonen, 2011; Zhang and Banerji, 2017). Indeed, the results of all cases highlight the 'soft' side of the organisation as critical for the success in service innovation. The case of the STAR suggests that its transformation from a product-focused to a service-focused company led to the commitment to service innovation and continuation of the design thinking. The pilot group of CCoI in MOON, given its success in enhancing the efficiency in operation, nevertheless did not lead to service innovation; because of its unchanged organisational structure and culture. On the other hand, committed to the provision of new services, Hotel A is struggling with effectively accomplishing its vision to offer excellent service due to an inability to motivate staff to perform and to instil a culture of excellent service. The case of GALAXY demonstrates how an innovative and collaborative structure and culture enabled an organisation to develop and deliver new services. As service innovation is defined as a solution whose value is co-created by the provider and the customers in accordance with their needs, access to information about those requirements is therefore a prerequisite for its success, as suggested by Vargo *et al.* (2008), den Hertog *et al.* (2010), and Laforet (2012).

Though the design tools are originally developed for enhancing operational performances, they are identified as able to replace ICTs to enable service innovation.

Employment of ICT was observed in STAR and MOON acting as a channel to exhibit information about their companies and their products. One exception is that social media is used by Hotel A as a customer interface. However, as its new service concepts primarily result from and are delivered by their staff and their business partners, it cannot be considered a significant dimension of service innovation. The same situation is applicable to GALAXY, which relies on the members for developing and delivering services. This finding echoes Adebanjo and Michaelides (2010) who argue that ICT is not widely used in the SMEs for innovation due to constraints of funding and expertise. Moreover, the success of STAR in service innovation highlights its uniqueness, by challenging Barras (1986), Barras (1990), and associates service innovation with the development of ICTs. However, it is noticeable that the design tools introduced by the GSA are accepted and implemented in all cases to develop new solutions. The tools successfully facilitate, in association with other dimensions of service innovation, the development of new services by engaging key stakeholders in the process of knowledge exchange. From the SDL perspective, Lusch and Nambisan (2010) argued that ICT can play an important role in the success of service innovation by creating an ecosystem and platform that engage actors in value co-creation.

Findings from the cases of STAR and GALAXY, however, indicate that design tools and design thinking, which are affordable to SMEs, are potentially a replacement of ICT for the same purposes in terms of engaging actors in the process of value co-creation.

5.2 Knowledge Exchange

This section will discuss how knowledge is exchanged.

Two phases of knowledge exchange, as demonstrated in Figure 5-1, are identified as associated with service innovation.

The first phase, takes place within the pilot groups by engaging three key actors: researchers, the CEOs and members of the organisation; the latter are recognised as contributors to implicit knowledge about the businesses and customers. GSA organises and initiates knowledge exchange among the staff or members by introducing and implementing design thinking. CEOs play an essential role in motivating the participants with their vision of knowledge exchange, and in extending what they achieved in the pilot groups to the rest of the organisations.

In contrast to the operation-oriented first phase of the knowledge exchange in the pilot, the second, service-oriented, phase of knowledge exchange identified in STAR and GALAXY, takes place across the organisation. This process, as Figure 5-1 demonstrates, engages both staff and customers using design thinking and tools. The CEOs no longer play an administrative role in this process, which is conducted between the staff and customers or by members, in the case of GALAXY. This finding, therefore, contradicts the statement by Desai (2010) which emphasises the role of leadership in administratively enabling knowledge exchanges. Leadership, as the results imply, impacts on the two phases of knowledge exchange in a strategic, rather than administrative level.

The collaborative nature of new service concept is attributed to knowledge as a prerequisite for developing innovation. In the case of STAR, POD play a role in engaging customers to develop services. In the case of Hotel A and GALAXY, however, customers are not involved in the process of solution development. New services are derived from implicit knowledge through interaction between staff and customers. This finding agrees with Laforet (2012) that SMEs are knowledge-rich regarding customers (proximity). However, despite service innovation, which is defined as the value co-creation process

between the providers and the customers, it is the internal network, as STAR suggests, or the network within the cluster, as GALAXY indicates, that enable the SMEs to access, absorb, and make use of the customer knowledge. The process of knowledge exchange between staff or the cluster members is therefore critical for the development of service innovation. SMEs are enabled to engage members to exchange knowledge, assisted by design thinking, meet the needs of the customers and eventually effectively develop and deliver new service concepts.

The three cases indicate that the first phase of knowledge exchange should lead to enhancement of operational performance. Were the same process to be led by service vision for knowledge exchange, it would result in four supportive dimensions of service innovation, shown in Figure 5-1, which further encourage the organisation to implement design thinking, and enable internal collaborative knowledge exchange that eventually results in new services. The mutual realisation of service innovation and knowledge exchange is observed in STAR and MOON, and is validated by GALAXY, with design thinking as a catalyst and enabler.

The role of design thinking in enabling collaborative knowledge exchange and service innovation will be examined in the next section.

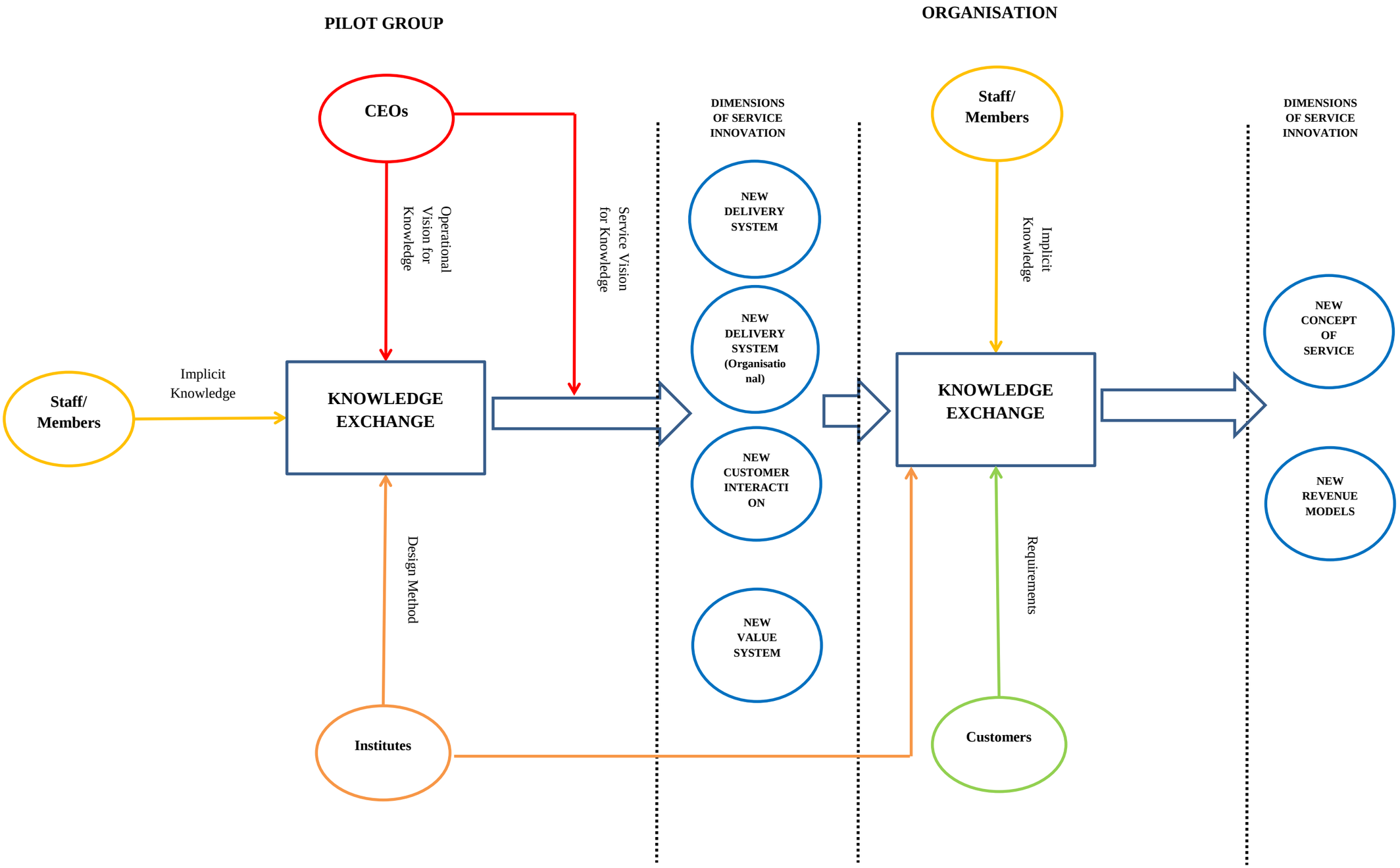

Figure 5-1: Knowledge Exchange, Dimensions of Service Innovation, and the key Contributors

5.3 Design Thinking

Findings from STAR and MOON justify the propositions made in Chapter 2 that SMEs would be able to develop the enablers of knowledge exchange and dynamic capabilities for service innovation, in a context of internal value network. This result is further explored in the context of a cluster by studying GALAXY. The following sections will discuss how design thinking makes possible knowledge exchange and service innovation.

5.3.1 Design thinking and Service innovation

The potential of design thinking for enabling service innovation is discussed in Chapters 4, where comparisons were drawn between CCoI and the dynamic capabilities for service innovation (see 4.4) suggested by den Hertog *et al.* (2010). An across case analysis is provided below:

1) Design thinking enables SMEs to signal users' needs and technological options for service innovation in two ways. First, in the pilot groups, the staff are engaged to explore potential. Across the organisation, the needs of the customer are addressed by engaging customers and members to exchange knowledge. At the same time, the studio environment, collaborative process, design tools and creative culture which were developed from the practices of design thinking, enable the companies to identify technical options that meet the identified requirements of customers;
2) Conceptualisation is believed to be another essential capability for service innovation (Parasuraman *et al.*, 1985; Alam, 2002; den Hertog *et al.*, 2010). The tasks include imagining and visualising possible service offerings and relating them to the strategy and the delivery system by organising a multi-disciplinary team across the organisation with an open culture (Frei, 2008; den Hertog *et al.*, 2010). The service design is also recognised by Edvardsson *et al.* (2011) as a core concept in their holistic service prerequisites model. The prototyping of solutions as executed by the pilot groups (particularly in STAR and GALAXY), enable the option evaluation;
3) The bundling/unbundling capability is achieved in the pilot groups, and then by the organisation in STAR and GALAXY, by engaging staff

across the organisation. It is noticeable that, the company in the service sector is more likely to bundle partners' services to provide *ad hoc* services, whereas the two cases in the manufacturing sector primarily rely on their internal abilities to develop new services. It further strengthens the conclusion that bundling/unbundling capability is at the core of service innovation;

4) The ability to co-produce and orchestrate, argued by Teece (2007), Kindstrom *et al.* (2013), and den Hertog *et al.* (2010), exploits networking opportunities. Customers of STAR are engaged by the POD. Moreover, the result highlights the internal network, enabled by design thinking, as a mechanism that identifies new opportunities and value. The study of GALAXY is by contrast congruent with Doving and Gooderham (2008), in that the context of the service sector, making alliances with external partners is an essential capability for spotting value and opportunities for new service, made possible in this case by the implementation of design thinking;
5) All three cases achieved the ability to learn and adapt in both pilot groups and in the organisations through design thinking. Learning and adapting is described by den Hertog *et al.* (2010) as a meta-capability for constantly innovating in service. Scholars such as den Hertog *et al.* (2010) further put forward the idea that 'it is important to strike a balance between top-down management and [a] bottom-up approach'. This statement is in line with Krogh *et al.* (2000) and Nonaka and Nishiguchi (2001) who highlight the mix of both approaches for effective knowledge creation;
6) The sixth capability for service innovation, namely expansion and flexibility, is related at the strategic level (den Hertog *et al.*, 2010). CCoI aims to influence company thinking; this was achieved in STAR and GALAXY. The expansion of the capabilities for service is subject to the service vision of GALAXY and STAR. The case of Hotel A, where CCoI did not actively engage, the staff remain somewhat alienated form the service enhancements;
7) The cases of STAR and MOON, both of which are from the sector of manufacturing, address the focus of research on servitisation by highlighting and confirming changing culture and mind-set from GDL to SDL as being a key challenge (Salonen, 2011; Zhang and Banerji,

2017). The findings imply that, by implementing design thinking, businesses can be equipped with an effective way of communication that enable the employees to understand the integrated service offerings, which are believed lacking in the manufacturing companies (Baines *et al.*, 2009);

8) Lastly, findings from GALAXY indicate that design method enables SMEs of various businesses and structures to configure their products, services and personnel, which is believed to be another challenge for servitisation (Brax, 2005), to satisfy the customers with integrated service innovation.

5.3.2 Design Thinking and Knowledge Exchange

CCoI is tailored to participant companies (Johnson, 2015). Findings from all three cases imply that they are enabled by the design thinking to exchange knowledge in the pilot groups in terms of instilling knowledge vision, managing conversation, mobilising knowledge activists and creating context. Detailed descriptions of those enablers can be found in Table 4-4.

By creating the same identity and target, a vision for knowledge is instilled in the pilot groups. This vision, created by the participants themselves through the design thinking, can be operationally oriented in the cases of STAR/MOON, or service-oriented in GALAXY. It was found that, by implementing design thinking, participants across the organisations are engaged to generate a knowledge vision. However, different visions lead to different results. In the cases of STAR and MOON, the knowledge vision is focused on operations and products to improve organisational performance. Such a vision was contained within the pilot groups until STAR instilled a service vision across the organisation. This finding is further validated by GALAXY, which planted the service vision for knowledge exchange in the organisation.

Activities reflecting design thinking are organised by the researchers in the pilot groups to engage the participants of equal status in a studio-like environment. Those activities are welcomed by participants, frontline staff showed enhanced confidence and interest in interacting. Design thinking is applied to visualising the ideas of the participants. The informal and collaborative method of interacting has been sustained in STAR and GALAXY and further fosters service innovation in the long-term.

The third enabler of knowledge, according to Krogh *et al.* (2000) is knowledge activists. In the pilot group, both the leaders and the researchers from the GSA are recognised as knowledge activists. The leaders work as the organisers who motivate staff to participate in the pilot group and as a decision maker at the strategic level. The role of knowledge activist is highlighted in the case of STAR that introduced a service vision into the organisation after the pilot group closed. Such a role is critical for implementing design thinking in an organisation to enable collaborative knowledge exchange and service innovation. Researchers from the GSA introduced the design thinking and conducted the activities to engage the participants, organise innovative conversations, and break down boundaries between departments. This effort is effective with the assistance of the leaders. The role of the activist is inherited in the POD of STAR by the POD manager who organises staff across departments to converse with customers to develop solutions.

Finally, by implementing design thinking, a context for sharing knowledge is created in the pilot groups. Such a context is characterised as a space that enables face-to-face interaction, individual interaction, collective interaction, and virtual interaction (Krogh *et al.*, 2000). A studio-like space is separated from the work place for the pilot group to organise and conduct the activities as above. With an operational vision for knowledge exchange, such spaces incubate new ideas and solutions by encouraging participants, regardless of their backgrounds and status, to interact equally. Design tools enable the participants present and exchange their opinions. However, as STAR and GALAXY illustrate, it is the service vision that enables the companies to see the value of design thinking for service innovation and collaborative knowledge exchange.

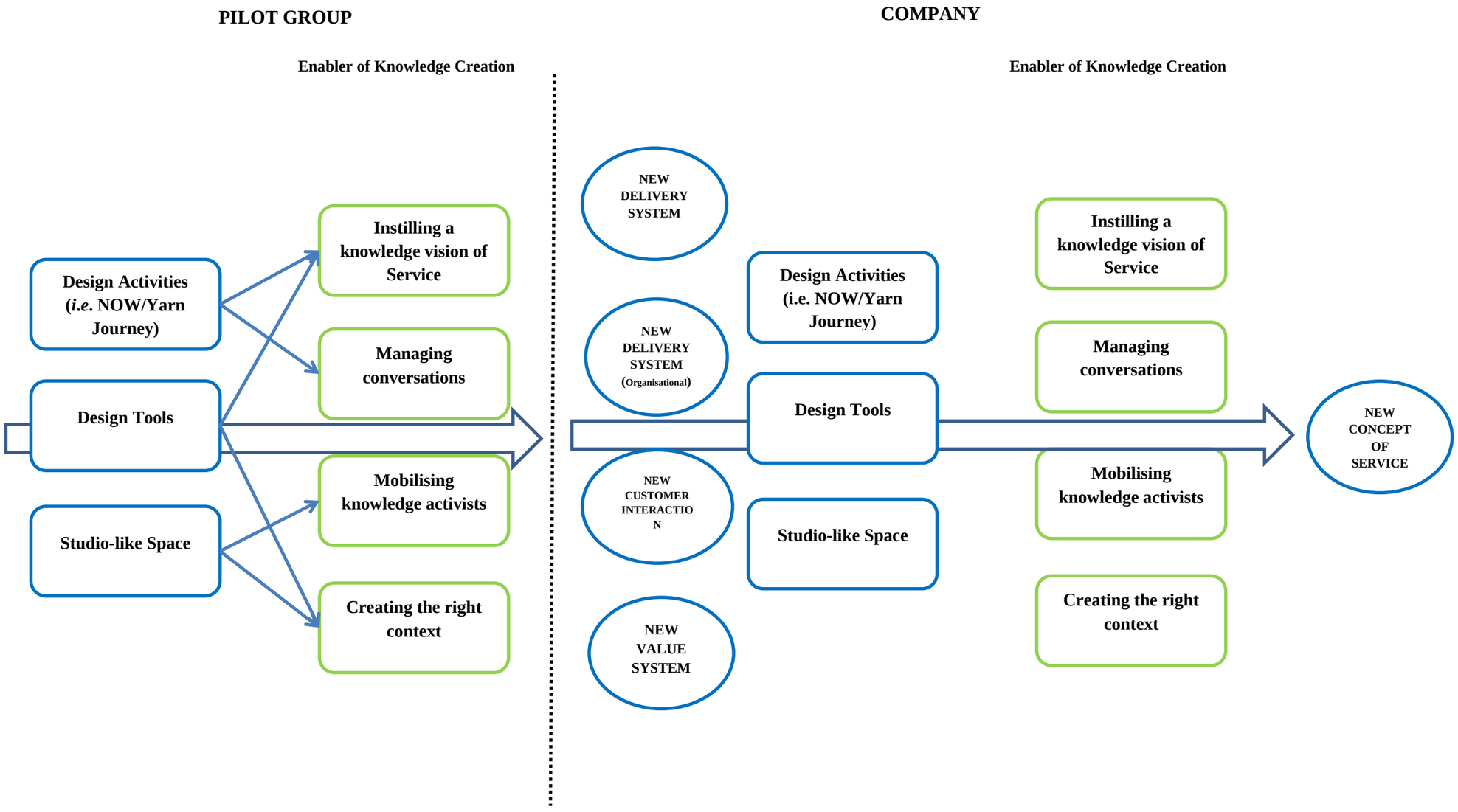

Figure 5-2: Examples of the CCoI Activities in Association with the Enablers of Knowledge and Dimensions of Service Innovation

5.4 Summary of Chapter 5

Chapter 5 aggregated a discussion on the findings from the three cases to address the three themes of this research, namely service innovation, knowledge exchange and the impact of design thinking. Conclusions will be drawn from the discussions in Chapter 6 in relation to the four research questions.

Chapter 6: Conclusions

Data collected from the field was analysed and discussed in Chapters 4 and 5. Aggregated conclusions in correspondence to the research questions are discussed in Chapter 6.1. The contributions of this research to literature and practice are presented in 6.2. Limitations and directions for future research are presented in 6.3.

6.1 Conclusions from the Aggregated Results

6.1.1 Answer to Research Question 1

Conclusion on service innovation responds to the first research question, namely:

Q1: How is service innovation initiated, developed, and implemented by SMEs?

Differences in the way service innovation is conducted were detected between the SMEs by sector. SMEs from the manufacturing sector, MOON and STAR, tend to rely on internal collaborations to develop and provide new concepts of service by engaging the members of the organisations in knowledge exchange. The situation of the service sector is more diverse: SMEs from the service sector develop and provide new concepts of service either by engaging their internal members, such as the staff in of Hotel A, or by collaborating with other businesses in a cluster, as the case of GALAXY indicates.

In addition, the three cases imply that SMEs develop and provide service innovation through staff/members. The interface between the providers and the customers, as GALAXY and STAR indicate, does not need to be cutting-edge but rather collaborative, engaging members, inside the organisation or a cluster, in the process of knowledge exchange enabled by implementing design thinking.

There is a difference between manufacturing and service sectors in how SMEs conduct service innovation through new value systems. Networking with other businesses to develop and provide service, is observed only in the case of GALAXY. In the manufacturing sector, as STAR indicates, SMEs conduct service innovation by internal networking and engaging staff across the company.

Moreover, the three cases indicate that, SMEs, both in manufacturing and service sectors share the costs with customers to pursue constant provision of new services.

This process is based on negotiations with the customers without the engagement of the members of the organisation.

Lastly, in terms of the delivery of service innovation, all cases suggest that SMEs rely more on innovative culture, flattened structures and collaborative personnel, than technology. SMEs conduct service innovation by engaging the key stakeholders, both internal and external partners, in knowledge exchange enabled by design thinking.

From the SDL perspective, service innovation is seen as process that encompasses actors in value co-creation (Lusch and Vargo, 2016); instead of outputs of product or technology (Barras, 1990; Gallouj and Weinstein, 1997; Santamaria *et al.*, 2012); utilising a constellation of resources (Kenney, 2001; Mele *et al.*, 2014). Findings relating to the 6-D model confirm that it is an appropriate measurement of service innovation within the traditional SMEs context, though adjustments are needed to comply with the SDL. Specifically, dimensions such as service delivery and value systems are more critical than the technological or new service concepts in terms of empowering SMEs to innovate in service. This conclusion echoes Lusch and Nambisan (2015) who emphasise the importance of the service ecosystem, service platforms and value co-creation for the success of service innovation. POD or GALAXY were created as ecosystems and platforms that engage internal and external actors in the process of value co-creation. As the cases do not rely on ICT, conclusions by Lusch and Nambisan (2015) can be extended to non-technology-intensive sectors, with ICTs being replaced by design thinking for creating service ecosystem, service platform and enabling value co-creation.

6.1.2 Answer to Research Question 2

Conclusions about knowledge exchange respond to the second research question, namely:

> *Q2: How is knowledge exchanged between the key actors for service innovation to be realised in SMEs?*

The following points relating to the second question are highlighted below:

1) New solutions, as a dimension of service innovation, are derived from the collaborative knowledge exchange among the key actors, such as the staff or

members of the network. Two phases of knowledge exchange are identified (Figure 5-1). The supportive dimensions of new services, such as new service delivery system, new tools, new value system and new customer interaction, are derived from the knowledge exchange, which is enabled by design thinking implemented in the pilot groups of CCoI. The second phase of knowledge exchange, facilitated by the supportive dimensions, is divided into two stages for developing new solutions. In the first stage, the company exchanges knowledge with customers in order collaboratively develop solutions. In the second stage, the knowledge is exchanged internally among staff to develop and filter the solutions identified in the first stage. It is noticeable that only the first phase of knowledge exchange is conducted in all three cases, whereas the second phase, facilitated by the supportive dimensions, is only undertaken in STAR and GALAXY. Innovation in service relies more on the engagement of all members with various backgrounds and skills, as the case of STAR and GALAXY indicate;

2) The first phase of knowledge exchange, takes place in the pilot groups because of the intervention of the GSA, and the second phase of knowledge exchange, taking place in the organisation after the pilot groups are interconnected by the new service delivery system;

3) The dimension of the new revenue model is not a consequence of knowledge exchange but a tactic used by firms to support their relationships with customers, irrespective of whether it is driven by finance or innovation.

From a knowledge perspective, conclusions as above underline the importance of seeing service innovation as a process of value co-creation instead of an output of product, technology or resources. This wider scope sees the co-created value being the essence of successful innovation that enables the enterprise to be dedicated to collaborative knowledge exchange and service innovation. The conclusion also confirms the importance of an ecosystem and service platform for the success of service innovation from a knowledge perspective.

6.1.3 Answer to Research Question 3

The third question of the research is about design thinking:

Research question 3: How is knowledge exchange and service innovation enabled by the implementation of design thinking in SMEs?

By comparing the three cases in relation to how they made possible by design thinking to exchange knowledge and create service innovation, the following points are highlighted:

1) In the pilot groups, design thinking enables the three participant companies/organisation to signal user needs and technological options, conceptualise complex problems, visualise the process and ideas, prototype and (un)bind capability, co-produce and orchestrate the solutions and conduct organisational learning and adapting. Design thinking was put into practice through identifying and acting upon issues associated with the business. The results of this research agree with Jevnaker *et al.* (2015) that the introduction of design tools into the organisation can create common language among participants to create innovative ideas. In addition, this research also supports Andreassen *et al.* (2016) that service design enhances the performance of the organisation. However, it is the creation of a viable and sustainable business model, which is defined as a service delivery system by the 6-D model that enables the organisations to generalise the positive results; through applying design tools across the organisation. In the meantime, the creation of such model can be a consequence of the implementation of design thinking, as it was implied by Geissdoerfer *et al.* (2016). This finding echoes Culén *et al.* (2016) and Liedtk *et al.* (2017) that a more structured methodology and adaptive, open-ended design tools are necessary for non-designers to implement design thinking. The service delivery system, such as POD or GALAXY, enabled the businesses and their staff to see the value of design thinking; and further understand and accept it in a context that they created themselves;
2) Recognising the decisive role of the qualities of adaptation and flexibility in enabling an organisation to be service-innovative, this research turns to the exchange of knowledge in the pilot groups for an explanation. Design thinking is found to have enabled the pilot groups to create knowledge in three regards as *per* Krogh *et al.* (2000), namely instilling a knowledge vision, managing conversations and creating the right context. CCoI was targeted at enhancing the operational efficiency and performance of the SMEs by releasing the potential of the staff for innovation. This target was achieved in all pilot groups,

as they all developed innovative solutions. However, only STAR and GALAXY recognised the potential for innovating on service, and the value of the design thinking in enabling them to do so. Guided by the new strategic goal, both STAR and GALAXY implemented design thinking and were transformed into service providers. It is therefore concluded that, creation of a knowledge vision for service innovation being a process of value co-creation instead of an output of product, technology or resources is critical for businesses realise the potential for empowering knowledge exchange and eventually service innovation.

6.1.4 Answer to Research Question 4

The last research question pertains to the demand in the literature for explorative research on the clustering of SMEs to produce knowledge (Giuliani, 2007, Giuliani, 2011):

Q4: How do SMEs collaborate in a cluster to exchange knowledge and innovate in service?

This question responds to the demand of scholars such as Giuliani (2007), Droege *et al.* (2009), and Huber (2012) to study clusters of SMEs from a micro-perspective and by considering the individual characteristics of businesses.

The study of GALAXY suggests that the collaboration of SMEs for knowledge and service innovation is a consequence of service vision and assistance of design tools. The members then develop potential and solutions by realising such vision. The process of knowledge exchange, both in the pilot group and in GALAXY, is therefore aimed at the resilience of local tourism. The findings from GALAXY support Giuliani (2007) on the discovery that diffusion of knowledge within the cluster is purposeful and selective rather than random, as would be predicted from a territorial perspective.

Moreover, the formation of GALAXY does not result from the pursuit of financial interests but from the commitment of local businesses to their community. The social proximity of those members embeds those SMEs in this area, such as Hotel A, to collaborate to enhance local tourist services. Researchers from the GSA played the role of catalysts and enablers in this process. The findings from Hotel A and GALAXY also agree with Giuliani (2007), Hervas-Oliver *et al.* (2011), Huber (2012), Ben Letaifa and

Rabeau (2013) in their criticism of the territorial perspective for being unable to explain either the social proximity or to foster innovative collaboration.

However, the discovery by Giuliani (2007) that the performance of the cluster is determined by the knowledge or skills of its members is not justified by the cases of Hotel A and GALAXY. Members of GALAXY are not from the high-technology sector. Implementation of design thinking enables those companies to exchange knowledge to develop and deliver service innovation collaboratively. This finding underpins the conclusion of den Hertog *et al.* (2010) that service, in contrast to technological and product innovation, is developed by combining existing services for a solution to customers' needs.

6.2 Contributions

By referring the conclusions above to the literature and to practice, the following sections will demonstrate the contributions of this research to the existing research into service innovation, to the development of the 6-D model of service innovation, and to the implementation of design thinking.

6.2.1 Contributions to the Research of Service Innovation from a Knowledge Perspective

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).

The relationship between collaborative knowledge exchange and service innovation, enabled by design thinking, is confirmed by the results from all three cases. The abundant implicit knowledge of staff is regarded as an advantage that SMEs can explore for innovating in service, regardless of their weak financial power and insufficient skills, particularly ICT expertise (Adebanjo and Michaelides, 2010; Laforet, 2012). The externalisation and exploitation of such implicit knowledge is therefore critical for those companies to combine existing capabilities of both staff and business partners to meet the requirements of customers through providing service. Findings about 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.

The cases of STAR and MOON focus on the organisational layers of knowledge exchange and service innovation, whereas the case of GALAXY expands the scope to examining a cluster of SMEs. The result from the pilot groups in STAR and MOON recognises the internal network as a mechanism that engages staff in knowledge exchange and furthers service innovation. This finding agrees with Chatti (2012) who positions the individual at the centre of knowledge exchange. Moreover, findings from all three cases recognise the constrains of finance, skills, and human resources that SMEs have to face for knowledge exchange, as Wong and Aspinwall (2004) and Laforet (2011) suggest.

Moreover, the results suggest that it was the intervention of the GSA and the implementation of design thinking that engaged staff in collaborative knowledge exchange.

However, this contradicts scholars who promote adaptive technologies, social media or other ICTs (O'Reilly, 2005; Desai, 2010), the results from the cases imply that design thinking can replace ICT in the organisation of knowledge exchange due to their interactive and illustrative nature.

Finally, the results of all the three cases emphasise the role of CEOs as both motivator and organiser, which is also testified by Anand and Daft (2007), Desai (2010), Laforet (2012), by their vision for knowledge in implementing design thinking across organisations.

More importantly, SDL, instead of GDL, is found to be the essential way of thinking that will release the potential of SMEs for permanent knowledge exchange across the organisation and eventually for service innovation. The change from an operational to a service perspective encouraged the owner of STAR to transform the organisation and further to implement design thinking. Without such a vision, as in the case of MOON, the first phase of knowledge exchange resulted in an enhanced operation rather than services, and would prevent the collaborative knowledge exchange from spreading to the organisation. This conclusion echoes the statement of Vargo and Lusch (2004), Vargo and Lusch (2006), Lusch and Vargo (2008) that service innovation is a more engaging and constant process than product or technical innovation. In addition, the recognition of the CEOs as catalyst to the knowledge exchange, however, does not imply that top-down management is necessary for the creation of knowledge. On the contrary, effective knowledge exchange in the pilot groups, organised by the researchers from the GSA, resulted from devolved structures, transparent organisation and process, and collaborative processes that engage staff. These qualities are also recognised by Laforet (2011) as advantages to SMEs for innovation.

6.2.2 Contribution to the Development of 6-D Model and the Definition of Service Innovation

To address the research question 1 regarding how SMEs conduct service innovation, this research adopts the 6-D model of service innovation as its framework; it further contributes to literature by exploring the 6-D model, as suggested by den Hertog *et al.* (2010), in a context of non-knowledge intensive SMEs. The results indicate that this model is an appropriate lens to isolate the value of service innovation from product innovation, as in the case of STAR and MOON. Moreover, the relation between knowledge exchange and service innovation is clarified by looking at the process through the 6-D lens, which

reveals the importance of a new service delivery system and knowledge exchange. Additionally, the findings above also suggest that the 6-D model is applicable in a manufacturing context, and can shed light on the process of servitisation, which has been called for in the literature (Martinez *et al.*, 2010).

This research applies the 6-D model in a context of SMEs and the non-knowledge-intensive manufacturing sector to reveal the contrast with the knowledge-intensive service sector from which the 6-D model is developed. The results agree with Droege *et al.* (2009) that such a model needs to be adapted to the manufacturing sector by synthesising the service and technical perspectives for addressing the product as a dimension of service innovation.

By applying the 6-D model to a manufacturing context, results of this research imply that the scope of the 6-D model for seeing partnership with external businesses as a new value system. This is explored in the context of the service sector by using the case of GALAXY, suggesting that the 6-D model needs to be extended to the internal collaboration between staff of various abilities to develop and deliver service innovation.

Lastly, this research examined the 6-D model from the SDL perspective. In contrast to GDL and resource perspective, which define service innovation as an output of products, services, technology or constellation of physical resources. SDL regards it as a process of value co-creation that engages actors, from which new products, services, technologies are generated (Lusch and Nambisan, 2010; Aal *et al.*, 2018). The success of service innovation is dependent on the creation of an ecosystem and a platform that engages relevant actors for value co-creation (Lusch and Nambisan, 2010). From this perspective, the service delivery system (POD and GALAXY) being defined as the culture, organisational structure and personnel (den Hertog *et al.*, 2010) is the critical dimension for the other five dimensions to be realised. It is concluded that, originated in service sector, the 6-D model needs to be adjusted to address service innovation more broadly, as exemplified by service strategies in manufacturing (Rubalcaba *et al.*, 2012). This research therefore contributes to that adjustment by looking at the six dimensions from a SDL perspective and redefines the roles and relations of the dimensions in service innovation.

6.2.3 Contributions to the Implementation of Design Thinking for Service Innovation

Contextualised by CCoI, this research is interested in studying service innovation from a knowledge perspective and the impact 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 research provides an SDL angle to appreciate its value in enabling SMEs through service rather than product. The transformation of STAR, because of CCoI, into a service-oriented company and the creation of GALAXY demonstrate how the potential of design thinking for improving the performance of SMEs is envisioned by SDL.

The case of STAR also addresses the call of literature for tools and methods for servitisation (Nudurupati, 2016; Bustinza *et al.*, 2017). Cases from the manufacturing sector suggest that changing culture and mind-sets of both the top management and the staff are critical for the success of servitisation and the implementation of design thinking. The implementation of design thinking also visualises the hidden value of service innovation. New measurements of performance from a service perspective, which is different to operational measurement, are required to encourage SMEs, particularly their managers, to conduct service innovation and design thinking in the long-term.

This research agrees with Geissdoerfer *et al.* (2016) that design thinking can facilitate viable and sustainable business models for small businesses. Stressing the importance of service delivery system and service vision for generalising the enhanced performance by applying design tools across the organisation. This research further contributes to the study of this topic by providing a service perspective, instead of product/technological perspectives, for applying design tools to service innovation.

Lastly, from the SDL perspective, Lusch and Nambisan (2015) recognised ICTs as an enabler for ecosystems and platforms that empower service innovation. Existing research, however, suggests ICTs are unaffordable for non-knowledge-intensive SMEs (Adbanjo and Michaelides, 2010; Laforet, 2011). This research contributes to the study of design thinking by recognising it, being a way of thinking and a toolkit, as a potential replacement for ICTs in enabling service innovation. The effect of such a solution, however, needs to be made through the new service delivery system.

6.2.4 Contributions to Policy and Practice

This research reviewed the outcomes of CCoI from a service innovation perspective. The results suggest that a service vision, which provides an explanation for the extension of CCoI in STAR and its containment in MOON, is needed for implementing design thinking. Furthermore, highlighting the critical role that the top managements play in engaging the organisations in implementing design thinking, this research indicates the need to embed design thinking within the leadership prior to rolling it out to a wider public. Support from the top management must focus on both the engagement of staff and the changing the vision from product to service-focused.

Lastly, these results provide the CCoI sponsors, the Scottish Government, with clear evidence of the value of design thinking.

6.3 Limitations and Possible Directions for Future Research

The thesis recommends three lines of enquiry for future research into service innovation, knowledge exchange and design thinking.

All six dimensions of service innovation suggested by den Hertog *et al.* (2010) are covered by the three cases. Most of the findings about the 6-D model are consistent with den Hertog *et al.* (2010) except the use of ICT as new service delivery system, which is not found to be a significant facilitator. ICT is regarded by not only the researchers into service innovation, such as *den Hertog et al.* (2010) as essential, but also by researchers in knowledge exchange, including Allee (2008), Battelle (2009), Desai (2010), and Adebanjo and Michaelides (2010) as a critical enabler for knowledge exchange. To date scholars have tended to focus on knowledge-intensive enterprises or high technology companies. It would be potentially advantageous to investigate the role of ICTs in developing new services in non-knowledge intensive enterprises. 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 to 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 phenomena 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.

Lastly, studies of a larger scale are necessary, as suggested by Yin (2014), to strengthen the validation of the findings, they provide only 'base level' support for the conclusions. Quantitative data derived from surveys are therefore needed to establish any causal effect between the factors that are identified by this research; such as the service vision of CEOs, and the mutual realisation between collaborative knowledge exchange and different dimensions of service innovation. The thematic model, as illustrated in 6.2.2, requires richer data, both qualitative and quantitative, to be justified in different contexts.

6.4 Summary of Chapter Six

Chapter 6 provides an overview of the conclusions derived from the case studies. Conclusions regarding service innovation provide an answer to question one by testing the 6-D model of service innovation. It is concluded that such a model can address service innovation not only in the knowledge intensive service sector, but also in non-knowledge intensive SMEs in both manufacturing and services. It provides a lens with which to identify the value created by service, which generates a vision of knowledge exchange in CEOs and encourages them to adopt design thinking across the organisation. The relationship between knowledge exchange and service innovation is examined by question 2. The answers to question 3 demonstrate how design thinking makes possible collaborative knowledge exchange and fosters service innovation, and explains its success across an organisation from a service perspective. Answers to the last question address the clustering of SMEs to provide research on this topic with micro-economic scope.

Contributions associated with the conclusions are presented as a complement to the 6-D model of service innovation, research into service innovation from a knowledge perspective, implementation of the design thinking, and research into clustering with a micro-perspective.

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Appendix 1: Reference of Data and Codes

The Interview with CEO of STAR

CODE	REFERENCE
KES1	'CEO of STAR: …a lot of work by the GSA were creating the culture of innovation rather than just training people to be innovative and try to get undoubting to get what we intend to do… that certainly are good legacy in that. '
NSS1	'CEO of STAR: We also sit with the client in the area (POD), and design products together. So we will sit with them and it all really needs to start with the problem. And if there isn't really a problem to be solved, it's quite difficult to collaborate…' 'CEO of STAR: …that is the problem with price, again, there are so much work he can do, because still we can add value, and the dropping the cost of the product …'
NSS2	'CEO of STAR: We have dealt with this customer for 30 years. So our relationship is very strong with them, but it's also very static; if we try to get them involved in the new products it could be quite difficult, particularly with the market places, sales is quite static, stagnant in marketplace.'
NSS3	'CEO of STAR: If you look at different marketplace such as fibre, tips, that is a very fast moving marketplace, the relationships will be built there far more innovative, and far more short-term as well, far more dynamic.'
NSS4	'CEO of STAR: We actually have a filter process, we score our opportunities, and we use that in order to do a better job of grading the prospects and filtering out the good from the bad…So there are the key factors we use in terms of to grade an opportunity, to score those to filter out of the opportunities that we follow on to form. And that was done by the staff themselves. The top leadership was not involved in that process.'
NSS5	'CEO of STAR: … it takes about 5… on average, you know, eighty *per cent* of our sales are completely after five face-to-face visits. We

	need to make sure if our five face-to-face visits are on a program of opportunity that is valid; so we do use a filter system as a part of that. …We'll speak to the decision maker, and there is a need for this product, it has to solve the problem, it has to be, you know, has what we need, next to this, is the emphasis on client… Then it's other applying signals, either… Is the company strong at supporting to this? Do they answer back? Do they follow-up? …And finally is it sizable enough business?' 'GB: So do you have generic products for most of clients, or do you just design certain products just for clients specifically. CEO of STAR: It depends on the POD; a lot of POD have customers' specific products, that we have developed hand-in-hand with customers over years. We have supply agreement we can all sell to anybody else, they can advise for anybody else.'
NSS6	'CEO of STAR: It's not going to be a functional boss or a geographical boss; it is literally the people who work (on) the services in the POD, (which) have five bosses. And how they do that is not by line management, it's by POD management so they, when they go to a POD, they do whatever they need to do for that POD. Then they have each end of moving for that POD, they want for that POD ...'
NSS7	'CEO of STAR: So what we have here is in those boxes underneath points; this is (the place) where all of these guys are: engineering, technical, producing, quality, *etc.* and POD leaders are there. Each of those POD is literally an area for each POD manager to set and their own space... BG: So you have each POD working for each specific project by mixing the staff from different backgrounds? CEO of STAR: Yes. And the other point is, they leave (the office area), in order to join the customers in POD, …they come to the POD, they work in a POD, they go back to the desk. They do their work here (POD) but take their direction here (the office area). CEO of STAR: POD think of ideas; (the incubation team) fast track it (the generated idea) through the prototypes; we get filter for samples, we then take it though the POD to the customers, and the customers then say, 'we like this, we hate that, we don't want this', and it feedbacks.'

NSS8	‘CEO of STAR: So if people ask us if it is like a mixed organisation, definitely not. It’s not going to be a functional boss or a geographical boss, it is literally the people who work the services in the POD, have five bosses. And how they do that is not by line management, it’s by POD management so they, when they go to a POD, they do whatever they need to do for that POD. Then they have each end of moving for that POD, they want that POD ... BG: In this way, who is responsible for the communication with your customers? CEO of STAR: The POD leader… POD leader is fixed. BG: What is the responsibility of the POD leader? CEO of STAR: Everything… Not the delivery, so everything, customer facing, the projects, … but (if) it comes to the manufacturing of the samples and product that is someone else; the operations manager he is responsible. We actually have an innovation manager who is responsible for prototyping, to make sure that is done. So the POD leader is the business leader and it’s very much out what we are focused. BG: So he is more like a salesperson? CEO of STAR: A bit of both, it’s more or 80 percent external, 20 percent (internal). BG: Can I understand the leader as a hub between your team and customers for communication and interaction? CEO of STAR: Yes, very much. BG: So one leader is responsible for several projects? CEO of STAR: Yeah. … You can see here… these activities are four developments of different kinds of products. Some of the ideas, some new products they think about, BG: But in terms of the knowledge exchange, the POD leader could be a hub between the two? CEO of STAR: Yes, but he’s responsible for making sure the exchange goes ahead, but in terms of the content, he does not need to know

	the content necessarily the detail, the technical person can help him, he's there to make sure the POD continues to proceed itself forward.'
NSS9	'CEO of STAR: CEO of STAR: It is just about having a mind-set on the use of (the design) tools and being open to different ideas. We have a toolkit that has 30-40 different tools that you can use, to help. BG: Did they create the tools? CEO of STAR: We created them together we effectively…a lot of tools are out there, the Glasgow School of Art helped create them and put them together, and train us up on a lot of the tools … there are lots of different tools we now use them in the POD that we have nothing of before get trained from the Glasgow School of Art.'
NSS10	'CEO of STAR: Typically, we eat all the costs ourselves, for the initial prototyping … because we want to make sure that we are not putting a barrier. We also make sure that the customer is sufficiently interested, and it's not just because the material is free … So, if there is a process we follow, we'll extend the sample run; if we get the feeling that the customer is now in the process and thinking they will buy, we will then engage them in the paying for some of the extended runs. We like to think it would like, if you go on a training courses free, you don't listen as much, as in the training course you spend 10 thousand pounds on, and it starts the deal, so we actually, we make it easy to do little trials but we comes to join you as a partnership.'

CODE	REFERENCE
KES2	'CEO of STAR: the GSA is different… we've been partners with the school of art now for probably 3-4 years, and they have trained us on being innovative. BG: So can we say something about the training? How did they train you to be more creative? CEO of STAR: Yeah. It is just about having a mind-set on the use of tools and being open to different ideas. We have ware of toolkit that has 30-40 different tools that you can use, to help. BG: They created the tools or you did? CEO of STAR: We created them together we effectively…a lot of tools are out there. Glasgow School of Art helped create them and put them together, and train us upon a lot of the tools like Scamper, Sexats or... There are lots of different tools … there are lots of different tools we now uses them in the POD that we have nothing of before get trained from the Glasgow School of Art.' 'CEO of STAR: A lot of work by the GSA was about creating the culture of innovation rather than just training people to be innovative … that (the culture of innovation) certainly is good legacy in that.'
KES3	'CEO of STAR: We have been in a situation where the products we did for years had been very good for us in terms of profitability; so we had money in the bag and they were still continuing to come through; so we'd go into this way of working, whereas it wasn't being productive, wasn't having solutions in the end of it, but we still had the money in the bag, so everything was okay.'
KES4	'CEO of STAR: It's very visual, there is no hiding (BG: And efficient). Yes, because people goes with that. At the end, if we have finished product, what we do here is, with each of these elements (draw on the board), you know you have an idea. If you look at it, just every single new product production process, but in eight stage processes, or the nine-stage process, you have probably learned few of them. You are going to have to make this product, you then hold up on the products, that the dead should be strangled quite early on. But because you've got process you need forward the process. What we see is, this is an 8 stage-process. But we build the stage up, almost like a Lego. But if on the second stage you don't get there, you stop. And we've killed there already (pointing to the other board with three

	yellow stickers on), at the early stage. So we could fill fast at least. But filling fast is not of doing something, it's 'do it' and 'learn from it'; if it does not work, kill it, and move on to something new. So we don't have an 8 stage process for every single thing. We have an 8-stage process for the things succeed, some of them might fail it, by five, so we have the people work to get there, but no more, we don't have any more people work on it when it's killed. And then every year, we review all the failures for why it failed. That's why we keep that, all year, for a good lesson to learn. And we revisit the whole process.'

The Focus Group

CODE	REFERECE
NSS11	‘Marketing Director: I work underneath the POD director. So both of us are effectively salespeople for that POD, so we would both come and generate some ideas, but at the same time it doesn’t always need to be a customer’s lead, it can be something POD Manager thinks, or Marketing Assistance thinks. That’s a completely new area, and all could be that, as a technical person within the department has a new idea to improve a customer’s products and they would then bring this to the POD. ’ ‘BG: How do you identify the unrequired products, or in other words, innovative things? Marketing Director: A lot is to be researched; different people in the company would do, by going to exhibitions, networking events… also by speaking to your customers, ’ Marketing Director: …We don’t do (market research) ourselves. We will get technical people involved in the visits to market or exhibitions where there is an expert person interested in something that we are currently doing. Neither we’ve got the POD structure very much focused. It’s anything to do with composites: for me it’s just looking at the things that Produce Development Assistance be related to. You need to get to speak to these people and find out what they are great at, what they want from a product that (they) can’t get on the market at the moment; that’s when the gap starts to become noticeable.’ ‘Marketing Director: It (POD) can be a mixture of both. So some products of redevelopment, developing at the moment in the concept POD, are, products that customers said, ‘we need you to change that, we need you to do something like this.’
NSS12	‘POD Manager: I mean that there might be like four/five ideas that come out of the meeting but we wouldn’t have the capacity and the time to develop all… we just take them to next step and then at the next step you will narrow it down a little bit further and in the end; we might have two or three ideas to take forwards.’

	‘Marketing Director: We really had to look at how we were operating as a business and how we would change that through the connections we had. With the director coming in five years ago as chairman, he had previously been chair of Glasgow School of Art, so there was already a link there with GSA and he was aware of the intention to start working with businesses to implement culture of innovation... when CEO of STAR came it (the problem in the company) was really highlighted. It felt that our sales of our existent products were in decline, we thought it was a sign of recession but it was not, and we needed to react to that.’ ‘Marketing Director: We are traditional textile organisation. we had a number of products, that were working as a kind of our cash cows we developed them years ago, they were nice to us and the decline hidden behind was not noticed. So for me that was really the pivotal point of how STAR really started to change as a company (Others: Yeah)…and it really for us when David came and CEO of STAR came when it was really highlighted in terms of we almost felt our sales of our existent products were in decline, we thought it was a sign of recession… they were all going to decline anyway and we needed to react to that.’
NSS13	‘Marketing Director: Depending on the strategy you are looking at. It could be: are we going to be after a market leader or are we going to be after size of company, turnover, quality of customer, and how much they will pay on time, what’s the classic position, or sort of kind setting … (POD Manager: the empathy?) the empathy, we are speaking to certain companies, we are speaking to decision makers. (Laugh). Produce Development Assistance: I think they vary so much doesn’t it? It depends on what you are working on at the time. Marketing Director: Yeah. Even, you know, what’s the type of detail you get from different customers, whom you are learning most from, who seems more keen on your products… it does a whole, but that, lot of that, fits in to the filter’s talking about the CRM what we call madness filter. Marketing Director: Yeah, I think it’s empathy …the customer basis you gain, the soft side of things. I find that the meetings with us have been an hour to see the potential of a client with, like the director, we will feel that empathy together. Then you work out how you will read that, potential business and opportunity.’ ‘Marketing Director: I’ve been in the company for 12 years now. If I think back of how things were, we operated from two different sides; we worked to our own departments; and you didn’t really speak to many people with that department, or in the same building there’s another department. You should learn more but, for me you know, I was in sales and marketing departments and it does not have the site here,

	and we had development done here; you were working in that department but the department was not linked anyway. There was no clear strategy for the organisation in terms of where we will be going and there was lack of decisions happening as well.' 'Marketing Director: And… you know the meeting was very formal; it was in formal meeting room environment , and you sometimes have to go about to… we have meetings to arrange meetings this lack of kind of way whereas there was no action really coming out of the meetings. We were having it and sitting around and speaking about things but even from the sales and marketing point of view we were looking at our strategy and forecasting for the year ahead, there was NO meet (??5:41), if so we would look at or we think we will be going to do, (such as) maximum in sales turnover, … you know there was typical ten thousand into 12 different ticks, so we would have figures against these ticks. But there wasn't kind of companies we will be going after. What they are using, how much potential businesses, will be there… there was nothing clear or defined in terms of what we will look at what we are moving to, that obviously was then the results, there nothing coming through the organisation (laugh).' 'Marketing Director: I think, when POD Manager was involved with the NOW team, there were 12 individuals selected from all of these organisations. They went off site, two days a month for six, nine months. … From that, from me, I don't know what you think at, what became evident quite quickly was that we had individuals within these groups, some of which I didn't know particularly well, you were quite new as well so you don't really (POD Manager: yes) know many either. But we did get 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 … hmmm, there were some of the relationships formed. That don't please us actually, (but) I think (it) helped the transition of moving, from (previous organisation of STAR) to the POD system. So that was great contributions from everybody there across the board because there were some really good strong relationships formed. Marketing Director: Yeah, and I think that if you go back to the NOW team, you know, team that we didn't have before, it was about people working as a team, and quickly we thought benefits of that: we had a cross functional team. So when we were started to use tools to generate ideation, it was clearly seen in the benefits of cross functional working how the ideas came through so much quicker, and also the skills identified we had a monsters we won't be aware that we had; and that also aided us in terms of moving people through the organisation, which might not have otherwise, because we were able to work is that team and use tools and people, all had the equal inputs, and equal see, and that was probably the first time in our organisation was really felt that was the team-used people were from different parts of organisation, working together, and being able to have that equal say enough feeling that they are in the meeting that they could have the same input and same ideas because Produce Development Assistance they were managers and directors of the

	organisation and that didn't matter. And that is being you know that's a key part of our POD structure now, it is based on that, that's really from the start.'
NSS14	'POD Manager: We find the customers ourselves, and we basically have a brainstorm session with them. (BG: With the clients?), yes. So we define like a couple of their products … We would just generate the ideas with them, and we have got a number of tools from the GSA that help us generate ideas and also, when it comes towards the end of like brainstorm session, select the ideas that are the best.' 'Marketing Director: So if I was in the market, and saw an opportunity and I felt that it would be beneficial to have Produce Development Assistance from concepts development to take part in a brainstorm session with the team of my POD, or if I was the lead to look at, from the technical side, (POD Manager: yes) POD Manager could come into my meetings; we will set meetings; we will look at that specific opportunity, and get involved with composite POD discussion; or you know, other areas so we do, we can all cross over into each other's but we generally have set sorts of team that do kind of work.' 'POD Manager: When it comes towards the end of brainstorm session to select the ideas that are the best and having proved a really good one is a topography (Marketing Director: Yes) is when you have lots of ideas, and you basically give each person 3 dots spend, and then you put a dot to that idea they think the best. So they will end up with two or three dots for what is the best idea. You've generated them in a democratic way.'
NSS15	'POD Manager: Also as a manager you basically do everything: you (Produce Development Assistance) will be involved in the development, and you will be involved in the marketing, you will be involved in the market research, you will be involved in finding the best materials, you (Produce Development Assistance) will be involved in the selling product to the market, you will be involved in speaking to the customers… So, there are so many contexts… sort of norms, can just judge here the person I think.' 'Produce Development Assistance: I think, (POD is) not just a typical office staff room. In the POD we have machine operators and heads of production. They bring lot of the knowledge not only about the equipment, but as well as general knowledge about the market, (which is) really valuable.'

	Marketing Director: It (the new ideas) can be a mixture of both (from the staff and from the customers). For example, composite POD is working on the fairly retired product, and that wasn't customer requested that but with we identified ourselves that patent was due to expire and there is an opening for something like that.'
NSS16	'Marketing Director: So there was already a link there with GSA which Produce Development Assistance just become aware of the intention to start working with businesses to implement culture of innovation which supports things like what we were looking to try, new product development, new product production, but also how to use the design-based tools, even looking at process to improve efficiency of organisation. So for me that was really the pivotal point of how STAR really started to change as a company. (Others: Yeah). POD Manager: Toolkits come from GSA. All tools they showed us … BG: So the tools are basically developed by GSA rather than by yourself? Marketing Director: Yep. Tools … GSA did them.'
KES5	'Marketing Director: What we have as a POD team is generally a set team in place. So they would have, weekly meetings, monthly meetings, depending on what happens in that POD at the moment. But what you can also find is to say something new you come up with. So if I was in the market and saw an opportunity … (or) a client comes with opportunity and I feel that it would be beneficial to have Produce Development Assistance from concepts (development department) to take part in a brainstorm session with the team of my POD, or if I was the lead to look at … you know, from the technical side you know. (POD Manager: yes) POD Manager she could come in to my meetings we will Produce Development Assistance have set meetings; we will Produce Development Assistance look at that specific opportunity, and like that something get involved with composite POD discussion, or you know, other areas so we do; we can all cross over into each other's but we generally have set sorts of team, that do kind of work. BG: Are you just responsive to the requirement from the customers, rather than meeting together for some general issues or creating something that are NOT for the requirements by the customers? Marketing Director: It can be a mixture of both. So some products of redevelopment, developing at the moment in concept in the POD, are, products that customers said, 'we need you to change that, we need you to do something like this.' But other ones come from market

	research; so from identifying the need in the market. Then bring them back, so for example, composite POD is working on the fairly retired product, and that wasn't customer requested that but which we identified ourselves that patent was due to expire and there is an opening for something like that. POD Manager: and also we … because the employees or everybody are like… they feel responsible as well, so you get people from all departments of the company; they are really more involved in how the businesses are actually doing. (ALL AGREED) BG: So you get new ideas from everybody, (All: Yeah!) to initiate the new products (All: Yeah). Marketing Director: I think, but sometimes it is really important about the POD as well, as not just a typical office staff room, in the POD we have machine operators and heads of production that coming to the POD because a lot of time the knowledge that they bring not only about the equipment, but as well as general knowledge about the market, really valuable.' 'Marketing Director: … people who would have felt in position to speak to everyone, (it) is almost an equal platform… Produce Development Assistance: I think I also feel in that way because like … you have David who is the owner of the company, there was a time as when I was first said to David, (inaudible, 15:40) … David was one of the best laughs ever , we have a great conversations now cause we both have the music, festivals bla bla. I've got a very great relationship bound each other. David would come for a drink of … like.. and it's really nice because you have no scares to sort of… you know ' 'BG: Is this very informal before POD was introduced … I mean the interaction between you … Marketing Director: It was formal, (ALL: Yeah). Marketing Assistance: I think it could be interesting so say that I don't learn the POD and so everything was in place like this right now, so… yeah when I go to the company I can really see how it is to be an innovative structure because it was like… informal; you just speak what you manage or… someone assist, someone doesn't really matter everybody has got the same level input… So that was great contributions from everybody there across the board because there were some really good strong relationships formed …'

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) were 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 the relationships formed which I think helped the transition of moving, from (previous organisation of STAR) to the POD system, so that was great contributions from everybody there across the board because there were some really good strong relationships formed.’ ‘Marketing Director: I think that you go back to the NOW team that we didn’t have before. It was about people working as a team. Quickly we saw benefits of that. We had a cross-functional team; so when we started to use tools to generate ideas, it was clearly seen in the benefits of cross-functional working how the ideas came through so much quicker, and also the skills identified that won’t be aware we had, and that also aided us in terms of moving people through the organisation who might not have otherwise, because we were able to work as a team and use tools. People had the equal inputs, and equal see, and that was probably the first time in our organisation really felt that it was the team. And that is being a key part of our POD structure now: it is based on that. We were working like studio environment; we were writing on the walls, we were using posters and a lot of those kind of things we’ve now grow in the POD structure too. POD Manager: We had to work as a team to say how we were going to do that (Also said Marketing Director). In one of the exercise we did on one of the workshops, which was based on the Picha-coocha, presentations, but we called it Pitchy-kitschy, with ten slides, ten seconds each and we decided as a team ‘Okey, back to the base we actually going to do one each about something personal to herself; and we are used to things like that so that helped us to get to know each other’s world but also help us practice the new tools we were learning.’
KES7	‘POD Manager: We find the customers ourselves, and we basically had a brainstorm session with them. (BG: With the clients?), yes. So we define like couple of their product … We would just generate the ideas with them, and we have got like a number of tools that we’ve got from the GSA, that help us generate ideas and also, when it comes towards the end of brainstorm session, select the ideas that are the best…’

	‘Marketing Director: We generated the ideas with them (researchers from the GSA), and we have got a number of tools from the GSA that help us generate ideas and also, when it comes towards the end of like brainstorm session, select the ideas that are the best and which have been proved a really good one is a topography (Pod Manager: Yes). That is when you have lots of ideas, and you basically give each person 3 dots spend, and then you put a dot to that idea you think the best. So some of ideas they will end up with two or three dots so you know that is the best idea or you think you’ve generated so almost like a democratic way of …deciding which, which idea(laugh) is the best.’ ‘Marketing Director: … when it comes towards the end of like brainstorm session to select the ideas that are the best and having proved a really good one is a topography (MQ: Yes) is when you have lots of ideas, and you basically give each person 3 dots spend, and then you put a dot to that idea they think the best, so some of ideas they will end up with two or three dots so you know that is the best idea all you think you’ve generated so almost like a democratic way of …deciding which, which idea(laugh) is the best.’ ‘BG: Who built the contact with clients in the beginning? Marketing Director: We don’t move from POD to POD. So at the moment, Produce Development Assistance, as the director of the fabric technology POD, is the person that goes out and gains her new contacts. And I work underneath the POD director, so both of us are effectively salespeople for that POD, so we would both come and generate some ideas… POD Manager: We find the customers ourselves, and we basically had a brainstorm session with them. (BG: With the clients?), yes. So we define like couple of them like Produce Development Assistance their product … We would just generate the ideas with them.’

MOON

The Interview with Director of MOON

CODE	REFERENCE
NSM1	'Director of MOON: Design process (for Branch 4) is almost exclusively to brief, so there is very little (flexibility). It's more prescriptive to a client's design. So quite often, when we are given with an opportunity to work with those companies, we are matching a fabric design they already have.'
NSM2	'Director of MOON: We would design that collection (of Branch 3), the components of that collection, speculatively and then, and then release it, hoping the customers will find designs interesting ...'
NSM3	'Director of MOON: Through historical relationship Produce Development Assistance be influencing to working more collaboratively. I think a lot of that relationship is very then sort of financially driven, rather than necessarily creatively or creatively or collaboratively driven.'
NSM4	'Director of MOON: We've been able to work with them (the clients) at concept stage, rather than responding to the decision on the concepts. There would probably be variations in the theme, rather than definite different designs. But we would have a great level of design influence. If we are able to influence, the more involvement we have earlier in the process, the better conversion, the better chance we have and secure the order in the end of it, … that's being a really important step for this business to be able to get involved in this designing project at much earlier stage.'
NSM5	'BG: So how do you share the expenses and the revenues together with the agents you collaborate with? Director of MOON: The agents, the agents will affectively take a percentage of the selling price.' BG: That is to say, you have different ways of collaborating and the way of sharing the expenses and revenues (Director of MOON: Yes), according to different customers? Director of MOON: The benefits are shared equally, but generally not all so. The interior designing company is responding to a brief from a client, so they are being paid by the client to come up with an interior design solution. There they are not involved in the flow of an order,

	and the fulfilment of that order, so the Produce Development Assistance have the scope of the interior design. But then our relationships as a manufacturer would be with the either the airlines. At that stage we don't have any direct commercial relationship with the design house. Any product design, time and costs, (are) completely (consumed by) us. If we are working with potentially a seating manufacturer, then that might be different; so the seating manufacturer, or ourselves, might be responding individually to the brief, from the client or from the interior design company or we might be supply in collaboration so we do have two or three collaborative relationships with seating manufacturers, so in, on that bases, either we are in collaboration with selling fabric to the airline, and there they pay the they just pay the seating manufacturer for a service, but more common is the commercial relationship between the airframe builder, and seat manufacturer.And even if our fabric is specified, we will need to enter into the commercial relationship with the seat manufacturer, and the seat manufacturer would then manage the ummm the negotiation. So the seat manufacturer is selling the finished seat, our fabric is a component of that seat, and even if the airline has chosen our fabric, our relationship then are with the seating manufacturer, we will be negotiating the price with the seating manufacturer, if that makes sense? (BG: Yes.) So, you know, it's a multilevel supply chain, and, you know, your customer might not be the client. Director of MOON: That's right, so, and, and again, you know, even our fabrics have been chosen, for a particular, emm, project, what is important to the… crucial to either the rail company or the OEM, manufacturer or the aviation or the airline, is the combination of the materials, that make up the seats, are ummm are compatible, and perform well, and pass all the tests, certifications they need, so ummm, when it comes then to testing, then that is something we would tend to doing collaboration with the seat manufacturer, or the panel manufacturer, if it is a service vertical surface, so there are some elements testing we would have to pay ourselves, there are certain elements testing we work in collaboration. So testing and certification would be area probably to note.'
NSM6	'Director of MOON: So, what would be our frustrations is that we feel like we can add value, to any of our clients (of Branch 3), but at times we don't necessarily get that access, because the agents might automatically consider rather than giving us the opportunity to develop a fabric. They Produce Development Assistance already have a fabric, they could sell from a different manufacturer.'
NSM7	'Director of MOON: However, in recent years we would be able to work more collaboratively with certain customers before releasing a collection (of Branch 3), work more closely and on the bespoke basis with the customer to understand more about what they're trying to achieve, and then Produce Development Assistance be design fabrics specifically for a compensation with a, if a particular field, particular broad design fabric of a particular wide, base colour, or fits of the design. Then we would be less speculative process, more collaborative process and a higher chance of convergence of that sale, that's happening more and more with, I would say, Produce Development

	Assistance is between half of dozen to a dozen key customers.’

CODE	REFERENCE
KEM1	‘Director of MOON: What our design team would do is they would take influences from external consultancy.’
KEM2	‘Director of MOON: Design of new products comes from the designers on the basis of their experiences and intuitions.’

The Interview with Production Director of MOON

CODE	REFERENCE
NSM8	'Production Director of MOON: So we are effectively designer and manufacturers to create products for global brands. Branch 2 is slightly different proposition because Branch 2 is our own proposition which is about business to consumer.'
NSM9	'Production Director of MOON: I suppose their responsibilities are taking the design brief, and creating the product, that is going to meet the customer requirement if you like. They have some very structured meetings. Often our designers will meet with customer designers, and they have their communications as well. BG: Do you mean the direct communications between the designers and the global brands? Production Director of MOON: Yes.'
NSM10	'Production Director of MOON: They are, but what's not so simple is how you make something like to be woven, just because something can be drawn on a picture does not mean you can weave it. (BG: So you offer technical support to your clients for this to be realised?) Yes, because not everybody can… you know some of the equipment is not the same, so it's not just a question of saying it's like a photograph, it is not photograph; that is achieved by understanding the weaving process.' 'Production Director of MOON: When we are working with the global brands, we are listening to their view of what they want to create. So they have an intention about what they think their requirement is for…So in this site, we have two roles. We are the manufacturer, and with the brand… But in this one (international fashion brand), the customer is going to (the client's) store, getting the (the client's) experience … There's nothing of the product designed for us. So actually the whole brand experience is not us. What relevant to us, is that we will fulfil the brand experience of what is provided (by the international fashion brand). Our only role in that, is to supply for them (BG: To respond to their requirements) to respond them to help them deliver that promise but a consumer in (the client's) environment would not know anything about Branch 1. BG: Who are involved in this kind of meeting?

	Production Director of MOON: Produce Development Assistance be the director, or weaver. If it's for a global brand, it's just the director.' 'Production Director of MOON: …you start with the intention that you want to create, and then you do the technical aspect of it… when we are working with the global brands, we are listening to their view of what they want to create. So they have an intention about what they think their requirement is for…Our only role in that, is to supply them (BG: To respond to their requirements) to respond them to help them deliver that promise but a consumer (of our clients) would not know anything about Branch 1. BG: So you offer technical support to your client for this to be realised?) Yes, because not everybody can… you know some of the equipment is not the same, so it's not just a question of saying it's like a photograph, it is not photograph, ummm, that is achieved by understanding the weaving process. … So this week we've had clients come in, they said: 'Okey here is what we think about for next season here is in colours, here is my ideas, what can you help with us?' So they start with their ideas with what they want to have. (BG: Who are involved in this kind of meeting?) Produce Development Assistance be the director, or weaver, ummm, well, if it's a global brands, it's just the director.
NSM11	'Production Director of MOON: If we have control over the brands, we might make stock against our own risk, and then sell from our stock. So that model is different because we won't make stock of this, because we can't sell us. So we only make this to order, our brand equity, we make stock. So there are some differences but not on design site.' 'Production Director of MOON: The only difference is, here you got global brand at this, so you got collaborations with customers, you could have viewed the global brand we supply here as yourself, so we respond to our own brief, rather than to our customers' own brief.'
NSM12	'BG: How do you get the knowledge about the sales, the designs of your products? Production Director of MOON: It's judgment. (BG: Who is responsible for this?) Director, director is responsible for our own brand. She is responsible for what we create, and which colour we have for styling, design, how much we make, how much we are going to sell, how do we sell that…she's also responsible for getting the customers so she knows what the (retailors) like, …it's not all facts and figures and data. Fashion is not rational. Because there is a lot of feel. So it's not business perspective because there is going to be a lot of analyses.

	Probably (it's) more from qualitative understanding or getting groups together or watching consumer's behaviour.' 'BG: Interesting. Do you know how she (the director) gets this knowledge? Production Director of MOON: We used mixed team of designs as well. But that's a typical creative process. You know that scarf there, we Produce Development Assistance design that scarf, we didn't know how it's going to feel, and there are quite lots of risks, and so that's why getting 75 *per cent* sales is exactly quite good. BG: It sounds the process is quite implicit rather than explicit? Production Director of MOON: Completely.'
NSM13	'Production Director of MOON: Sometimes we get fabrics we don't plan to. So with Produce Development Assistance, we make samples. Produce Development Assistance come up with four ideas, so we plan something we think that one, that one, that one (he pointed on the drawing), and that one is good, but sometimes this one is okay. So it can slightly help the process, but somebody thinks that thing is nice, and so it's chosen. BG: But how do you get to know that the unexpected one is good? Production Director of MOON: that's visual things. So if we go through the fabrics, what do you like? You know what you like; you probably can't articulate exactly why you like it. Because we made them as a by-product of the form we want it. So we make the form we want, we got these ones, so then to show them…but you can't completely understand why. You get to get insights, (BG: That's intuition?) and intuition, but it exactly I can't understand why do people feel the way they feel, and so that's interest of us and we spend time thinking about it, but you don't really know… it's not at all an objective, it's not all qualified, or we defined.'

CODE	REFERENCE
KEM3	'Production Director of MOON: …when we are working with the global brands, we are listening to their view of what they want to create. So they have an intention about what they think their requirement is for…Our only role in that, is to supply them (BG: To respond to their requirements); to respond them to help them deliver that promise but a consumer (of our clients) would not know anything about Branch 1. Production Director of MOON:…So this week we've had clients come in, they said: 'okey here is what we think about for next season here is in colours, here is my ideas, what can you help with us?' So they start with their ideas with what they want to have. BG: Who are involved in this kind of meeting? Produce Development Assistance be the director, or weaver, ummm, well, if it's a global brands, it's just the director.' (NSM10) 'Production Director of MOON: Our customer (of Branch 2), never tells us what they want. You won't know what fashion is going to be next year. That's our job. So our consumers can't tell us what the fashion is going to be. BG: So what are their roles in the designing? Production Director of MOON: Not designing, but we do have groups we have insight from them, so we get people together, and we understand and explore decision making processes. BG: How is the process going? Production Director of MOON: So we Produce Development Assistance invite people together, have drinks, have somebody they… (BG: Brainstorming?) Not like a brainstorming because we don't have an agenda, but we got somebody facilitating it, and they will invite and lead the discussion, and we will get insights from the group discussion.' Production Director of MOON: This one (Branch 2)? This one, our customer, never tells us, they don't tell us what they make. You won't know what fashion is going to be next year. That's our job. So our consumers here, can't tell us what the fashion is going to be.

	BG: So what are their (consumers) roles in the designing? Production Director of MOON: Nothing. (BG: Nothing?) This director here (Branch 1), the customers don't tell her, so actually, in terms of errr, she will listen, she will observe, she will see herself, but they don't say this is what we need. This director here (Branch 2), is very much listening, so this one is still focused in the marketplace, … And in fashion, most people are following fashion, it's not supposed to ask most people, what they want, cause they don't know. They are following. Production Director of MOON: …we are not interested in what's on now; we are interested in what's going to sell next year, and how to influence our process. So we are very much leading, rather than following. BG: You don't involve the end consumers into your process of designing? Production Director of MOON: Not designing, but we do have groups we have insight from them, so we get people together, and we understand and explore decision making processes. BG: How is the process going? Production Director of MOON: So we Produce Development Assistance invite people together, have drinks, have somebody they… (BG: Brainstorming?) not like a brainstorming cause we don't have an agenda. But we got somebody facilitating it, and they will invite and lead the discussion, and we will get insights from the group discussion. BG: How did you sift the best ideas from the… Production Director of MOON: I don't think it's necessary to. The best is about trying work out what is the thing that is of representative of the market. What I was describing is called the qualitative research. And, so if you google qualitative research, that's focus groups, then it's trying to say by understanding by getting insight to how people behave, then you can better form your traces. What you don't have is data. And so what you need to be judging, is do you think the people you are listening to are representative of the market and their requirement.

Researchers from the GSA

The Interview with Researcher 2

CODE	REFERENCE
KEM4	'Researcher 2: At workshops, (there) were a chosen slice of the company, from 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 its low as 8 or 9, but generally there were all attendance. And we would deliver design methods. The two designers worked, with my support, to help design them.'
KEM5	'Researcher 2: (it was aimed at implementing) design methods that would look at the processes in the factory and look at the problems, the issues, by revealing the knowledge among the group. And (CCoI introduced) visual creative ways of how you can capitalise and address problems in the factory as they were reviewed. So there were a lot of those specific creative activities, and was about of (letting them) look at the bigger picture, activities as well.' 'Researcher 2: People were learning about their own organisations through it, and that was great but they used to it as a sort of spring board; they decide (to do) Quick Win project, and never came back to develop it. I was seen as a sort of, should be a sort of leaving artefact they came back to it printing what they learned about it and kept using it. It was a good site in which to do what Jeni called 'The Deep Dive' project.' 'Researcher 2: And visual creative ways of how you can capitalise and address problems in the factory as they were reviewed.'
KEM6	'Researcher 2: And because there were some wins, there were very effective tools, and then you saw them trying to develop. And I think these tools made this slice survived after we left as far as I know …' 'Researcher 2: …they didn't influence them as a factory as what we wanted it.'
KEM7	'Researcher 2: the biggest problem we faced on this was based on the management. If the management people were valuing the project, they would have encouraged their departments to work with them, to encourage the project, the relationship with them and share more time and interest in the methods and approaches. This slice we would try to get the slice to perform, but management would not, from the

	very top, engage with us as much. So we were pushing from inward out, inviting people to come along ourselves to see if they would engage and that felt quite cold cause they had their own jobs their own departments to work with.'
KEM8	'Researcher 2: One is the design department; we needed to get them on board but they thought the activities we were doing as, I don't know, I don't want to use the word 'patronising' but they thought they already knew the stuff, and they were asking 'oh, how much should we have,' as much as you think the company needs it. It's not some little training courses that we were doing. This is for the culture of the organisation and I don't think they quite embraced that idea. They had their own methods there, their own jobs in departments and approaches. And I think they prioritised that by trying to bridge the gap to other departments.' 'Researcher 2: The slice was seen as a separated group to the rest of the factory rather than a resource that everyone could learn from.' 'Researcher 2: Actually one management, for one department, cannot influence the management cross all the departments. It was seen as an extra work because the other factors there happened was this sort of the other workers, from the factory, there were cults from the slice members, ...there was few as sort of clique, as a sort of special group; they didn't have to do with the regular job all the time. The slice was seen as a separated group to the rest of the factory rather than a resource that everyone could learn from. I think that was a difficult thing to shift. It was a very complicated factory it's really interesting to look at it because there were individuals in this slice, it was a small fracture of the company that we were working with. And you need at least one representative to say from one department who worked as natural leaders who worked natural managers they were like young employees just arrived but they didn't have the capacity and authority to take this method to their department. They were essentially just being trained to be good participants, rather than people who represented this method. It's not naturally something they would do themselves anyway, cause the slice selection didn't discern about who had motivation to any change in the organisation; it's more like who was willing to take part.

	Lots of different complex problems were going on and the design team at the time didn't have the capacity to turn that into those methods and into how they move the intervention forward. But there was potential for designers to do that. But it might be much more in line with management, technique and skills.'
KEM9	'Researcher 2: Richard was the highest-level manager who was part of the slice, and he saw the value, he was very much seen as a leader in a group sometimes to the problem of individual methods because the group always look to him to make decisions. When we were always encouraging the group mentality in a group decision but he understood the value it could have for everyone and so you see individuals converted if you want or willing to take on the method, but on an organisational level, the idea impact is a lot lower, and I think that's just down to the circumstances in the situation that the project went through.' 'Researcher 2: People were learning about their own organisations through it, and that was great; but they used to it as a sort of spring board, designed Quick Win project, and never came back to develop it. It was seen as a sort of leaving artefact and then they came back to it, printed what they learned about it and kept using it. It was a good site in which to do what was called 'The Deep Dive' project.'
KEM10	'Researcher 2: the slice started its own project in the makers' market. They had completed that, and this was new sort of many projects they had initiated themselves and used a visual journey method basically. So it was something they were repeating for themselves because they saw it as a high value method, which was encouraging, but again it didn't ripple out to others other than they might have brought people to help them in certain aspects.'
KEM11	'Researcher 2: But from what I've encountered, you saw a change in the individuals. I think the most tangible impression was when we started with them, they externalised some of their problems, they said 'our suppliers were not good enough, our clients were not good enough', or they got problems with the people they were dealing with, not with themselves. By the end, they realised they had started with themselves; they worked specially with that project about internal process that they could change. And that was the biggest change within the slice.'
KEM12	'Researcher 2: They've never been given the time to look at these problems across the board I guess. Because what we learned about the factory is like silos; in this sense each department has their own skill sets, has their own machinery, or has their own processes. And there were very few debates on how they communicate across the board. And that's why we Produce Development Assistance do our own journey; we had all the departments to go to each of the stages of developing products. And here were loads of issues that you hadn't seen: none of them have known this. So here we made a connection. So that was the first thing that we realised that we do have to look at

	ourselves and how we could improve things. And the other thing was the management culture. They will do themselves far too busy to talk to each other about strategically how to approach it. (GB: As STAR did before the intervention?) Exactly. The first thing they would do is to share issues and spend time looking at the issue; try to understand it. But that's a harder thing to be translated into management level. As we have discussed earlier some of the issues came up in the communicating in working with managers. The slice members was where I saw the most change, they were individually expecting different things from the organisation; they were demanding different things.'
KEM13	'Researcher 2: During the intervention itself, there were simple skill gaps, they saw, for example, they had these things could be AX, computer system, so this was how they looked input, kind of fabric grounds, and that certain thing, I think, the weavers had real implicit knowledge about when or whether they are going to ran out of weft, to finish their run, whereas the computer would allocate them a certain amount and they knew that they are run out, but they didn't have the skill set to adjust the number to get more weft. So they think when it is run out we just have to stop, and you waste time and money. So they decided to train members of yarns to work with weavers together to get the weft in place, to train them. So it would reduce delays like a moment. And that was one of the Quick Wins did come out and that was just a connection of: there was a skill gap they need to know how to deal with these problems on site, because they would have minded if they have fewer workers, certainly fewer managers when you don't have the proper skill to deal with the problem.'
KEM14	'Researcher 2: They didn't feel as safe to do that kind of work in the factory. Because some of the persons did the work with very intimidated personalities. I think there was a member called Lyn who every week was questioning whether she should continue because she felt she was getting grief or problems from diagnosing her department. And I was trying to encourage her, because she always offers a good conversation. She looks very experienced, but in terms of leading an activity, she was very rarely doing that. If she was never one who was kind of learning to be a good participant, but at the extra layer of responsibility and sharing the process you would not expect that offer. So she especially needed a safe space to engage these activities and even then there is still fraud with issues. GB: It sounds like that they are used to following the commands. 'Researcher 2: Exactly. That's why the changes were mostly in the slice, (be)cause they were given that flattened democratic platform to get involved and by the end, all of them were willing to engage in new discussion in this new project but in that safe space. And in that

	factory, they didn't feel that safe space.'

The Interview with Researcher 3

CODE	REFERENCE
KEM15	'Researcher 3: From my experience, there were lots of personal development in the team focused on that what was quite reserved in slice become (they were) lot more confident. I asked them for their opinions, they said that the relationship with management got a lot better, as they've got more visible, kind of more friendly relationship, more comfortable than just saying hello, good morning whereas before they were definitely split in hierarchy, and they feel comfortable even just saying hi. So that changed.'
KEM16	'Researcher 3: I think some of them were a bit not friendly as if they were being told what to do. GB: how did these staff resist this plan? Researcher 3: I thought there were plenty of them they thought it was a bit silly. Because it's so different to the way they worked. Researcher 3: On one hand you set up persistence whereby they had a drop in for ideas while other employees won't agree so to submit an issue or potential solutions to an issue. And then the group would assess that and then the percentage by the management. And that was successful in some people while others felt like the job was changing and they didn't actually want that change to happen. So on one hand you had one action, one changed, it seemed positively from some and very negatively from others. (GB: Why it was negative from someone?) Because they were changing the job that they found was a good job, and was very clearly defined. They were quite happy with that. Then they were almost extended at this other strength which they were uncomfortable with or reluctant to, resistant to.'
KEM17	'Researcher 3: I don't think there is any personal change. As far as I am aware there was not physical systematic change. (GB: How about the structure?) The structure did not change.'

Hotel A (Chairperson of GALAXY & Owner of Hotel A)

CODE	REFERENCE
NSG1	'Owner of Hotel A: We always look to see how we can have value to anything that would provide, whichever we can in the restaurant, you would be imaging, from wines to the food…' 'Chairperson of GALAXY: Three years ago you (Owner of Hotel A) noticed a gap in the market, for (car) rental. So we bought one vehicle (service), which is rented to, you know, to customers… So someone came to the area and said 'I want to hire a car.' There wasn't a service. So the partnership (with the local garage) came about as a result of that. We said to them, because they are shut on the Sundays, we said to them 'you give us a couple of cars and we'll keep them working; make sure it's filled in for you.' So we did that. As well as we buy the car (service), we rented out to people.' 'Chairperson of GALAXY: We were the first hotel in the area to have local swimming pool. It would cost us quite a lot of money to put up a swimming pool… So we built a relationship with the pool; so we pay the pool at a reduced rate and we have cars. (Customers) can access the local pool and local gym.'
NSG2	'Owner of Hotel A: If there was anything more we could do for them. Hire a car came about, we've been also in partner with the local garage, and we can have the cars delivered here to whatever they want at any time, because people find it not very easy to get hired cars. So we thought about a gap on market. So we do speak to other businesses whether we can try to add value to our business.' 'Owner of Hotel A: By speaking to them, by interacting with them, and asking them about what they needed, if there was anything more we could do for them.' 'Chairperson of GALAXY: A lot of this is done because people here know that we provide the high quality, good service and we really look after them well; so that's really a word of mouth… we do advertisements on local paper, we do it quite a bit in social media, Facebook, Twitter… we do mail and emails; we built up-of-date base of people.'

NSG3	'Chairperson of GALAXY: We promote the local produce. So that's the whiskies, we actually have our own bottled whiskies. GB: So you have the relationships with the local businesses for offering these services and products. Are they permanent or temporary, I mean these relationships with these local businesses? Chairperson of GALAXY: I think they are permanent. It's been there for 60 years. Owner of Hotel A: We also have relationships with other suppliers, whisky supplier, family firms involved. We have the relationships with them as suppliers of whisky as well, and they don't just sell us whisky, we have selected whisky for us, we will select together (with the distilleries).'
NSG4	'GB: Regarding your staff, how do you organise your business and staff, to promote your service? To boost your service? Chairperson of GALAXY: That's probably one of the most disappointing aspects of the hotel Bin. Because we have tried to use trainings to promote the business for every person … and they are not really interested in it. But on other hand I would say is, we've just gone through the assessment in the people process and the assessor asked me if I have any questions, particularly I wanted that, then I wanted to know, if they were money-oriented. And she came back to me and she said 'no, they just love working here.' They don't really work with incentives; they don't really bother about it. So it's still working on…' 'Owner of Hotel A: If I could add, you would be interested in a way you could install within the people, but it's trying to have the staff understanding what we are trying to achieve is very difficult. We found it's very difficult to take people install these ideas believes in them just in a classroom situation. We don't have the time, the facilities, and the type of person where that would work in a classroom situation. It's more on job training where people see. We have some staff that are better than the others, in dealing with people…We do train and encourage other staff to do that. Some other staff are not as comfortable at doing that…so it's the theory is fantastic but the delivery is taking a while.'
NSG5	'GB: Do you share the revenues and costs with these partners on contract? Chairperson of GALAXY: We don't share any revenues. We just pay them for six cars, and our residences use the cars. So it's added extra for hour. So added extra hour our guests, but it also showing them what is it in the area. A part from the benefit that people thinking 'yeah

	it's really great to stay in MC hotel cause they do all these things for you', there is no perceivable they look for us.'
NSG6	'GB: Regarding the Facebook and social media you hire for accessing the information of customers, do you use it intensively or occasionally? How do you build the database of the customers? Chairperson of GALAXY: That's two different things to me. The database for the mailings, we gather that information because we have our feedback forms, when people check in we pick up their emails. When people are dinning in here, there is a little feedback form they fill in for us as well.'

CODE	REFERENCE
KEG1	'Chairperson of GALAXY: Just a setting example Bin…the staff just know that what we want to do is to provide the best service. So if someone, for instance, they could find out that someone was a vegetarian, and we do have vegetarian dishes but that person likes particular things so they would come through to ask them saying 'is it alright? If we are going to do such and such.' And we would say 'yes.' We had another example from few years ago while a conversation here led the waitress to tell the kitchen that someone here has never tasted Tatti scone, as it is called in Scotland, potato scone, they called our staff at the time to came through and she said 'we haven't made any but you might find to get some from Tesco tomorrow so they can have them for breakfast.' So that was a kind of the waiting staff telling the kitchen and then the kitchen staff coming to us because they wanted to do something great for the customer.'
KEG2	'Owner of Hotel A: There is very open line of communication. (Chairperson of GALAXY: Too open sometimes (laughing)) But it's not successful, as we would like. Because sometimes the staff don't realise how important is the little things people tell that. We are trying to make them aware of listening to what customers tell them, so they can use that information and… it's… we are very flexible. But we could only do and react to the information that was given. And in certain cases, we find that we don't get it early enough or, we don't get it at all. So it's really trying to find a way to encourage the staff to be as proactive as we are in adding value or finding out what someone really wants…'

KEG3	'Chairperson of GALAXY: We promote the local produce. So that are the whiskies; we actually have our own bottled whiskies. GB: So you have the relationships with the local businesses for offering these services and products. Are they permanent or temporary? Chairperson of GALAXY: I think they are permanent. It's been there for 60 years. Owner of Hotel A: We also have relationships with other suppliers, whisky supplier, family firms involved. We have the relationships with them as suppliers of whisky as well, and they don't just sell us whisky, we have selected whisky for us, we will select together.'
KEG4	'Chairperson of GALAXY: …we work with them, they see us how we are doing they see us how we interact with the customers.'

GALAXY: (Chairperson of GALAXY, Owner of Hotel A & Researcher 1)

CODE	REFERENCE
NSG7	'Chairperson of GALAXY: GALAXY, the role is, GALAXY brought together some different businesses within this area. And what we want to do is, (be)cause some people say we want to increase the tourist footfall in this area. And we are doing that so for instance we've had a conference in the area, which was on social media. There is an archaeological festival on this weekend we sponsored that partly. And there is a food and drink festival on Oct. 10th, and GALAXY's organising that.' 'Chairperson of GALAXY: GALAXY, the role is, GALAXY brought together some different businesses within Catheness and Sutherland. And what we want to do is, cause some people say we want to increase the tourist footfall in this area.'
NSG8	'Chairperson of GALAXY: We, the revenue we generate are purely from membership fees. We have 70 members now. We also are funded. We have funding from (local enterprise council), we have funding from (local government), and we have funding from heritage lottery funding.'
NSG9	'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).'
NSG10	'Researcher 1: GALAXY at the moment is beginning to put together the coordinated offer, web offer and developing into paperwork work offer on tourism in Catheness and Sutherland.' 'GB: Can you give some specific examples about what they offer? Researcher 1: There's a website called GALAXY, and next month I am going to a weekend festival called 'tastes north' which is to exploit and extol local projects and food and drink.' 'Researcher 1: Our role was to build up a group of businesses that would begin to work together and use creativity and design methodologies; begin to develop something of significance to improve tourism in this area. And we had no idea how to do that, and what

	actually eventually happened in the name and everything came out of it was the work of the people who are members of that group, the twelve members.' '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.'
NSG11	'Chairperson of GALAXY: I think that's a great idea (GALAXY). For our business, I would honestly tell you Bin: there is not really a benefit. It's a cost to our business, because the amount of time we put into GALAXY. But we know the area needs it, and we don't actually look to benefit from GALAXY. We didn't get involved with GALAXY to benefit from it in anyway. What we want to get involved for was for the whole area to benefit. Owner of Hotel A: We believe the community growth and our businesses growth, but ultimately our community needs it. The community would go to us, so we want to give something back (to the community). It's interesting; it would be good to explore your thoughts or your analysis of those businesses. Because many businesses are in a long-term growth to survive, many businesses can do something in short term. You can be a star overnight, and do something and a lot of money will disappear, whereas to be consistently good over a long period of time takes a lot more organisational skills, marketing skills, for your product, to be adapted, changed to your market, whatever. And one way of doing that is by adding to the community. You are not doing it looking for something coming back but you're doing it knowing it is worthwhile from your organisation…But it's not just a hotel, it's not just tourism so for instance, …And that's why a lot of people alike here. Some others aren't. But …people want to do their best for the community. It is the attitude.'

Appendix 2: Plain Language Statement

Plain Language Statement

1. Study title and Researcher Details

The title of the research is “Collaborative Service Innovation in SMEs: A Knowledge Perspective”.

Bin Gao is currently a doctoral researcher in management at the Adam Smith Business School, University of Glasgow: b.gao.1@research.gla.ac.uk; mobile +44 (0)744 683 1967.

This research is supervised by Professor Robert A. Paton and Dr. James M. Wilson, they Produce Development Assistance be contacted: Robert.Paton@glasgow.ac.uk and James.Wilson@glasgow.ac.uk; +44 (0)141 330 5037 and +44 (0)141 330 5041

2. Invitation paragraph

You are invited to participate in a study, which is a part of the doctoral research project conducted by Bin Gao. The regulations and instructions of the University of Glasgow require that you be informed of the goals, content, and likely results of this research prior to participation. Please carefully read the following information prior to consenting to participate. If you require further information or have any questions please contact the researcher.

Thank you.

Bin GAO

3. What is the purpose of the study?

The purpose of this study is to investigate the collaborative exchange and usage of knowledge between ‘actors’ within a network pursuing service innovation The context of the research is the key Scottish economic business sector of small and medium-sized enterprises.

4. Why have I been chosen?

You have been chosen because your company is recognised as a small and medium-sized enterprise identified as being engaged in service innovation.

5. Do I have to take part?

Your participation is completely voluntary and you are free to withdraw at any point.

6. What will happen to me if I take part?

Should you agree to participate your contribution is likely to consist of an initial semi-structured interview at a location and time convenient to you, followed by an invitation to provide additional contacts engaged within your service innovation network. Once the actors within the network have been interviewed you will be requested to attend a network focus group to collectively review the service innovation process and outcomes, once again at a place and time convenient to yourself. Your total contribution is unlikely to exceed two hours.

7. Will my taking part in this study be kept confidential?

All data associated with this research project, in accordance with the University ethical approval process, will be securely held and the anonymity guaranteed.

8. What will happen to the results of the research study?

The results will be communicated via the doctoral thesis (publically accessible) and Produce Development Assistance be synthesized into published conference and journal articles.

9. Who is organising and funding the research? (If relevant)

Not applicable.

10. Who has approved the study?

The study has been reviewed by the University's College of Social Sciences Research Ethics Committee.

11. Contact for Further Information

Should you require any further information, or have any concerns, please do not hesitate to contact the researcher at b.gao.1@research.gla.ac.uk or +44 (0)744 683 1967.

Additionally, if you have any concerns regarding the conduct of the research project you can contact the College Ethics Officer: Dr Muir Houston, College of Social Sciences Ethics Officer, Muir.Houston@glasgow.ac.uk

Appendix 3: Case Study Protocol

Collaborative Service Innovation in SMEs: From A Knowledge Perspective

Case Study Protocol

Part 1: An Overview of the Study

1.1 Mission and Goals

This research attempts to study how knowledge is exchanged in SMEs for service innovation to be initiated, developed, implemented and operated.

Based on the research gaps identified in the literatures, two questions are asked:

Research question 1: How is service innovation initiated, developed, and carried out by SME by collaborating?

Research question 2: How is knowledge exchanged between the SMEs and these actors for service innovation to be realised?

1.2 Rationales for Case Selection

The multiple cases study is selected to achieve the research intend. The study is initiated by identifying cases from the companies targeted by two-fold criteria: firstly the definition of SMEs in UK by section 382 and 485 of the Companies Act 2006:

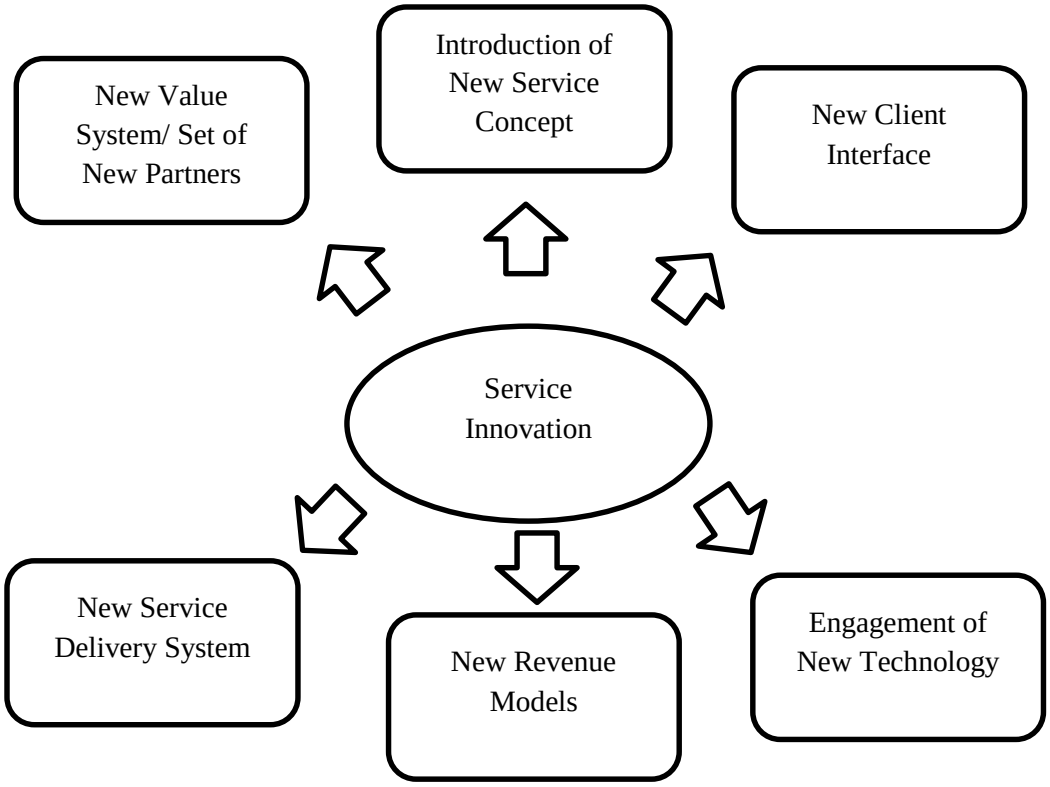
"A small company is defined as one that has a turnover of not more than £6.5 million, a balance sheet total of not more than £3.26 million, and not more than fifty employees. A medium-sized company has a turnover of not more than £25.9 million, a balance sheet total of not more than £12.9 million, and not more than 250 employees (Henry, 2012).

And secondly the characteristics identified by literatures for SMEs including*:*

- *Dominant role of the entrepreneur/owner;*
- *Resource poverty (capital, time, knowledge and skilled personnel);*
- *Flexible organisation capacities;*
- *Focus on short term;*
- *Strong local/regional focus and customer needs orientation;*
- *Low degree of formalisation(Bos-Brouwers, 2010)*

The managers/owners who are responsible for the operation and decision making of the companies that meet the above criteria will be interviewed for the identification of cases according to the 6-D model of service innovation by den Hertog *et al.* (2010), which is demonstrated in the following graph:

Picture 1: The 6-Dimensional Model of Service Innovation (den Hertog *et al.*, 2010)



Cases must be selected according to the features of new services outlined in the table prior to next step for looking into the knowledge processes. Each company Produce Development Assistance cover one case, namely one dimension of service innovation, or multiple cases. Therefore the number of cases is not dependent on the number of the companies that are involved. The process that the service is initiated, developed, implemented and managed will be mapped, and the actors that have participated will be identified for next step.

Part 2: Data Collection Procedure

2.1 Outline of the Data Collection Procedure

This research attempts to look into the knowledge exchanges among the SMEs and the actors within the networks for service innovation.

With the focal company selected, a case is created by interviewing its CEO/owner in order to map the process of the service innovation with the actors involved identified. Questions about their businesses, on the basis of the secondary information that has been conducted before the interview, will be asked for more details. In terms of the service innovation, questions about how they are interacting with customers, how they are collaborating with

their partners for services/products to be carried out, how they distribute the costs and revenue, and how they deliver their services/products, will be asked. This information will be analysed after the interview for service innovation to be identified rather than directly asking them about service innovation which Produce Development Assistance confuse them. Moreover, the interviewees will be asked to describe the processes that these operations mentioned above, and the actors that have been engaged. This information will be reconfirmed in the end of interview before asking them for assistance to engage these actors for focus groups.

Actors identified in the interviews are then engaged in the focus group for describing how knowledge is exchanged between them and the focal companies. The participants of the focus group will receive emails with, in addition to the documents that I have sent to the interviewees, a brief of the information collected in the interview, including the services and the processes that they are created and managed as well as their roles by the descriptions of the CEO/owner of the focal company. They will be asked to recall what they have done and what they believed to have contributed to the process with their knowledge. The knowledge exchange process will be mapped and confirmed by the end of the focus group.

This process carries on if more actors are identified until all relevant actors are properly covered.

The result, namely the process of knowledge exchange for the services will be feedback to the CEOs/owners of the targeted companies for confirmation.

Collected data are coded and analysed with the assistance of Nvivo.

2.2 Accesses to key organisations and interviewees

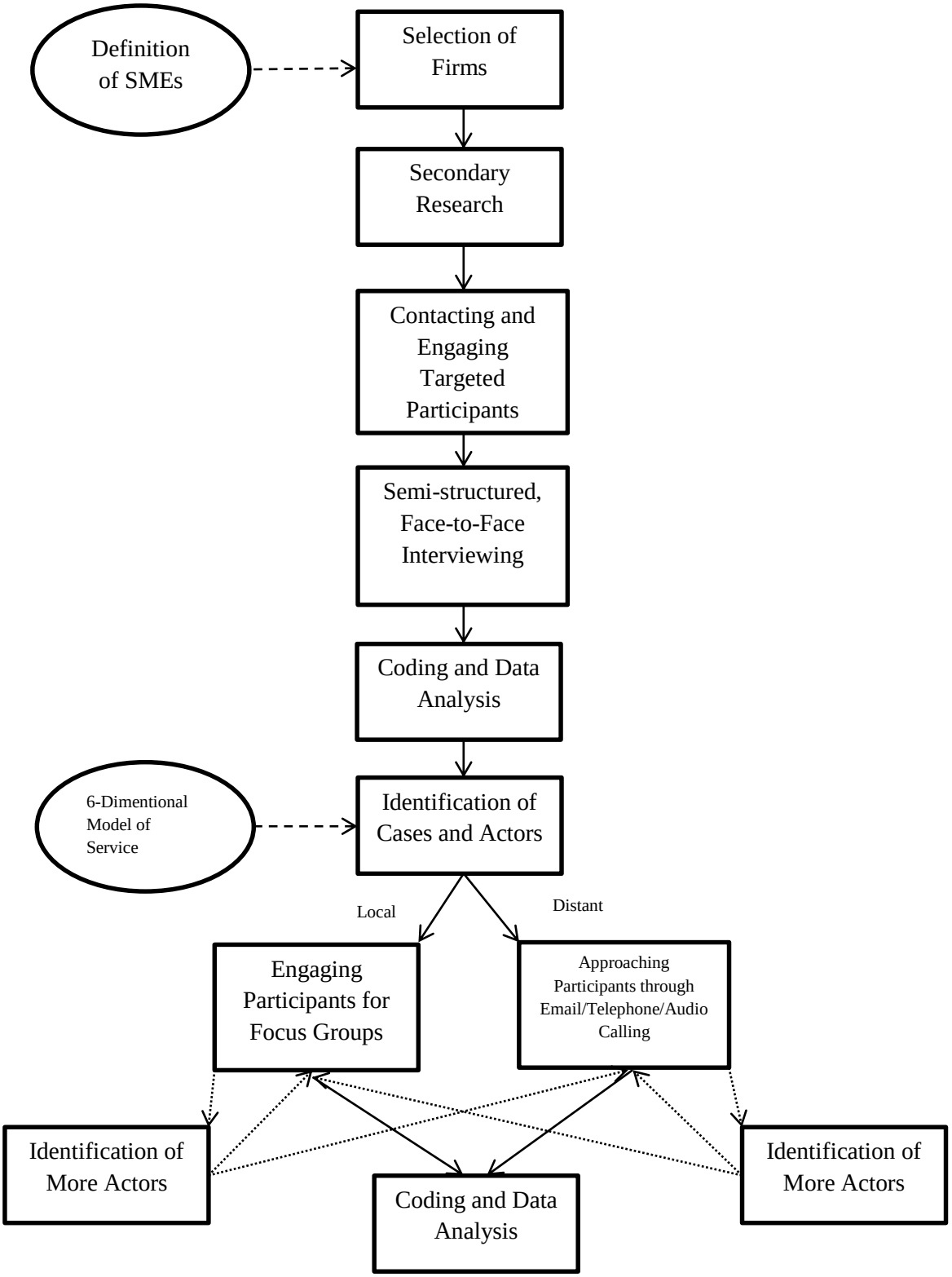
The key organisations and interviewees for data collection will be accessed to through Prof. Robert A. Paton of the ASBS or researchers from the GSA. The senior manager will be contacted by email or telephone with introduction to the researcher, invitation to the interview, a brief of the research, the plain language form and the ethic form. The date and the venue of the interview will be discussed and fixed. Questions about this research will be answered to before they agree to attend. The participants for the focus groups, as mentioned above, will be accessed through the focal companies.

2.3 Risks in the Data Collection Procedure

Due to the availability, schedule, and other reasons the participants might not be able to join in for the focus groups. These participants will be invited and contacted through the CEOs/owners of the targeted companies. In the case that no actor is able to attend, the

researcher will send them emails or call them with the same questions that are discussed over in the focus groups (exchange of information by several contacts via emails or callings), or let them comment on the drafted knowledge exchange process that is mapped in the focus group.

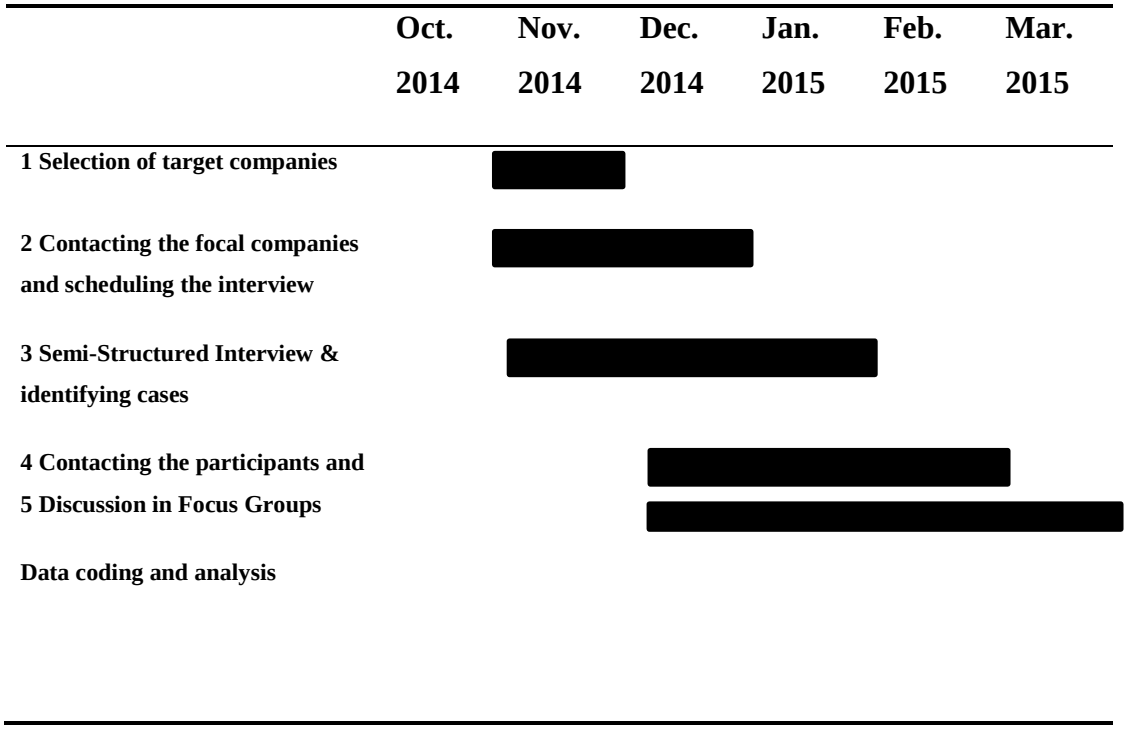
The Process of Data Collection



2.4 Schedule

The data collection procedure will be conducted from 1st November, 2014-1st April, 2015. As shown in the table 2, secondary researches and case selection will be completed by 20th November, 2014. Contacting, observing and interviewing the focal companies will follow an ongoing process starting as soon as the case selection is completed. The engaging and interviewing of actors identified in the last step will proceed simultaneously with the interviewing of the focal companies. All the first two phases should be completed by the February, 2015, followed by the data analysis.

Schedule of Data Collection Procedure



Part 3: Data Collection Process and Questions

3.1 Research Questions:

Research question 1: How is service innovation initiated, developed, and carried out by SME by collaborating?

Research question 2: How is knowledge exchanged between the SMEs and these actors for service innovation to be realised?

3.2 Responses expected from the Interviews

1 Based on secondary research, in-depth knowledge about the businesses will be obtained from the CEOs/owners of the firms;

2 Services that the firm are providing or intending to provide are identified; Because the data will be categorised according to the 6-D model of service innovation by *den Hertog et al.* (2010), attentions must be concentrated on the six new service dimensions, as shown on table 1 above, in terms of client interface, service concept, new partners, service delivery, revenue models and technology.

3 The process that the service is initiated, developed, implemented, and managed will be mapped;

4 Actors that have participated in the whole processes and their responsibilities and roles will be identified;

3.3 A Brief of the Interview and Questions:

Before the interview starts, a brief of the study, including the information about the researcher, the purpose of the study, the reasons for engaging the target company, and the instruction of the interview, will be given to the interviewee, with the documents *i.e.* ethic form, consent form, and plain language form provided and processed.

Example:

'Good morning/afternoon, first of all I must thank you for attending this interview. My name is Bin Gao, a third-year PhD student in management. My interest of research is the knowledge exchange for service innovation. This research is attempting to look into how knowledge is exchanged collaboratively during the process of service innovation. The fieldwork will include two phases: in the phase one, which is what we are primarily going to do today, I will identify the cases; in the phase two I will need to look into how knowledge is exchanged in the process of service innovation. The purpose of the interview today is to identify the services that you are providing and map the process of how these services in your company is initiated and implemented, and who are engaged in this process. Based on the data I collected today, I will need to engage the actors, through you, that are identified today into a focus group in order to depict how knowledge is contributed and exchanged for the service to be realised. More information about this interview can be found on the plain language form in your hand.

The interview today will last about 60 minutes, no more than 90 minutes. I will ask some basic questions in order to keep our conversation on track, and I will let you give your opinions for most part of the interview. There is no standardised answer, so please speak what you have in mind as details as possible. The whole process will be audio recorded and preserved under the rule of the University. Before we start, you Produce Development Assistance want to read through the plain language form and the consent form carefully and raise your questions about this study, and could you please sign the consent form if you agree to participate.'

Opening questions will be asked based on the knowledge obtained from the secondary researches. They Produce Development Assistance include questions in relevance to the businesses that they are running, their products, changes that they implemented in recent, *etc.*

'Thank you for consenting to participate, and now the audio recorder is on and we will start the interview shortly. I have got to know about your company by browsing your website in recent, and … (describing my knowledge about the company, the product, and services that they are providing). Is my description correct or did I miss anything?'

Questions about the services that they are providing will be asked then. If any service innovation, based on the 6-D model of service innovation, are already identified in the secondary research,

questions about the details of these services will be asked. Otherwise, the participants will be asked to describe the services that they are providing or about to provide, with the following questions:

'a) How do you collaborate with your clients for developing your products, or services, like DIY services etc.?
b) How do you interact with your customers, or in other words how do you normally communicate with your customers?
c) How do you collaborate with your partners, i.e. the suppliers, for these services/products to be carried out?
d) How do you distribute the revenue and costs in collaboration with your partners/customers?
e) How is your firm organised to provide these products/services?
f) Do you hire any electronic technologies in any form for your products/service to be provided?'

Based on the responses to the above questions, more questions are asked in order to achieve information about how these services are initiated, developed and implemented:

'Why did you choose to collaborate with your customers/to interact with your clients/ interact with your partners/ distribute the revenue and costs/organise your company in this way?

Where/how did you get the idea of applying this service?

Could you describe how these ideas were developed planned and finally implemented?

Could you try your best to recall who were engaged in these processes? Why did you invite them into these processes?

Could you figure out what roles they played in these processes?

Thanks for your description. According to what we have discussed, I draw a chart like this, how do you think about it? Does it summarise (roughly) what you meant in the conversation?'

3.4 Responses expected from the Focus Groups

1 The roles that the participants have played in the process of service innovation;

2 Knowledge they contributed to these processes;

3 How knowledge was exchanged in the process;

3.5 Basic Questions and the Process of the Focus Groups

In addition to invitations, an introduction to the researcher, the study, the result of the interviews including the process of the service mapped in the interviews, and the focus groups *i.e.* the purposes, time, and the expected results, will be provided by emails or telephones. Documents including the ethic form, plain language form and consent form will also be provided prior to the focus groups. Finally, schedules for available dates and venue for the focus groups are provided for the participants to select after they are consent to join in.

Before the interview starts, a brief of the study, including the information about the researcher, the purpose of the study, a brief of the results achieved in the interviews, the reasons for engaging the the participants, and the instruction of the focus group, will be given to the participants, with the documents *i.e.* ethic form, consent form, and plain language form provided and processed.

Example:

'Good morning/afternoon, first of all I must thank you for coming to the focus group today. My name is Bin Gao, a third-year PhD student in management. My interest of research is the knowledge exchange for service innovation. This research is attempting to look into how knowledge is exchanged between your company and other actors during the process of service innovation. The fieldwork will include two phases: in the phase one, which has been done, I will identify the case of service innovation; in the phase two, which is what we are going to do today, I will need to look into how knowledge is exchanged in the process of service innovation. The purpose of the focus group today is to identify the role that you have played during the process of knowledge exchange, what and how you have contributed to this process, and how the knowledge was exchanged for the service innovation to be carried out.

The focus group today will last about 60 minutes, no more than 90 minutes. I will ask some basic questions in order to keep our conversations on track, and I will let you give your opinions for most part of the interview. There is no standardised answer, so please speak what you have in mind as details as possible. The whole process will be audio recorded and preserved under the rule of the University. Before we start, you Produce Development Assistance want to read through the plain language form and the consent form carefully and ask me questions about this study, and sign the consent form if you are consent to participate. Moreover, the brief of the information I collected from the interviews about the processes of the service, including the roles that you played in the process, according to the description of the CEO.'

Opening questions will be asked based on the knowledge obtained from the interviews:

'Thank you for consenting to participate, and now the audio recorder is on and we will start the discussion shortly. I suppose that you have read through the process of the service and your roles in this process as what the CEO recalled. Do you have any comments or disagreements?'

As the information about the service innovation have been collected and categorised into six dimensions at the first stage, the following questions will be asked in respect to each dimension.

'Could you try to describe the roles you had played in the process that the services were initiated/developed/implemented/managed?

Could you describe your contributions to each stage of the service innovation process?

Could you roughly describe how you collaborated with which participants during this process?

In which way did you usually contact each other for exchanging the opinions/ideas at each stage of the service innovation process?

Do you have any comments on his/her descriptions on the processes?

What external intelligence have you used for playing your role in the service innovation process?

Did you use any technologies in the service innovation process for exchanging ideas and opinions?

If so, what were these technologies and why you selected to use them?

Thanks for your responses, according to your interactions, can I summarise the information you provided as follows:

(A summary about their roles, contributions, way of exchanging opinions etc.)

Is my description correct? Do you have anything to complement?

I must thank you all again for coming today and the invaluable information you provided is greatly appreciated. These data will be stored and processed later and the results will be feedback to you.'