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# **EVALUATING THE EFFECTIVENESS OF DESIGN SUPPORT FOR SMALL AND MEDIUM SIZED ENTERPRISES IN SCOTLAND**

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A thesis submitted in partial fulfilment of the requirements of the Robert  
Gordon University for the degree of Doctor of Philosophy

This research was carried out in Gray's School of Art, Robert Gordon  
University, Aberdeen, UK

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# Abstract

Small and medium-sized enterprises (SMEs) are the engine of economic growth and job creation. Governments have devoted considerable resources to increase their competitiveness in the market. Several design support programmes (DSPs) have emerged from this investment to promote design as a strategic resource for innovation and business growth. Although existing research indicates that an effective use of design can enhance the business performance, a lack of interest amongst SMEs to work with designers is cited in several studies. Despite the great amount of money, energy and time that has been spent on design support for SMEs, there is still a lack of knowledge about effective delivery and evaluation.

This thesis focuses on the problem of finding better ways to assist SMEs with design for economic growth by evaluating the effectiveness of design support for SMEs. This research, therefore, has examined the activities of UK-based DSPs, investigated the expertise of design consultancies and inquired about the self-image of designers in order to expand the knowledge of design support for SMEs.

The research applied an interpretive paradigm, where multiple realities are recognised as socially constructed. Data was gathered through interviews with individuals representing DSPs, SMEs, design consultancies and government support agencies assisting SMEs. Observation of business support events and publicly available documents were used as additional sources. A thematic analysis and a systematic metaphor analysis were employed to examine the resulting data.

The research has highlighted a number of key issues that are pivotal to the success of design support for SMEs. This PhD research also proposes two explanatory frameworks to contribute to design theory and practice: a seven-step evaluation framework for planning and evaluating the outcomes of DSPs and a re-framing of the generalist-specialist dilemma that can inform the activities of design consultancies and DSPs and can guide designers to improve their expertise.



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To my inspirational grandma,

Melehat Selçuk

*nur içinde yat*

(1928-2011)

## List of the researcher's publications

- Gulari, M.N. (2013). Metaphors in design: An analysis of how we represent design expertise. *Proceedings of EKSIG 2013-Experiential knowledge Special Interest Group-Design Research Society*, Loughborough University, Loughborough, UK. (It is one of the seven papers selected for the journal publication)
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- Bugali M. H. & Gulari, M. N. (2013). How eco-design strategies are applied in UK-based SMEs: An empirical Study. *Proceedings of the 15th International Conference on Engineering and Product Design Education E&PDE13*. Dublin, Ireland.

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# List of abbreviations

BEDA	The Bureau of European Design Associations
BIS	Department for Business, Innovation and skills
DSPs	Design Support Programmes
DMI	Design Management Institute
DTI	Department of Trade and Industry
FCS	Funded Consultancy Scheme
OECD	Organization for Economic Cooperation and Development
OL	Organisational Learning
PR	Public Relations
RDAs	Regional Development Agencies
ROI	Return on Investment
SMEs	Small and Medium sized Enterprises
SFD	Support For Design
SEE	Sharing Experience Europe project

# 1 Introduction

This chapter introduces the research topic, provides a background for the reader, justifies why this research has a particular relevance and defines its scope. It also presents the research aims, questions and objectives. At the end of the chapter, the basic structure of the thesis is described, and a list of definitions of terms used in this thesis is included.

## 1.1 Background and rationale for this study

### 1.1.1 The context for SMEs and SMEs support schemes

Small and medium-sized enterprises (SMEs)<sup>1</sup> are widely considered to be vital in both developing and developed countries for economic growth and competitiveness. They manufacture most of the new products, create employment and provide flexibility to the economy (Storey, 1994). SMEs represent over 99% of all businesses in the UK and account for more than 59.8% of the private sector employment (BIS, 2010a). Policy makers in economically advanced countries recognise that SMEs have internal shortcomings inhibiting their progress and ability to be competitive in the market (OECD, 2004). Thus, the presence of external support services that

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<sup>1</sup> According to European Commission (2013):

“The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million.

Within the SME category, a small enterprise is defined as an enterprise which employs fewer than 50 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 10 million. A microenterprise is defined as an enterprise which employs fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million”.

promote and enhance an SME's competitive performance by addressing their challenges is justified. 'SME support' constitutes an important policy instrument (Caniëls & Romijn, 2005), which results in a great amount of time, money, and energy being spent on support for SMEs. SMEs have been encouraged to make use of funding and knowledge exchange schemes to overcome their challenges.

During recent decades, several platforms, such as knowledge centres, research hubs and innovation centres, have emerged to provide organisational, critical and economic services for SMEs to facilitate innovative and sustainable economic growth. However, many of these government-supported programmes appear to be failing to meet expectations in terms of impact and quality (Caniëls & Romijn, 2005). Excluding the internal evaluation reports prepared within projects, the studies mostly illustrate that the impact of these programmes has been uneven and disappointing in many cases (Caniëls & Romijn, 2005; Storey, 2000).

### **1.1.2 The context for design-led business support for SMEs**

Design innovation has become the focus of many scholars, educators, practitioners, regional governments and design institutions. Design scholars and practitioners encourage a better exploitation of design by taking a strategic approach. Approaches, such as design thinking and design strategy focus on using design as a strategic business tool rather than developing discrete services and products for business. 'Intuition', 'creativity', 'holistic' and 'lateral thinking' are part of a new set of values that have become important for business by supplementing and even replacing the traditional values of business such as rationality and calculation (Lank & Lank, 1995). As a result of these new values and the acceptance of design as an element of innovation (DTI, 2005), in the last few decades, there has been an increase in the number of government-funded and private design-associated entities that aim to support innovation strategies for new product/service development and organisation change, such as Live Work (n.d.) and the 'Designing Demand' (n.d.) in England; the 'Centre for Design and Innovation' (C4di, n.d.), the 'Institute of Design

Innovation' (n.d.) and 'Design in Action' (n.d.) in Scotland; the 'One-to-one Advisory Service' (Design Wales, 2006) in Wales; and the 'Centre for Design Innovation' (n.d.) in Ireland.

Raulik-Murphy (2010) states that historically, design promotion centres (see Section 1.6 for a definition of this term) have been invaluable organisations for introducing design to businesses, increasing design awareness and presenting the value of design to the different stakeholders. Although these benefits continue to be of significance at the present time, design promotion centres are facing difficulties. The pressure of securing funding from government bodies has greatly challenged their financial viability. For instance, in 2001, the Danish government stated, "public money should not be spent on promoting the development of individual private industries that should be left to the free market" (Ramlau & Melander, 2004, p.49). Similarly, in the UK, the Design Council<sup>2</sup> announced in April 2012 that its role changed from a non-departmental public body to an independent charity organisation. The department for Business, Innovation and Skills (BIS) used to manage the funding of the Design Council. This change from public body to a private sector charity resulted in reduced government funding (BIS, 2010b).

Raulik et al. (2008) highlight an increasing expectation from design promotion centres to contribute to economic development and demonstrate meaningful results. Consequently, design promotion centres have redefined their role by taking more active roles in business growth and by delivering design support programmes (DSPs) (see Section 1.6 for a definition of this term) for companies and promoting design as a business service.

### **1.1.3 The challenges of design-led innovation**

Design-led innovation is a challenging domain; the economic value of design is hard to measure (Hertenstein et al., 2005); its terminology is vague (cf. design thinking: Hassi & Laakso, 2011; design management: Gorb, 1986), and its scope is hard to define (Lawson & Dorst, 2009). Terms

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<sup>2</sup> Although there are many design councils in the world, such as American Design Council, India Design Council, Danish Design Council or German Design Council, in this the thesis, "the Design Council" refers to the UK's Design Council.

such as creativity are problematic in terms of what makes someone creative and how creativity is managed (Dorst & Cross, 2001). Subsequently, design and design-led innovation are sometimes neglected by government bodies when aiming to support SMEs with innovation (Tether, 2005b). Despite the many efforts that have been made by DSPs during the last few decades to stimulate SMEs to realise innovations, there is still a lack of knowledge about the mechanisms for effective implementation and evaluation.

Although various studies (e.g. Lorenz, 1986; Roy & Potter, 1993; Press & Cooper, 2003; Walsh et al., 1992) present design as a crucial tool for market competition, the value of design is often insufficiently exploited and underestimated, particularly by SMEs (Bruce et al., 1999; Thenint, 2008). Brazier (2004) suggests that in most cases, design services are viewed sceptically. She states that SMEs consider design a low priority over other options or as a luxury non-essential requirement. Studies cite many reasons to explain the unwillingness of SMEs to use design. Factors include SMEs' lack of awareness concerning the role of design in business performance and its practice (Bruce et al., 1995, 1999; Press & Cooper, 2003), misconceptions of the cost of design (Heufler, 2004), the non-existence of customer demand for design (Bruce et al., 1995), a lack of interface between SMEs and design (Cawood et al., 2004) or cultural differences between SMEs and designers (Gorb, 1986). In addition, in comparison with corporate businesses, SMEs have a limited budget to invest in design and innovation that affects their decision-making process on commissioning external design support (Er et al., 2013).

#### **1.1.4 The credibility of designers and design expertise**

Dorst (2008), based on his investigation of the history of design research, identifies that the focus of design research is overwhelmingly on the design process to the exclusion of investigating designers themselves. Although he acknowledges that several successful models resulted from these research efforts, he claims that giving the methods and models to design students would not make them 'designers' by reflecting on his experience in design education. He highlights the importance of the 'design object' and the 'design context' and the 'designer' in the design process and argues that

design research should re-focus on these elements. "One issue we need to tackle urgently is to [...] describe 'the designer', still the missing person in design research" (Dorst, 2008, p.8.). Using the CATWOE<sup>3</sup> criteria, Love (2006) raised several questions relating to the performance of DSPs. Among these, one is particularly well suited to the present study and deserves investigation: "what is the required expertise to assist SMEs?"

Other significant aspects of the collaboration between designers and SMEs relate to how the design profession and design expertise are perceived by SMEs. An issue that arose early in the research was the design profession lacks credibility, and this is perhaps a result of the ambiguity surrounding the designers' self-image, the notion of design knowledge, skills, processes and methods. This ambiguity makes it difficult for designers to communicate design expertise to non-designers in a field that continually broadens and loses its borders to include a wide range of design interventions. Despite the increasing number of studies on the use of design within SMEs in recent years, little attention has been given to the understanding of the breadth and depth of design expertise, the representation of design expertise in relation to designers' self-image, the relationship between designers and SMEs and how design expertise can be developed to work with SMEs more effectively.

SMEs' lack of awareness on how to work with designers is reported in several studies (Brazier, 2004; Bruce et al., 1999; Cawood et al., 2004). Nonetheless, this is half of the equation, the other half, which concerns designers' understanding about how to work with SMEs and about their expectations and priorities, is less frequently studied. This raises the issue of reciprocal challenges in the working relationship between designers and SMEs. These challenges, if understood and navigated, could yield a productive and innovative pairing.

There are several studies on the nature of design expertise (Cross, 2001; Lawson & Dorst, 2009; Lawson, 2004). Yet the credibility of design

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<sup>3</sup> **CATWOE** is a mnemonic for a checklist for problem or goal definition **C** stands for the 'customers of the system'; **A** refers to the 'actors'; **T** means the 'transformation process'; **W**, the 'world view'; **O**, the 'owner(s)' and **E**, the 'environmental constraints'.

expertise for SMEs is seldom discussed. It is pertinent and timely to ask how design expertise and design attitude influence the effectiveness of external design support, the collaboration between SMEs and designers and consequently the design industry.

### **1.1.5 The lack of criticality in the design and innovation field**

There is a large body of design and innovation literature covering examples of best practices and practical guidance for businesses to achieve innovation through exploiting design (e.g. Berger, 2010; Brown, 2008, 2009; Esslinger, 2009; Kelley & Littman, 2001, 2005; Lafley & Charan, 2008; Rae, 2008). This material is significant for raising discussion and reaching a large audience. Nevertheless, these studies -mostly books that are written by practitioners- are questionable in terms of the reliability of the data they are based on; that is, they lack empirical data and methodological analysis to support their findings. Books supporting innovation creativity are highly popular; there is an abundance of prescriptive books proposing methods for unleashing innovation and creativity for businesses. Despite good visual structure and interesting content, many of these books mislead readers by representing an oversimplified picture of the design process.

Although most of the aforementioned literature is non-academic, Dorst (2008) identifies the existence of a prescriptive approach in design research tradition as a major area of concern. He claims that academic inquiries often produce prescriptive guidelines instead of explanatory frameworks. To his observation, studies rather “jump from description right into prescription” or develop a tool to be used by practitioners. He claims that “the lack of an explanatory framework for design makes it hard to build up an academic knowledge base, and it makes it well-nigh impossible to reflect critically upon each other’s work” (Dorst, 2008, p.7).

DSPs employ numerous methods and strategies to help SMEs with their product development process. Although case studies are published on websites and found in reports (e.g. The Design Programme<sup>4</sup>, n.d.), it is

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<sup>4</sup> The Design Programme, which delivers the Designing Demand programme in the South East England region.

often difficult to extract the knowledge from these case studies and to reveal what is effective and ineffective to build up an academic knowledge base. In addition, case studies are subject to 'selection bias', which means that they often present the best examples. It is also not clear to what extent innovation activities undertaken by a specific SME can be considered successful or not, notwithstanding that the criteria they use for defining success is questionable. Additionally, the programme deliverers often write the descriptive papers and reports for these programmes; their main objective is perhaps not critical analysis to inform academic research but the promotion of DSPs and to present its effectiveness (Raulik-Murphy, 2010). Consequently, Raulik-Murphy (2010) suggests that arguments in these published case studies may aim to advocate the value of design to the reader, resulting in a lack of critical debate. She also notices that these documents mostly get published soon after or even during the delivery of design support and highlights that such a timeframe inhibits the programme deliverers to observe the long-term impact of their activities and to reflect on their process. As a result of these limitations, the research area of design innovation and DSPs for SMEs requires rigorous research, a critical debate, and explanatory and theoretical frameworks to support its advancement.

## **1.2 The scope of this research project**

The research reported in this thesis focuses on the problem of supporting SMEs with design approaches and expertise to initiate innovation with the aim of contributing to economic growth. The research has considered 'design support for SMEs' as design interventions provided by design consultancies and DSPs. DSPs are part of the design support mechanisms along with design consultancies. Figure 1.1 explains the external design support for SMEs and the role of DSPs. In general, design consultancies support SMEs with design, but their relationship and the use of design within a business can be also initiated and endorsed by DSPs. DSPs are intermediaries; therefore, they do not operate in isolation. Their effectiveness depends on many components such as the existence or non-existence of other programmes, efforts of design consultancies and

government bodies, policies, and other indirect components and actors. Solely looking at the effectiveness of DSPs would not encompass all the complexities of the design support phenomenon and thus it would not provide a substantial contribution to knowledge. The present study aims to provide a big picture of design support for SMEs, although the impact of national design strategies and government policies remain beyond the scope of this research study.

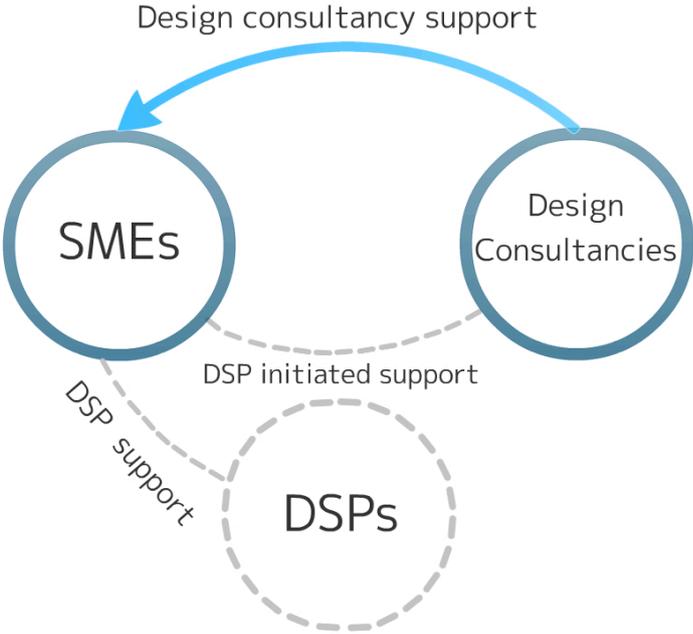


Figure 1.1 Design support for SMEs

This thesis focuses on 'effectiveness', which is understood through evaluation. It can be done either by evaluating the impact of design interventions on business performance or by evaluating the mechanism of design interventions itself. The former type of evaluation is more common and has been addressed by a few researchers (e.g. Roy & Potter 1990; Walsh et al., 1992). The impact of design on business is often measured using the standard business performance indicators, such as economic growth, increased competitiveness, increased sales, reduced cost, and job creation (Amir, 2002; DTI, 2005). Focusing on the measurement of outcomes may be informative as to whether the programme or the support has been successful or not, but it may fail to reveal why and how. This

research has focused on the 'why and how' to investigate the effectiveness of design support. This requires, not only the examination of the content and process of design support for SMEs but also the examination of discourse around SMEs and designers.

The problematic collaboration between SMEs and designers is often investigated with the assumption that SMEs do not understand design. How designers communicate their expertise to SMEs is often ignored. The cultural differences between SMEs and designers have been infrequently studied, and when they were investigated, it has often focused on SMEs' hesitation to appreciate the design identity. The implications resulting from the uncertainties of design have been infrequently discussed. To address the uncertainties and missing self-criticality in the research domain (Raulik-Murphy, 2010), this PhD research has adopted a critical stance to identify the existing assumptions of DSPs and design consultancies while they are supporting SMEs and to what extent they are valid. These issues can be addressed by examining the discourse of design and the designer's self-image and identity.

This research examines the design support for SMEs in Scotland from three different angles, which can be thought of as 'lenses', as illustrated in Figure 1.2. In research, different lenses are used to concentrate on specific variables and connections to highlight diverse parts of the research phenomenon and to propose an alternative set of practices and answers to reader (Ancona et al., 2001). The first lens looks at the effectiveness of DSPs. The focus is on the assessment of DSP activities in order to produce new knowledge that guide program improvement and theory of design support for SMEs rather than the assessment of activities to judge whether a particular programme is successful or not. The second lens focuses on evaluating the effectiveness of design consultancies while working with SMEs by paying attention to the importance of design expertise. The third lens examines the credibility of the design profession and designers' identity in undertaking these roles by looking at discourse around design expertise.

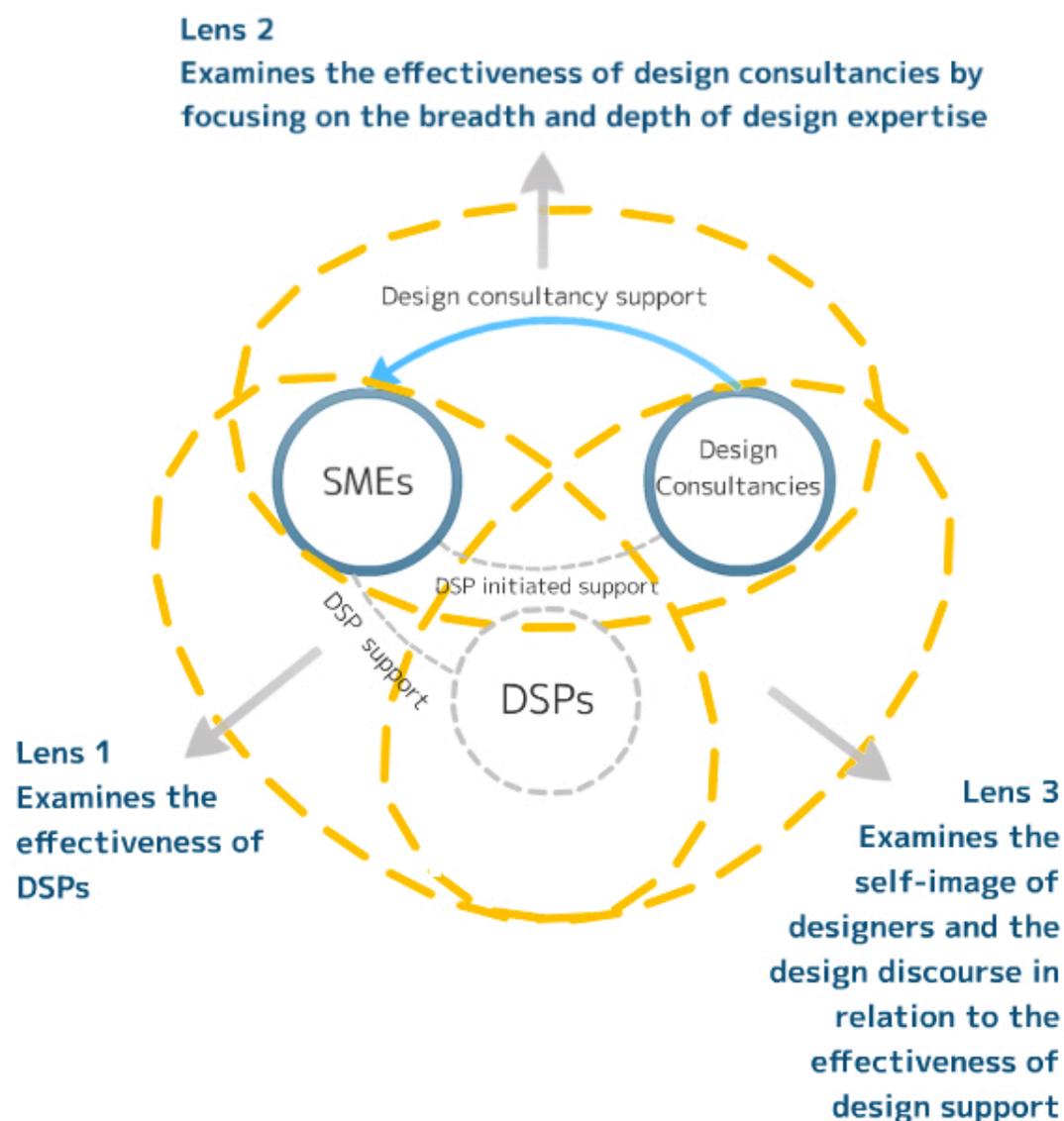


Figure 1.2 The scope of this research study

### 1.3 Aims and objectives of the research

In view of the need for the research and the gaps in knowledge that were briefly identified, a primary aim of the research was established as:

**Aim:**

To evaluate the effectiveness of design support models:

- By critically examining the methods, procedures and general principles utilised by DSPs while supporting SMEs,

- By examining the expertise of design consultancies while supporting SMEs and
- By identifying designers' self-image, changing role of design expertise and its credibility.

**Research questions:**

- How, when, and in which contexts are DSPs effective/ineffective and why?
- How can the success of DSPs be evaluated?
- What are the required expertise, knowledge and skills, an external designer needs to have to work with SMEs effectively?
- What are the existing assumptions of DSPs and design consultancies while they are supporting SMEs, and to what extent are they valid?

**Research objectives:**

The following objectives were established in order to address the research questions and meet the aims of the research.

- To identify the current stage of knowledge and relevant theories of design support for SMEs by undertaking a contextual review of the field of design-driven innovation, design expertise, DSPs, SMEs and topics related to innovation practice, design support mechanisms, how SMEs learn and knowledge exchange.
- To evaluate the effectiveness of DSPs by analysing objectives, content and implementation of DSPs.
- To examine design knowledge and approaches used to support SMEs' growth and innovation by design consultancies
- To develop and propose an explanatory framework for DSPs to be used as an evaluation and planning tool.
- To develop and propose a framework elucidating the generalist-specialist dilemma faced by external designers

## **1.4 The target audience for this thesis**

This research is primarily targeted at the researcher's peers in academia working on 'design support for SMEs' and the role of design expertise in supporting SMEs. Associates of DSPs who are assisting SMEs for business growth and innovation and also professional design practitioners who are working with SMEs can use the frameworks developed in this PhD research to improve the effectiveness of their services. This research also informs novice designers who may use the findings related to design expertise to strengthen their proficiency.

In the broader sense, design educators may take into account the discussions and findings related to design expertise explored in this research in order to inform their education strategy. Design practitioners can make use of the taxonomy of innovation tools, techniques and methods produced in this research as resources in order to improve their practice.

## **1.5 Structure of the thesis**

This section describes the structure of the thesis and the research process. The thesis has eight chapters and incorporates three lenses that address the aim of the research. A brief summary of each chapter is provided below:

### **Chapter 1 Introduction**

Chapter 1 provides the rationale for undertaking this particular research and identifies the research issues. The research aims and the justification of the research were also documented in this chapter. In addition, a definition of terms is included.

### **Chapter 2 Contextual review**

Chapter 2 is a review of the literature and other sources of media. It presents background information, relevant theories and concepts on design support for SMEs. The chapter presents the main findings from previous studies that are relevant for the practice and theory of DSPs and highlights

the research gap that this thesis addresses and from that develops a set of relevant research questions.

The literature review commences with the articulation of SMEs and innovation. It briefly provides some descriptive background information about SMEs, including their strengths and weaknesses for business success and previous theories about how SMEs learn. DSPs often articulate their approach as knowledge transfer. Therefore, describing organisational learning theories provides concepts that are useful for the subsequent evaluation. The innovation section offers definitions on innovation and touches upon how innovation happens and the types of innovation. The value of innovation for SMEs is discussed critically through existing research. Before examining 'design support for SMEs', consideration is given to what it means to be a professional designer (e.g. expertise, knowledge, skills and abilities) providing support to a business. Building on the discussion in Chapter 1, the issue of trust is also elaborated on here. This section draws substantially on existing studies on design expertise and theories of expertise to elucidate characteristics of design knowledge. The final section of the review focuses on two areas of research; consequently design support literature and government support for design programmes. Gaps and problems, such as the lack of criticality and theoretical frameworks on DSPs and the lack of design expertise studies looking at the generalist-specialist dilemma, are drawn out of literature review.

### **Chapter 3 Methodology**

Following the research questions and objectives informed by the literature review, this chapter identifies the relevant research approaches and discusses the methods adopted to undertake this research. The chapter starts with explaining the paradigm, an interpretive paradigm selected for this study, and why it is suitable. Interviews (n=27) and participant observation (n=10) were applied to gather the primary data along with the secondary sources. The resulting interview data has been analysed using a thematic analysis method (Braun & Clarke, 2006; Patton, 2002) to evaluate the effectiveness of DSPs and the 'generalist-specialist dichotomy'. To better analyse design expertise, primary and secondary data have been

analysed using a systematic metaphor analysis (Schmitt, 2005). Finally, appropriate criteria and methods of qualitative research ensuring the quality of the research and ethical considerations are also discussed in this chapter. Exploiting multiple sources of evidence and validating findings iteratively has ensured that a true picture emerges.

## **Lens 1**

### **Chapter 4 Findings on the effectiveness of DSPs**

Chapter 4 presents the research findings that are derived from the interviews and observations about the effectiveness of methods and procedures as a result of analysis. Key results have been divided into four headings by building on the structure that was identified by Rossi et al. (1998). Key findings are presented by “need for the programme”, “evaluation of program theory”, “process evaluation” and “impact/result evaluation”.

### **Chapter 5 Discussion of findings on the effectiveness of DSPs**

Chapter 5 discusses the main findings of DSPs in relation to existing studies and innovation and learning theories. The chapter begins with discussing the value of design awareness, innovation and knowledge exchange. Then, it moves onto SMEs’ involvement in design support and the factors that are contributing to SMEs involvement. Later on, issues regarding the articulation of the impact of DSPs and terminology issues related to design support are unfolded. The chapter proposes a seven-step evaluation framework that can be used for planning and evaluating design support outcomes. This new framework is a re-conceptualisation of Kirkpatrick’s four-level model (Kirkpatrick, 1998), which was developed to evaluate training programmes.

## **Lens 2**

### **Chapter 6 Analysis of design expertise**

Chapter 6 presents the analysis focusing on the value of design expertise as part of evaluating effectiveness of design consultancies. It presents the

findings related to depth and breadth of design expertise through interview data. It uncovers the SMEs' expectations when working with designers. It then discusses these findings in relation to existing studies, key concepts and theories. As a result of this, an explanatory framework proposed to describe the specialist-generalist dilemma that is faced by designers. A number of recommendations are drawn from this framework. These recommendations may not only inform design consultancies but also DSPs.

### **Lens 3**

#### **Chapter 7 Analysis of metaphors in design**

Chapter 7 presents a metaphor based discourse analysis by building on the conceptual metaphor theory by Lakoff & Johnson (1980) who state that metaphors structure our perceptions and understanding. The process adopted in this chapter is framed as a systematic metaphor analysis (Schmitt, 2005). The interpretations are based on the generative metaphor framework (Schön, 1979). It examines the designers' self-image and identity by analysing the visual and cognitive metaphors in the design field. It also examines how particular metaphors are used in certain contexts. The analysis serves to uncover the nature of design expertise and to identify problems in articulating design processes. It argues about the consequences of designer's self-image and traces the implications on the relationship between designers and businesses.

#### **Chapter 8 Conclusion**

This final chapter presents the conclusions of the research by reviewing the research questions and objectives. It summarises the main research findings, identifies the original contribution to knowledge, talks about the limitations of this study and make suggestions for future research.

Table 1.1 The structure of this thesis

<b>Chapter 1</b>	Introduction	<p>Presents the importance of the research problem.</p> <p>Provides background information regarding the research problem.</p> <p>Presents the scope of the study and target audience, aims and objectives, the structure of the thesis and the definitions of terms.</p>
<b>Chapter 2</b>	Literature review	<p>Presents the building blocks of the contextual review.</p> <p>Identifies the concepts and issues related to design support for SMEs.</p> <p>Provides background information and related theories informing SMEs, innovation, organisational learning, knowledge and expertise.</p>
<b>Chapter 3</b>	Methodology	<p>Describes the research methodology, the researcher's philosophical stance and the design of the research study.</p>
<b>Chapter 4</b>	<b><i>Lens 1</i></b> Findings concerning the effectiveness of DSPs	<p>Presents an evaluation based on the findings of a thematic analysis of interviews, observations and desk research about the effectiveness of DSPs.</p>
<b>Chapter 5</b>	Discussion of findings concerning the effectiveness of DSPs	<p>Discusses the main findings of DSP evaluation in relation to existing studies on innovation and learning theories.</p>
<b>Chapter 6</b>	<b><i>Lens 2</i></b> Findings concerning the effectiveness of design consultancies in relation to design expertise	<p>Presents the findings of a thematic analysis of interviews about the effectiveness of design consultancy support with a particular attention to the depth and breadth of design expertise.</p> <p>Discusses the main findings.</p> <p>Suggests an explanatory framework for the generalist-specialist dilemma.</p>
<b>Chapter 7</b>	<b><i>Lens 3</i></b> Analysis of metaphors in design	<p>Provides an analysis of discourse of design by adopting a systematic metaphor analysis.</p>
<b>Chapter 8</b>	Conclusion	<p>Summarises the conclusions.</p> <p>Demonstrates the key findings that answer research questions and objectives.</p> <p>Summarises the original contributions to knowledge.</p> <p>Identifies limitations of research.</p> <p>Indicates the key areas of future research.</p>

## 1.6 Definitions of terms and concepts

This section explains the fundamental terms and concepts that are used in this thesis to facilitate understanding of the contents of the thesis.

### *Design*

A dictionary definition of design is very wide. It concerns “planning and executing of a structure of piece of art or structure, or drawings or plans for construction” (Oxford English Dictionary, 2013). While Herbert Simon (1969) defines design broadly by referring to design as “transformation of existing conditions into preferred ones”, Ralph and Wand (2009) aim at a rigorous and unambiguous definition that unfolds “preferred ones” by incorporating object, agent, environment, requirements and constraints; design is “a specification of an object, manifested by an agent, intended to accomplish goals, in a particular environment, using a set of primitive components, satisfying a set of requirements, subject to constraints” (Ralph & Wand, 2009, p.109). The term ‘design’ is a complex term to define for designers, in this thesis, when design is used, it refers to the broader definition by Simon, but difficulties related to a broad design definition and the complexity of defining design are examined in Sections 2.3.1 and 5.6.

### *In-house Design vs. Outsourcing Design*

Design can be used by businesses in-house or outsourced from third parties. In-house design, in this thesis, corresponds to design proficiency lies in the design firm (Bruce & Morris, 1994). Design proficiency can be located in a design department or be dispersed to the other departments such as R&D, production and marketing. ‘Outsourcing’ refers to transferring a business task, function or process to an external (non-employee) group, rather than being undertaken internally. Design activities (e.g. product design, packaging design, exhibition design, branding, web design and graphics) are transferred to a design consultancy, a design agency or a freelance designer who designs on behalf of the company.

In this study, design consultant or design consultancy is used to describe external designers who provide a professional design service for the

creation and implementation of new products, services, or materials for the development and communication of corporate identities. Historically, the use of design consultancies may refer to support for designing products or services, and design agencies refer to support for specific services for the development of brand, corporate identity and communication. In this thesis, design consultancy corresponds to both design agencies and design consultancies.

### *Design Policy*

In this thesis, design policy refers to a cumulative set of strategic actions, plans and principles that are driven by government political vision to develop national design systems (Raulik-Murphy & Cawood, 2009). Design policies strategically guides the elements of a national design system, such as design support, design promotion and design education, to encourage effective use of design in a country (Raulik-Murphy et al., 2010). For example, The "Cox Review of Creativity in Business" is a design policy document (Cox, 2005).

### *Design Promotion*

Design promotion, in this thesis, corresponds to the definition provided by Raulik-Murphy and Cawood (2009, p.7), "schemes that are usually targeted at the wider public with the objective of raising awareness of the benefits of design through many different ways". These activities can include exhibitions, awards, conferences, seminars, workshops and publications. The Bureau of European Design Associations (BEDA) provided a list of centres, which are categorised under the heading of 'design promotion centres'. The list includes Bayern Design Centre (Germany) to Barcelona Design Centre (Spain) and the Design Council (UK) (BEDA, n.d.).

### *Design Support Programmes (DSPs)*

DSPs, in this thesis, refers to publicly funded projects and time-limited programmes that are aiming to assist businesses externally in achieving their objectives by working closely with them and by using design methods, skills and knowledge (Raulik-Murphy & Cawood, 2009). DSPs can be run by

design promotion centres, organisations that are attached to universities or other organisations that are publicly funded by national and regional governments. For example, the Designing Demand programme is a DSP run by the Design Council.

### *Design Intervention*

To Schein (2009, p.151), an intervention covers broad actions; he claims, "Everything you do in a situation communicates something and is, therefore, an intervention of some sort". In this thesis, design intervention refers to design actions that aim to solve a problem in an organisation and further improve the organisation's capacity for business growth and innovation.

### *Design Methods and Tools*

Many DSPs use various methods, tools and techniques to transfer knowledge and make the process tangible. A design tool, in this thesis, can be defined as an entity, which is tried and tested, extends human act or thinking towards a specific purpose. This purpose, for example, may enable the exploration of possibilities or the generation of new ideas and perspectives about an issue or problem to develop better design solutions. (A taxonomy of tools and methods used for innovation are presented in Appendix F).

### *Design Thinking*

Design thinking has become part of popular design language and has also been adopted by engineering, business and management practices in the last decade. There is an ongoing argument about the validity, value and impact of design thinking. Historically, design thinking has been regarded as of the way designers think (cf. Lawson, 1980), which is sometimes called traditional design thinking (Badke-Schaub et al., 2010). To Badke-Schaub et al. (2010) and Johansson and Woodilla (2010), the traditional discourse is well-established and based on several academic studies. In the recent years, 'design thinking' often refers to a 'method' for problem solving and innovation. This recent meaning was associated with Tim Brown (2008,

2009) and supported by some management scholars (e.g. Dunne & Martin, 2006; Martin, 2009). According to the premise of the 'new' design thinking, much of the knowledge and approaches acquired in the design domain are essentially heuristic and can be transferred to other fields.

In this thesis, when the concept of design thinking is used, it refers to the new usage, which is employing a design approach, methods and abilities to solve a wide range of problems. In a way, it is about devising design as a medium for intellectual inquiry to resolve not only trade-based activities, but also social problems, such as homelessness, unemployment and health and wellbeing. These design methods often involve human-centred design approaches, and abilities are considered as building empathy, creativity, divergent and convergent thinking to generate ideas and solve problems.

### *Design Management*

According to Farr's definition in 1965, 'design management' as a term describes the relationship between a design consultancy and a business client (Farr, 2011). A much broader definition and meaning for design management have been adopted in recent years. The Design Management Institute (DMI), which was founded in 1975 in the US and has been aimed at demonstrating the value of design in business, defines design management broadly as a process that "encompasses the ongoing processes, business decisions, and strategies that enable innovation and create effectively- designed products, services, communications, environments, and brands that enhance our quality of life and provide organisational success" (DMI, n.d.). In this thesis, design management corresponds to the DMI's definition.

### *Design Strategy-Strategic Design*

Strategic design/design strategy, in this thesis, refers to exploiting design as a business strategy rather than just merely designing products and services. Design strategy is an organisation's capability to perform well in the long term by considering outward market forces impact, internal structure, processes and values to serve its customers successfully, rather than focusing on the development of individual projects. It can be thought

of as designing strategy. This term is often related to the concept of design thinking. Confusion is observed within the use of this term, which will be discussed further in Section 5.7.

### *Evaluation*

To Patton (2002, p.10), "When one examines and judges accomplishments and effectiveness, one is engaged in evaluation. When this examination of effectiveness is conducted systematically and empirically through careful data collection and thoughtful analysis, one is engaged in evaluation *research*" [emphasis in the original]. This research considers evaluation as "a process that seeks to determine as systematically and objectively as possible the relevance, efficiency and effectiveness of an activity in terms of its objectives, including the analysis of the implementation and administrative management of such activity" (Papaconstaniou & Polt, 1997, p.10).

### *Innovation*

Innovation is evolved from Latin 'innovare', meaning "making something new." The UK Department of Trade and Industry (DTI) (2004) defines innovation as "the successful exploitation of new ideas". Drucker (1993, p.17), in *Innovation and Entrepreneurship*, states, "Innovation is the specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or service. It is capable of being presented as a discipline, capable of being learned, capable of being practiced". In this thesis, innovation is considered as bringing new ideas into the market, which emphasises the importance of the commercial implications of ideas. Commerciality is seen as the main difference between invention and innovation. In this thesis, Dodgson et al.'s innovation definition is adopted; innovation includes "scientific, technological, organisational, financial and business activities leading to the commercial introduction of a new (or improved) product or service" (Dodgson et al., 2008, p.2). A detailed discussion of innovation is presented Sections 2.2.4 and 2.2.5.

### *Tacit Knowledge and Explicit Knowledge*

The concepts of tacit and explicit knowledge are built on Polanyi's seminal work "Personal Knowledge" (Polanyi, 1962) and "Tacit Dimension" (Polanyi, 1967). In this thesis, tacit knowledge refers to the personal and experience-based mental models that cannot be easily articulated or documented; "we know more than we can tell" (Polanyi, 1962). Explicit knowledge in contrast refers to knowledge that is codified, recorded and expressed explicitly, such as formal models, rules and procedures. To Nonaka & Takeuchi (1995, p.61), tacit knowledge includes "knowledge of experience (body), simultaneous knowledge (here and now) and analog knowledge (practice)", whereas experiential knowledge includes "knowledge of rationality, sequential knowledge (there and then) and digital knowledge (theory)". This topic is further elaborated in Section 2.3.4.

# 2 Contextual review

## 2.1 Introduction

Chapter 2 is a review of the literature published in the field of design support for SMEs. In addition to providing a review of the literature and identifying gaps in knowledge in the field by, it serves to provide background information, key concepts and theoretical ideas concerning the effectiveness of design support for SMEs.

### 2.1.1 Undertaking the literature review

This research started within an epistemological interest in design as a method and a way of thinking. The literature search was undertaken in three major parts. The first part was undertaken to identify the design process, design methods and tools that are used during design interventions. Concepts, particularly design thinking, human-centred design and innovation that are used to inform design support activities have been explored. While undertaking this literature review, it became evident that there was considerable confusion around the concept of design thinking and design for business. It was evident there was a need to clarify design knowledge and skills that can be applied to design interventions with SMEs. The second part of the review was undertaken in order to investigate design expertise, knowledge and skills. The third part of the literature review aimed to consider DSPs, design promotion structures and the activities of national design centres.

During the literature search, several objectives were identified in order to begin to address the research questions and aims. For instance, discovering what other researchers had looked at in existing studies, to review problems in the field and identify a gap in knowledge, to look at the subject

from a critical perspective, to identify what theories and concepts have been utilised, to synthesise what the results of these studies were, and how these researchers informed the effectiveness of DSPs and design consultancies assisting SMEs.

A keyword search was used to identify relevant articles referring to design support for SMEs. This keyword research made it possible to track key articles and references from literature journals such as *Design Studies*, *Design Issues*, and the *Design Journal*, and the publications of the Design Management Institute were frequently monitored throughout the PhD study. In addition, unpublished PhD theses were also consulted. Due to the nature of the field of design and 'SME support' the scope of the review was not limited to solely academic publications but also included documents published or commissioned by governments and design organisations. Although the majority of the studies reviewed for this thesis are from the field of design, an interdisciplinary literature review is undertaken to understand SMEs, innovation, knowledge and learning.

### **2.1.2 Structure of the contextual review**

The contextual review commences with the articulation of SMEs and innovation. It provides some descriptive background information, including SME' strengths and weaknesses and key theories about organisation learning in SMEs. DSPs often relate their approach with learning hence describing organisational learning theories is useful and relevant to evaluating their effectiveness. The innovation section gives related background about innovation, touches upon how innovation happens and types of innovation. The value of innovation for SMEs is discussed critically through existing research.

Before focusing on 'design support for SMEs' in Section 2.4, this chapter examines what it means to be a design professional (e.g. expertise, knowledge and skills). Building on the discussion in Chapter 1, here also the issue of credibility is further elaborated on and professional design knowledge and theories of expertise are covered in some detail. The final section of the review focuses on the design support for SMEs; it looks at the

role of design in businesses, in particularly in SMEs and examines the effectiveness of outsourcing design through design consultancies and DSPs. Here, existing studies, the relevant background information and gaps/problems are expanded on.<sup>5</sup> The review concludes with revisiting the research questions.

## **2.2 SMEs and innovation**

### **2.2.1 SMEs**

SMEs have been of considerable academic interest in the economic and management literature as a result of their importance in the economy (Birch, 1989; Fisher & Reuber, 2003; Henderson, 2002; Radosevic, 1990; Sullivan & Kang, 1999; Storey, 1994; Wolff & Pett, 2006). Most studies focusing on SMEs emphasise their significance for economic development due to their role in reducing unemployment (Birch, 1989) and promoting flexibility and responsiveness to market change (Storey, 1994). The governments of most developed economies see SMEs as the source of economic growth, job and wealth creation. Many member countries of the Organization for Economic Cooperation and Development (OECD) have attempted to encourage innovation, research and development (OECD, 2004). As part of their attempts, they initiate programmes to promote growth and competitiveness within SMEs. These programmes have high priorities on the policy agendas of governments (Caniëls & Romijn, 2005).

Although SMEs are seen as the engine of economic growth, their own growth pattern is complex. Burns (1989) claims that despite being higher in their early years than in their later years, the growth level of SMEs remains generally low. Similarly, Churchill and Lewis (1983) suggest that any small firm, that experiences growth, will go through a life-cycle process of growth stages. This approach, which resembles the concept of product life-cycle, considers an early growth stage followed by maturity, decline and in the end, death. However, other authors writing on the topic of small firms have criticised such approaches that link the growth of small firms with age as

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<sup>5</sup> Appendix A provides information about the rationale of the elements of contextual review and the structure of the contextual review.

rather naive models to explain growth, since growth is a complex process. For example, Smallbone et al. (1995) suggest that it is harder to differentiate growth level in mature firms than new firms. To Oke et al. (2007), the difference is a result of their intention for growth and is dependent on their type of business or sector. For instance, in the British SMEs population, most of the 'lifestyle' businesses such as sole traders and freelancers have no intention to grow (Oke et al., 2007).

### **2.2.2 Characteristics and capabilities of SMEs**

This section presents some of the key features and capabilities of SMEs that are described in the literature along with the barriers to innovation. This knowledge helps to evaluate whether the design support provided for SMEs is tailored to SMEs' needs, strengths and weaknesses.

SMEs, in particular smaller enterprises, are conventionally characterised by owner managers being responsible for making all the critical decisions (Storey, 1994). To Carland et al. (1984), an SME owner perceives the business, which provides the main source of income for the owner and consumes the majority of the owner's time, as an extension of their identity.

Some characteristics of SMEs, such as flexibility, diversity, information sharing, independence and responsiveness are recognised as advantageous for economic development, and others including limited resources, lack of organisational skills and functional skills are considered to be disadvantageous (Nooteboom, 1994). SMEs confront particular problems constraining their innovation activities. Barriers to economic development and innovation are grouped into internal and external barriers (Piatier, 1984). Internal factors are a result of inadequate internal resources and expertise, such as a limited budget for investment, limited access to skilled labour, catching up with improvements in technological advancements, problems in carrying out marketing and project management activities; external factors are product and market structure, bureaucratic hurdles, and the problem of finding 'suitable' partners to collaborate with (Acs & Audretsch, 1990; Mohnen & Rosa, 1999; Ylinenpää, 1998).

The development of strategies for competition and growth within SMEs are limited especially for the ones that manage their operations on a day-to-day fire-fighting basis (Deakins & Freel, 1998). Selek (2008) states that looking from the point of view of an SME that tries so hard to survive and make things work, the resistance to change in thinking and hesitation in accepting new ideas immediately are understandable. Table 2.1 summarises the characteristics associated with disadvantage and advantage when they are pursuing innovation and growth. Similar to their larger competitors, SMEs need to be concerned with their market positioning, technological trajectories, competence building and overall organisational processes (Nooteboom, 1994).

Table 2.1 Summary of SMEs characteristics associated with weaknesses and strengths based on Nooteboom (1994)

<b>Characteristics associated with disadvantages</b>	<b>Characteristics associated with advantages</b>
<ul style="list-style-type: none"> <li>• Lack of functional expertise -difficulty in hiring full-time specialized occupations for diverse tasks</li> <li>• Difficulty of diverting skilled personnel from day-to-day activities</li> <li>• Limited investment capability, resources on new technologies</li> <li>• Lack of organisational characteristics that enable strategic use and acquisition of knowledge</li> <li>• Ad-hoc management</li> <li>• Short-term perspective</li> </ul>	<ul style="list-style-type: none"> <li>• Dynamic-lean structure</li> <li>• Personality, independence</li> <li>• Informal structure, short communication line and strong leadership</li> <li>• Sharing information quickly</li> <li>• Non-hierarchical structure</li> <li>• Accessibility of top level management</li> </ul>
<b>Innovation barriers and opportunities</b>	
<ul style="list-style-type: none"> <li>• Not being able to seize market opportunities</li> </ul>	<ul style="list-style-type: none"> <li>• Filling niche opportunities</li> <li>• Customised new products</li> </ul>

Although understanding these characteristics serves to evaluate DSPs, it should be noted that a significant characteristic of SMEs is their diversity. SMEs are not only different in size, sector, technology and R&D level, age/lifecycle and geographical location, but also in their individual dynamic and informal knowledge (Nauwelaers & Wintjes, 2002; Tödtling-Schönhofer et al., 2011). Over-generalising these inherited weaknesses and strengths might be problematic. For example, Bacon et al. (1996) suggest that one of the characteristics, informality, often co-exists with a non-

hierarchical/horizontal structure, but this non-hierarchical structure may not be experienced by employees due to the existence of paternalistic and authoritarian managerial styles to achieve control.

### **2.2.3 The learning process of SMEs**

Organisational learning (OL) refers to the process, in which organisations understand and manage their experiences, and organisational theory investigates models and theories about the ways in which an organisation learns and adapts. Although this study does not focus on OL, the theories of OL contribute to the understanding of the activities of DSPs, helping SMEs achieve knowledge transfer. Thus, OL plays an important role in the understanding of the way SMEs learn. The theories explained in this section will be referred to throughout Chapter 5 and in particularly Section 5.2.3.

There are different perspectives stressing the different models of learning. Early theories focus on individual learning and agree that learning starts from individuals (Argyris & Schön, 1978; Wang & Ahmed, 2003).

Organisations then learn via their employees; Argyris and Schön (1978, p.16) state that "organisational learning occurs when individuals within an organisation experience a problematic situation and inquire into it on the organisation's behalf". Yet, to Ikehera (1999), individual learning may not translate to OL. Field (1997) also notes that individual learning might negatively affect the organisation, or employees may make individual progress rather than benefiting the organisation. Thus, incorporating individual learning into OL is the responsibility of the organisation.

Considering an 'organisation as a learning system' is also another approach is OL (Wang & Ahmed, 2003). Shrivastava (1983, p.7) states, "Learning systems are the mechanisms by which learning is perpetuated and institutionalized in organizations". Studies in this stream concentrate on the improvement of information processing and problem solving abilities in an organisation. However, Wang and Ahmed (2003) note that factors, such as "flexibility, innovativeness and creativity", which have become increasingly important for an organisation to succeed, are missing within the system view.

Brown and Duguid (1991), Lave and Wenger (1991) and Wenger (2000) are amongst scholars who acknowledge that the contexts where individuals learn are significantly important in achieving effective learning, and social and cultural factors are not adequately emphasised in the earlier theories. Situated learning theories, therefore, stress the importance of the cultural perspective of OL. O'Reilly and Chatman (1996) suggest that the social relationships of a group, which guide the values, perspectives and attitudes of employees and shape their interpretations, influence learning within the company. To Jones (1996), a company should evolve to become a collaborative team culture altering traditional hierarchical cultures that undermine learning. Although Denison (1990) and Gordon and DiTomaso (1992) tentatively articulate the relationship between embracing a learning culture and enhancement of company performance, Wang and Ahmed (2003) state that there is a lack of empirical study validating the link between them within the existing literature.

Another important concept in OL discussed by Wang and Ahmed (2003) is 'unlearning'. The basic argument of this approach is that existing beliefs, values and methods inhibit learning. The approach builds on the ideas of Kuhn (1962). Kuhn claims that until an opposite theory is advanced, or a failure is experienced, people maintain their current beliefs and methods producing reasonable results, and they avoid accepting new paradigms. Therefore, for effective organisational learning, organisations have to learn how to discard previous learning and experiences to create quantum leaps (Wang & Ahmed 2003).

Experiential learning theory refers to learning as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (Kolb, 1984, p.41). Kolb (2001) states that the theory builds on Dewey's philosophical pragmatism, Lewin's social psychology and Liaget's cognitive genetic-epistemology. Individuals learn through reflection on a particular experience (observation and action) and understand its effects, and by doing so accommodate a new idea. Kolb's experiential learning model works following a four-stage cycle, which includes "concrete experience", "reflective observation", "abstract conceptualization" and "active

experimentation". Kolb's theory is not a simplistic cycle; Kolb (1984) stresses the 'dialectic' tension between abstract detachment and concrete involvement is essential for the creative process of learning. Deakins and Freel (1998) and Wang and Ahmed (2003) suggest that experiential learning is an appropriate model for SMEs to learn from their experiences.

Deakins and Freel (1998) and Zhang et al. (2006) draw attention to the fact that most organisational learning models are developed according to the needs and features of large organisations. Hence, these models are often not applicable to SMEs. For instance, Deakins and Freel (1998) claim that considering the size of small firms, theories improving communication can be ineffective in SMEs, as communication with a small number of employees should not be an issue for an SME. To Deakins and Freel (1998), the concepts and theories that recognise impact of uncertainty in learning and development, such as Schumpeterian dynamic approaches, are better suited for SMEs. Based on the analysis of data gathered through twenty-six interviews conducted with owner-managers, Zhang et al. (2006) identify that stable SMEs, unlike innovative SMEs, are adaptive and learn incrementally. The study also highlights the fact that the scope of learning is restricted to a small number of individuals in stable SMEs.

#### **2.2.4 Innovation**

According to Utterback and Abernathy (1975, p.642), innovation is defined as, "a new technology or combination of technologies introduced commercially to meet a user or a market need". This definition associates innovation with tangible outcomes, such as bringing new ideas, product or services to market in order to succeed or survive in the market. Von Stamm (2004) and various other design management researchers (cf. Juninger, 2008) find this approach is not enough and propose that innovation should be reflected in all aspects of an organisation. To Drucker (1993) and Bessant (2005), innovation is about change, a break with the past. Von Stamm (2004) highlights that change should address the status quo in the organisation and says, "Innovation is the art of making new connections and continuously challenging the status quo—without changing things for change's sake" (p.13).

Because of a noticeable disagreement amongst scholars on the definition of innovation, the innovation process and outcomes are difficult to analyse (Dosi, 1988). This drawback often leads to confusing results presented in research on innovation (le Bars et al., 1998; Cooper, 1998). Downs and Mohr (1976) heavily criticise the theoretical value of innovation research on the ground that there exists extreme variance amongst the empirical findings. To them, this variation is beyond interpretation. This instability is not only associated with the magnitude of relationships but also directionality, hence a lack of clarity and theoretical confusion (Downs & Mohr, 1976). Given this conceptual confusion and instabilities, this section attempts to deal with the characteristics, processes, types, levels, and business outcomes of innovation in order to contribute to the framework for assessing design support for SMEs.

There are different criteria used to determine whether an idea or action or process can be regarded as an innovation. Implementation is one of them. Jalonen's (2012) criterion builds on whether its adopter sees it as new or improved. There are different degrees of novelty and improvement. For Schumpeter (1934), creating and destroying existing structures such as technological, organisational, regulatory and economic paradigms achieve 'creative destruction' that means seeing and doing things differently to sustain long-term economic growth and social progress. However, the process of replacing old with new is neither linear nor causal (Smits, 2002). Utterback and Abernathy (1975) regard innovation as an iterative process and describe the sequential process of implementing innovation. When a technological product enters the market, the innovation process initially focuses on product performance, and then it improves product variety. Before focusing on the cost, it addresses product standardisation (Utterback & Abernathy, 1975). The innovation process is comprised of various stages and set of actions including problem identification, evaluation of alternatives, final decision making and bringing innovation into use (Rogers, 1983). Many scholars deal with the identification of the innovation process (Chiesa et al., 1996; Mudrak et al., 2005; Roger, 1983; Rothwell, 1994; Tidd et al., 2002). The Schumpeterian, push-oriented research and development (R&D), perspective has evolved towards an active user

participation and extensive networking approach (Sundbo, 1998). This transition is critical for design-led models of innovation, which are often based on human-centred and co-design approaches. Figure 2.1, based on Rothwell (1994) and Tidd et al. (2002), presents the historical evolution of the innovation process.

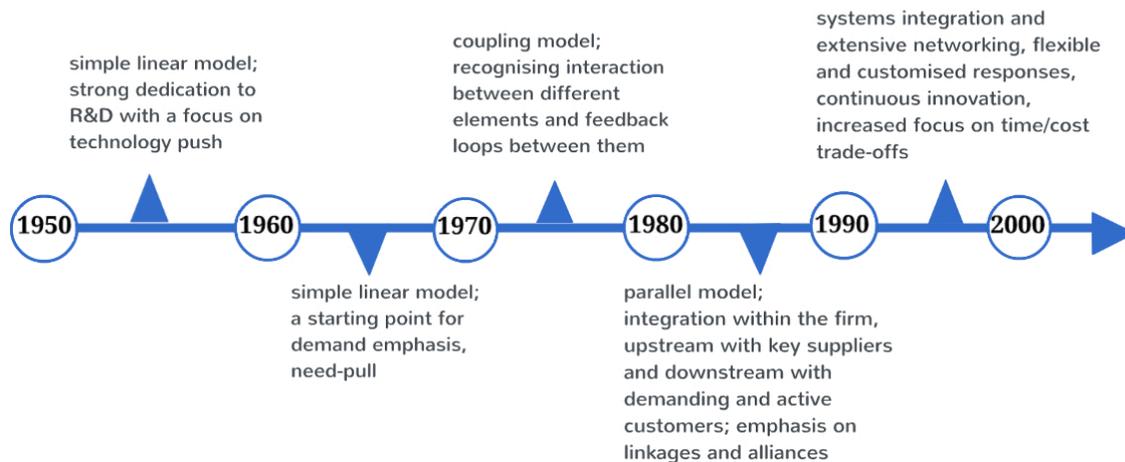


Figure 2.1 Evolution of the innovation process based on Rothwell (1994) and Tidd et al. (2002)

### 2.2.5 Types of innovation

Schumpeter's theory (1934) identifies five types of innovations that belong to two main categories: product innovations and process innovations. A product innovation refers to a novel product or improvements, such as a new quality, in an existing product. Historically, product innovation appears as the most widespread type of innovation (Oke et al., 2007). Process innovation is considered as a new or advanced ways of developing a product or service. It also considers the novelties in the administrative operations, organisational practices and systems (Rowley et al., 2011).

Francis and Bessant (2005) present four types of innovation: process, product, position and paradigm innovation. Definitions for process and product innovations are similar to the above definitions. Position or marketing innovation occurs in the market through new ways of distribution and exploration of marketing. Paradigm innovation refers to innovation that happens in the underlying mental models of organisational management, organisational structure and financial controls. Another type of innovation

that is often referred to as organisational innovation is defined as innovation in management initiatives at a company level. Other types of innovation are also studied under organisational structure, production process, people and product/service (Rowley et al., 2011).

Service innovation, which has received an increasing scholar attention in the last two decades (Alam, 2006; Candi, 2007; John & Storey, 1998), denotes novelty or improvements in service products, processes and companies. Hertog (2000) defines four areas of service innovation, service concept, client interface, delivery system and technological options.

Technical innovation and administrative innovation are considered binary models of types of innovation. Technical innovation refers to innovation within new products, processes or services based on a technical core of organisations. Bantel and Jackson (1989, p.108) suggest,

“Technical innovations pertain to products and services as well as production processes and operations related to the central activities of the organization (design and delivery of products, services, marketing, and office operations); such innovations are assumed to originate in the technical core of the organization”.

Administrative innovation refers to innovation in the social aspects and structures of the organisation. Administrative innovation involves novelties in “policies of recruitment, allocation of resources, and the structuring of tasks, authority and reward” (Daft, 1978, p.198). Daft (1978), in his dual core innovation model, indicates that the existence of organic structures in an organisation promotes forms of technological innovations, whereas administrative innovation is a result of mechanistic (bureaucratic) structures. Cooper (1998) suggest that although there is evidence showing that administrative innovation as a result of organisational change may promote technological innovation in some occasions, evidence also exists suggesting the reverse is true in other examples. Another dimension to classify innovation is the level of novelty. It is generally utilised to describe situations in which minor changes denote incremental innovations and major changes denote radical innovations (Tidd et al., 2002).

Although the aforementioned types of innovation are presented as discrete innovations, Cooper identifies that innovation has multiple dimensions (Cooper, 1998). These multiple dimensions, such as technological-

administrative and product-process often coexist within one innovation. For example, a new technique for developing a product has technological dimension, product and process dimensions (Daft, 1978).

### **2.2.6 Innovation and business performance in SMEs**

The relationship and relevance between innovation, continuous growth and competitiveness in the market has been widely addressed by numerous researchers (Freeman, 1997; Hall et al., 2008; Kotler, 1999; Mowery & Rosenberg, 1979; Pavitt, 1991; Temin, 1979). Innovation is often shown as a key factor contributing to a company's growth (European Commission, 2004), business success (Nonaka, 1991), profitability (Kotler, 1999), competitiveness (Dosi, 1988; Pavitt, 1991) and job creation (Hall et al., 2008).

The relationship between innovation and growth is also investigated through the level of novelty; impacts of radical and incremental innovation on SMEs are widely discussed. Chandy and Tellis (2000, p.1) underline the importance that radical product innovation brings to SMEs and state, "radical product innovation is an engine of economic growth that has created entire industries and brought down giants while catapulting small firms to market leadership". Kanter (1985) and Simon et al. (2002) claim that SMEs should focus on radical innovations because radical innovations tend to generate bigger profits in SMEs (Kanter, 1985). Simon et al. (2002) suggest that radical or pioneering products are fundamental for SME growth.

In contrast to the support for radical innovation, Rothwell and Gardiner (1988) state that 90% of innovation in the market results from small design steps. They argue that only a small number of radical innovations are introduced to a market but a considerably large number of incremental innovations build on these variations. Similarly, findings of another study (Oke et al., 2007), which is based on an online survey conducted with UK based SMEs from a number of industries, suggest that SMEs have a greater tendency to pursue incremental innovations rather than radical innovations. Although it is possible to assume that young SMEs would focus more on

radical innovations than the mature SMEs, Oke et al. (2007) state that their sample SMEs choose to focus on incremental rather than radical innovations regardless of the age of the firm. Their study corresponds with the findings of the Burns and Myers (1994) who state that 88% of high growth and most profitable SMEs succeed in the market and maintain their growth by increasing the sales of their existing products in their current market. This illustrates the fact that a good business performance is not necessarily the result of a good innovation performance (Oke et al., 2007). Rosenbusch et al. (2011) identify under which circumstances innovation is beneficial to SMEs by synthesising empirical findings. To them, the relationship between innovation and business performance is highly context dependent. The age of the company, the type of innovation and the cultural context influence the relationship. It should be noted that generalisations on the impact of radical and incremental innovations are also criticised. For instance, Downs and Mohr (1976) claim that an innovation can be regarded as minor or routine or major or radical depending on the organisation. Similarly, Winter (2006) stresses that an innovation is seldom perceived as the same by two organisations.

To some scholars, innovation should be considered as neutral. Innovating in the wrong way also leads to negative reactions from consumers. The innovation process has to generate certain outputs that lead to increased sales, lower manufacturing costs or improved customer relationships in order to be effective (Amidon, 2003; Doyle, 2002). Due to its complexity and the uncertainties involved in it, innovation is barely a routine process; the progress of an innovation is hard to programme (Jalonen, 2012). There are various interdependencies at each stage; the interplay between events and people affects the following stages that eventually determine the outcome of innovation (Cooper, 1998). Jalonen (2012) employs a systematic approach to reviewing the literature to identify uncertainties in the innovation process; these include technological, market, regulatory/institutional, social/political acceptance/legitimacy, managerial, timing, and consequence (see Table 2.2).

Table 2.2 Factors of uncertainty and their manifestations in innovation processes (adopted from Jalonen, 2012, p.33)

<b>Technological uncertainty</b>	<ul style="list-style-type: none"> <li>• As a result of novelty of technology in which details are unknown</li> <li>• Lack of knowledge to utilise new technology</li> </ul>
<b>Market uncertainty</b>	<ul style="list-style-type: none"> <li>• As a result of insufficient knowledge about competitors' behaviour</li> <li>• Difficulties in predicting the price development of raw materials</li> <li>• Unclear customer needs competing products and services</li> </ul>
<b>Regulatory/ institutional uncertainty</b>	<ul style="list-style-type: none"> <li>• Ambiguous regulatory and institutional environment</li> </ul>
<b>Social/political uncertainty</b>	<ul style="list-style-type: none"> <li>• Diversity of interests among stakeholders of innovation processes</li> <li>• Power struggle</li> <li>• Innovation threatens individual's basic values and/or organisation's knowledge possessed by perceived users of innovation</li> <li>• Necessary skills and knowledge contradict existing skills and norm</li> </ul>
<b>Managerial uncertainty</b>	<ul style="list-style-type: none"> <li>• Fear of failure</li> <li>• Lack of requisite tools to manage risk inherent in innovation process</li> </ul>
<b>Timing uncertainty</b>	<ul style="list-style-type: none"> <li>• Ambiguity of information in the late phases of innovation</li> <li>• Lack of information in the early phases of innovation</li> <li>• Temporal complexity</li> </ul>
<b>Consequence uncertainty</b>	<ul style="list-style-type: none"> <li>• Undesirable consequences</li> <li>• Indirect consequences</li> <li>• Unplanned consequence</li> </ul>

Concepts and theories related to innovation are not always valid for small businesses. In the last decades, scholars have highlighted that SMEs and large enterprises innovate differently, and thus process their innovations differently (Audretsch, 2001). Vyas (2009), in his PhD thesis, notes that the majority of previous work in business innovation mainly focuses on innovation in high-tech large enterprises rather than SMEs. A relatively small number of studies investigate innovation management in SMEs in comparison to the number of studies investigating innovation management in large enterprises (Mosey, 2005).

### 2.2.7 Summary of the studies on SMEs and innovation

The review has highlighted that there are many conflicting assumptions regarding how SMEs learn, grow and innovate. The literature on innovation is complex. There are instabilities recognised within the empirical data

about the role of innovation within a company even though innovation is a great asset for growth and competitiveness. This review showed that there is a pro-innovation bias in the field. Unlike the ideas of growth, which is approached with suspicion, innovation is typically considered as improvement and often regarded as positive. Still, there are some studies that suggest innovation is not always preferable for SMEs because there are risks involved in the innovation process, and innovation performance is not equivalent to company performance. SMEs can grow and be profitable without necessarily pursuing innovation.

It is clear that viewing SMEs as microcosms of larger companies is not helpful; distinctive characteristics of SMEs should be recognised to understand how SMEs learn and innovate. It is, therefore, important to identify how these characteristics of SMEs are addressed by external design support mechanisms.

### **2.3 Professional design expertise**

Design expertise can be thought of as a synthesis of design knowledge, skills and methods within professional practice. If the design profession is to play a constructive role in multidisciplinary innovation support for SMEs, it requires the identification of aspects that are distinct and helpful in their contribution, i.e. why design is a solution to this problem, and why SMEs should have confidence in designers in achieving innovation. This issue is explored through an examination of design expertise.

Expertise is about credibility, recognition and trust. For instance, to facilitate trust between scientists and citizens, philosophers Whyte and Crease (2010, p.411) suggest that science should extend its efforts to “develop normative theory of expertise and experience that can explain why the various epistemic insights of diverse actors should be trusted in certain contexts and how credibility deficits can be bridged”.

The content of this section, which goes into sub-sections, is as follows; first, it describes design as a profession, and then it proceeds to discuss the legitimacy crisis of expertise and design expertise in the context of the

challenges posed by design democratisation and software advances. Thirdly, it looks at existing studies focusing on design expertise. This is followed by a section that explores design knowledge, skills and the theories of expertise focusing on the value of knowledge.

### **2.3.1 Design as an activity and design as a profession**

Design, as an intellectual activity, is seen as the core of everyone's activities (Papanek, 1980; Simon, 1969).

"All men are designers. All that we do, almost all the time, is design, for design is basic to all human activity" (Papanek, 1980, p.3).

However, not all men are professional designers as Norman Potter (1980, p.10) highlights, "Every human being is a designer. Many also earn their living by design". The International Council Societies of Industrial Design (ICSID) define a multidisciplinary expertise of design:

"Design is a creative activity whose aim is to establish the multifaceted qualities of objects, processes, services, and their systems in whole life cycles. Therefore, design is the central factors of innovative humanization of technologies and the crucial factors of cultural and economic exchange. The task is to discover and assess structural, organizational, functional, expressive, and economic relationships" (ICSID, n.d.).

Design as a profession has been mostly developed throughout the last century, and with the emergence of new sub-disciplines, its area of expertise has been evolving (Press & Cooper, 2003). Figure 2.2 shows the development of the design profession based on Perks et al. (2005).

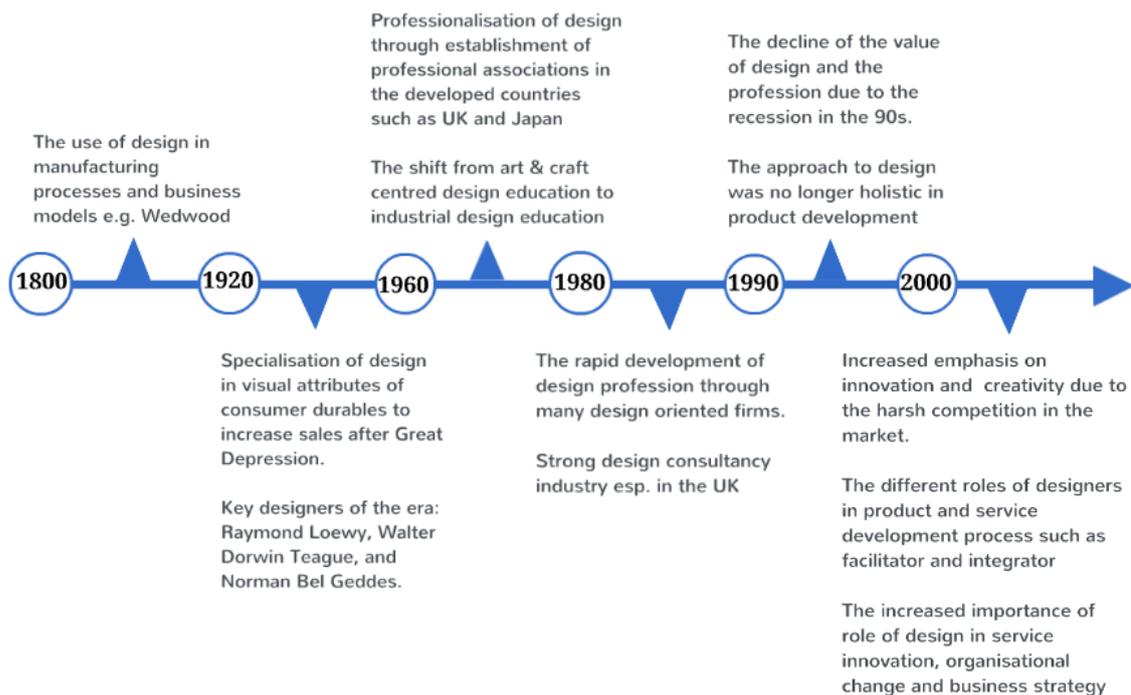


Figure 2.2 Historical development of the design profession in relation to business based on Perks et al. (2005)

Borja de Mozota (2003) classified the design profession into three categories: two dimensions (e.g. graphic design, communication design), three dimensions (e.g. 3-D, industrial design, furniture design), and four dimensions (e.g. Software design). Virtual design and digital design were added in the grouping to reflect the current comprehensive picture. However, this model does not allow for 'instructional design' and 'service design', or 'game design' that can be grouped under both 3d design and 4d design. Consequently, design is a versatile and growing discipline, and these categories are now perhaps not sufficient to represent the complexities of it.

Putting these categorisations aside, a recurrent theme within the design discourse is that design is one of the most mysterious occupations, little understood and poorly appreciated (Dumas & Whitfield, 1989; Gorb & Dumas, 1987; Sparke, 1986; Whitfield & Smith, 2003). Not only is there confusion amongst the public, but also this confusion extends to academic institutions and to the design profession itself (Smith, 2005). It is, however,

the responsibility of the designer profession to uncover the design mystery, as Misha Black puts it, "If designers couldn't tell you what they did, why could -or should- anyone else" (cited in Smith, 2005). Smith (2005), in her PhD, discussed widely the design profession and its profile in the public.

Smith and Whitfield (2005) draw upon the results of a large-scale investigation into the public's understanding of the design professions (interior, industrial, graphic, fashion and furniture). The results of the Australian sample show that designers are not all equal. Graphic designers, for instance, are moderately well understood, whereas industrial design is almost non-existent within the public's occupational category structure. Furniture design hardly exists as a design category. To them, there are several reasons behind this; firstly, design as an occupation has a disadvantageous position between the two powerful occupational constructs of artists and architects; secondly, anyone can practice design and term himself or herself a designer. Design remains largely unregulated. It is not essential to join an organisation that formally accredits designers who meet entry criteria. Frayling (1996) draws a relationship between the neglect towards the design profession and a lack of professional recognition that is linked to the absence of professional standards and the non-existence of a representative body that monitors them. In relation to this, he stated:

"There is clearly a direct relationship between the absence of professional standards and the reputation of a profession. Is design even regarded as a profession? Charters, diplomas, examinations have enormous impact, especially in a society such as Britain, in which ascribed status is much more important than achieved status in sociological terms" (Frayling, 1996, p.39).

On the other hand, Nelson and Stolterman (2003) consider the idea of anyone being able to apply design without having to be a specialist as a positive sign of design democratisation. Similarly, some designers regard regulation and certification as a threat to autonomy and creativity within the field (e.g. Swanson, 1995).

Yet therein lies the danger that is undervaluing design expertise. For example, a company wishing to make use of graphic design turn towards untrained in-house employees and standard office software. This practice is independent of the hobbyist movement regarding professional employment of individuals. This phenomenon has been often articulated as "silent

design" (Gorb & Dumas, 1987), and marginalisation of design expertise, which refers to a great deal of design work that is done by individuals such as managers and engineers who do not consider themselves to be designers. According to Iduarte and Zarza (2010), this situation happens when managers believe that they have the expertise to fulfil design related tasks or when they underestimate the necessary expertise of designers.

### **2.3.2 Studies of design expertise**

In comparison to the design process and methods, design expertise is less frequently studied (Dorst, 2008). A number of studies on design expertise can be found in the proceedings of the "Expertise in Design" conference (Cross & Edmonds, 2003), and two special issues of Design Studies have been published based on this conference. Recently the proceedings of the "Design Expertise and Connoisseurship" conference provide numerous research papers on the subject of expertise in design (EKSIG, 2013). Lawson and Dorst's book named "Design Expertise" (2009) focuses on the nature of design expertise and how it can be developed through short accessible case studies. Cross (2004), in his paper, overviews a wide range of prior research. In the design expertise literature, there are many contrasting yet equally reasonable views on the issue. In this contextual review, existing studies examining design expertise is considered under two main themes: 'experienced vs. novice' and 'designer vs. non-designer'.

The first theme is based on the understanding that expertise is not a skill an individual is born with; he/she acquires it in time after years of experience, after hours of deliberate practice and study of an area of knowledge (Ericsson, 2002). Research suggests that there are different phases in developing expertise. Numerous studies in the literature compare the activities and the comprehension levels of novice and senior designers to inform an understanding of expertise (for example, Atman et al., 1999; Kavakli & Gero, 2002; Lawson, 2004; Popovic, 2004). Atman et al. (1999) established that 4th year engineering design students generated higher quality solutions by considering more alternative solutions, spending more time to develop them and being more efficient in design steps than 1st year students. Kavakli and Gero (2002) compared professional design experts to

novice ones, and concluded that experts are much more efficient in understanding the project and selective about details of it, leading them to effective solutions. However, this sometimes causes a problem of design fixation (Lawson & Dorst, 2009), which is a result of jumping to conclusions without enough exploration of the underlying issue or spending time redefining the initial problem. Popovic (2004) compared novice designers (1<sup>st</sup> year product design students) and intermediate (2<sup>nd</sup> and 3<sup>rd</sup> year product design students) expert product designers (postgraduate students and practicing designers) in an educational context. The findings of his study suggest that novices base their strategies with weak content and their domain-specific knowledge is limited in comparison to experts (Popovic, 2004).

A seven-stage design expertise model is mentioned by Dorst (2008), which is based on the philosophers Dreyfus and Dreyfus' previous five-stage model. It proposes that acquiring expertise is like climbing a ladder starting from novice to expert leading to master and visionary. Each field requires a considerable amount of time to reach a peak of performance, but there seems to be an agreement that it requires a minimum period of practice of ten years starting from the first involvement as a practitioner (Ericsson, 2002). Dorst (2008) highlights the importance of researching how novices progress to higher levels of expertise as a consequence of experience. According to Popovic (2004), there is little evidence of how designers progress from novice to experts. To Lawson (2004), design expertise requires maturity; unlike sportsmen, recognition comes after years of practice. It is, to a significant extent, dependent on gathering experience through time rather than an innate ability. Ericsson (2002) claims that masters seem to consider inborn capacities and innate talent as relatively unimportant; rather, they emphasise the role of motivation, concentration and the willingness to work hard to improve performance. This approach represents a linear and steady development. The metaphor of gradually climbing through successive stages in pursuit of expertise, aiming to reach the top then stalling and inevitably declining may not communicate well the value of expertise with SMEs and be completely applicable to the design field. Practice does not always 'make perfect' (Schneider, 1985). Some

scholars claim that the number of years spent in the design field does not necessarily bring faster, creative and innovative designs to apply to the market (Eckert et al., 2003; Stacey, 2002). Eckert et al. (2003) studied the relationship between expertise and innovativeness and argued that developing expertise may increase the efficiency of designers but also hinder their creativity.

The second theme focuses on the idea that an expert displays a special skill or knowledge. It highlights a skilled action for approaching, framing and solving problems beyond knowing more rules, facts and examples (Anderson, 1983; Newell & Simon, 1972). Comparison studies between designers and non-designers/laypeople have been conducted to find out the abilities and knowledge designers possess. Lawson (1979) compared the different problem solving strategies of fifth year architecture and science students and found that while architecture students mostly adopt solution-focused strategies, science students adopt problem-focused strategies. Akin (1987) identifies the initial structuring of design problems, recognition and reframing as special knowledge possessed by architects. To Cross, core design abilities and typical activities are "produce novel and unexpected solutions, tolerate uncertainty, work with incomplete information, apply imagination and constructive forethought to practical problems, and use drawings and other modelling media as means of problem solving" (Cross, 1990, p.130). To Schön, (1983), the core of design expertise is formulating the problem, not only in the beginning but also throughout the process as a recurring activity (framing-reframing).

An emphasis on personal knowledge and skills possessed by exceptional designers is examined in some studies (Candy & Edmonds, 1996; Cross & Cross, 1996; Lawson, 1994). Cross (2003) argues that individual designers seem to have differing design abilities as a result of the examination of the commonalities in the approach of outstanding designers. He found that displaying a 'systems approach', designing from 'first principles, paying attention to 'framing' the problem, sometimes in a rather personal way; and not limiting themselves to the pre-defined problem criteria. His examination, however, is limited to three designers, Gordon Murray (car designer), Kenneth Grange (product designer), and Victor Scheinman

(engineering designer). It could be questioned whether these impressive lists of skills serves to attract SMEs and convince them about the value of design input and expertise.

A third theme should also be referred to which focuses on the rising hobbyist movement and how it affects the role of experts. The contribution of amateurism in progression of expertise has been increasingly attracting academics' attention (e.g. Beegan & Atkinson, 2008; Kuznetsov & Paulos, 2010). Learning by direct demonstration has become more and more widespread through pervasive applications and videos on the Internet, which contributes to the knowledge and skills of hobbyists. The level of expertise that amateurs can acquire may be questionable. For instance, a layperson may practice design for many years; however, they may remain naïve in their approach and methods. It is possible that they might be prepared and feel competent to undertake their work in comparison with people who received specific training/experience. In an open-source environment, many contributors are actually experts in their field, even if they are amateur contributors (for example-Linux<sup>6</sup>). This review, however, has focused on the 'design profession' and does not cover the expertise of amateurs. Yet, it has an influence on the perception of expertise.

### **2.3.3 Design skills and mindset**

Similar to studies comparing designers with non-designers to identify core skills and experiences, as the foundation of expertise, there are several studies that aim to establish the core skills of design. Design skills, design mindset and values are often regarded as inseparable and investigated together (Hassi & Laakso 2011; Kimbell, 2011; Michlewski, 2008; Owen, 2006). Walker (1990) identifies optimism, ability to innovate, diversity and experimentation as part of design skills. Lorenz (1986) states that synthesis and visualisation are amongst the most fundamental design skills. Press and Cooper (2003) categorise fundamental design skills that a designer must have under attributes related to the act of design and the process of design. The 'act of designing' refers to the ability to visualise and materialise design

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<sup>6</sup> Linux is an open source computer operating system, that is an alternative to that of Windows and MacOS

concepts for example by exploiting different colours, shapes, materials and media (Press & Cooper, 2003). The 'process of designing', on the other hand, is concerned with the core components of process such as researching, asking questions, synthesis, construction and deconstruction of ideas, the use of divergent and convergent thinking, and verbal and non-verbal communication (Press & Cooper, 2003). Bruce and Harun (2001 cited in Bruce & Bessant, 2002) suggest that designers have multidisciplinary knowledge that can be integrated with other disciplines. These skills and knowledge are categorised under applied, knowledge, processing and values/perspective (mindset) shown in Table 2.3.

Some researchers such as Michlewski (2008), von Stamm (1998, 2004) and Yoo et al. (2006) look at the issue through traits possessed by professional designers in an organisation. Bolland and Collopy (2009, p.9) define a design attitude as "expectations and orientations one brings to a design project". The researchers, through observing a project led by the renowned architect Frank Gehry, suggest that the use of models and sketches to stimulate creativity and thinking and an attitude of openness are the aspects of a distinct mindset of a problem solving and decision-making vocabulary. These aspects might be stimulating inputs for the functions of an organisation (Boland & Collopy, 2004). To Gemser and Leenders (2001, p.36), "It seems very likely that the impact of industrial design on company performance will vary depending on the skills and talents of and the experience of the designers involved". Michlewski (2008), in his empirical study, interviewed a number of senior designers working in design conscious firms and well-known design consultancies to identify characteristics of the professional design attitude. These characteristics are focusing on future solutions; perceiving reality as pliable —that is 'assertion-based rather than evidence-based'; having connected to work on emotional, rational and aesthetic levels; aiming to propose novel and original forms that challenge the status quo rather than relying on predetermined, cumulatively created frameworks; and displaying a positive attitude to the change itself.

Table 2.3 Design skills (adapted from Bruce & Harun, 2001 cited in Bruce & Bessant, 2002, p.48)

<b>Applied Skills</b>	<b>Knowledge</b>	<b>Processing</b>	<b>Values/Perspective</b>
Practical skills Creative Skills Commercial Skills Presenting Skills	Process Material Market Technical Commercial	Visualising Researching Analysing and prioritising Scenario building Adapting and inventing Presenting and persuading Understanding stakeholders' requirements and balancing them Intuitive thinking and action	Risk taking Originality Anticipating future trends Proactive in developing relationships, Managing uncertainty

**2.3.4 Design knowledge**

Expert behaviour relates to the study of knowledge levels (Popovic, 2004). Understanding design expertise requires unfolding design knowledge. In addition, knowledge has been increasingly considered as an organisational resource (Alavi & Leidner, 1999). DSPs sometimes associate their approach with 'knowledge transfer' (Raulik et al., 2006) and knowledge absorption (Acklin, 2013). As a result, providing some background information about the nature of knowledge, how/what designers 'know', and the transfer of design knowledge is essential to this study. The section begins with describing knowledge in general. Before describing the key concepts regarding the transfer of tacit knowledge, it presents the qualities of design knowledge i.e. what/how designers know. The concepts that are introduced in this section are used as theoretical lenses to evaluate the effectiveness of DSPs in Section 5.2.3.

Knowledge, as a broad and abstract topic, has raised different epistemological discussion in western philosophy starting from the classical Greek era (Alavi & Leidner, 1999). While it is not the aim of this review to discuss this historical perspective, a brief introduction is provided. Aristotle categorised knowledge into three parts: episteme, techne and phronesis. Episteme means to know and refers to genuine theoretical knowledge and

certainty. Techne is about how to make things and refers to the asset of practical thought and craftsmanship. It is practically applied knowledge. Phronesis, or practical wisdom, is about action and how to decide what to do. It is in relation to ethics. Episteme is considered to be a form of expert propositional knowledge.

The relationship between knowledge, information and data is also discussed by many scholars (e.g. Alavi & Leidner, 1999; Davenport & Prusak, 1998; Fahey & Prusak, 1998). Data refers to discrete objective facts such as raw numbers; structured records of transactions; information means data that is processed into a meaningful framework, 'a message', and knowledge refers to information that is actionable and used for production of knowledge (Davenport & Prusak, 1998). To Davenport and Prusak, (1998, p.5), knowledge is "a fluid mix of framed experience, values, contextual information, and expert insights that provides a framework for evaluating and incorporating new experiences and information". A handy analogical example is used by Swan et al. to demonstrate the difference between knowledge, information and data (Swan et al., 1999 in Alavi & Leidner, 1999). In their setting, a train timetable can be thought of as data; the announcement about a train leaving from a platform to a desired location 5 minutes ahead of time is information, and the passenger's realisation that this specific train is not the first one that reaches the desired location is knowledge.

### **Tacit-Explicit knowledge**

Another way to approach knowledge is through its explicit and implicit dimensions. Studies investigating tacit and explicit knowledge are often based on Polanyi's work on personal knowledge. Based on the simple observation, Polanyi (1962, 1967) suggests that tacit knowledge constitutes a large part of human knowledge: 'We know more than we can tell'. A widely accepted view is that tacit knowledge cannot be manifested explicitly or transferred due to its intuitive, implicit, personal and context-specific characteristics. By contrast, explicit knowledge can be codified and articulated verbally or written which makes it easy to transfer. The assumption that tacit knowledge 'cannot be manifested' is criticised by

claiming that it is “implied but not actually documented”, assuming that it can be articulated although it *has not been documented yet* (Alevi & Leidner, 1999).

Nonaka (1991) also builds on the idea of “not yet documented” and suggests that the interaction between tacit knowledge and explicit knowledge forms a spiral; tacit knowledge becomes explicit by externalising it and explicit knowledge becomes tacit by internalising knowledge. The real innovative ideas come from this spiral knowledge (Nonaka, 1991). For example, in tacit-to-tacit knowledge transfer, which refers to the way an apprentice learns new skills from the master, knowledge never becomes explicit and both master and apprentice hardly produce any systematic insights into craft. Therefore, it cannot be leveraged by an organisation. In the same way, explicit-to-explicit knowledge transfer, which means bringing separate pieces of explicit knowledge together as one, fails to lead to innovation. For example, although a financial report synthesises information from a variety of resources (explicit-to-explicit), the knowledge base within company, to his view, is hardly broadened by this new knowledge. Raulik et al. (2006, p.2), by building on the tacit and explicit dimensions of design knowledge, suggest, “design promotion activities tend to concentrate on the dissemination of explicit knowledge, while design support mechanisms might be dedicated to the transfer of tacit knowledge, from the design advisor to companies”. Based on Nonaka’s argument, the real challenge and the opportunity might be to create a knowledge spiral while externalising and internalising design knowledge shared through DSP events.

### **The qualities of design knowledge: reflective and tacit**

A fundamental study of design knowledge is Schön’s seminal work, the “*Reflective Practitioner*” (Schön, 1983). Through the reflective conversation framework, from a pragmatist perspective influenced by Dewey, Schön (1983) adequately integrates the oppositions between subject vs. object and knowledge vs. practice/action. He criticises the model of design science, technical rationality and the positivist approach to understanding design. To Schön (1983), each design task is unique, and therefore a fundamental issue of design practice is to determine the ways in which to

address these non-routine tasks. Likewise, Popovic (2004) places design expertise under "adoptive expertise" rather than "routine expertise" based on Holyoak's (1991) expertise framework. Adaptive expertise refers to experts making use their knowledge to adjust themselves to non-routine activities. Through reflection, Schön (1983) suggests, practitioners make use of their experiences and tackle different problems. Similar to Marx, who sees that theoretical and practical knowledge as one entity, Schön (1983, p.49) claims, "our knowing is our doing"; "doing and thinking are complementary. Doing extends thinking in the tests, moves and probes of experimental action, and reflection feeds on doing and its results. Each feeds the other, and each sets boundaries for the other" (Schön, 1983, p.280). In addition, he introduces "knowing in action" to describe tacit knowledge and situational knowledge.

"Once we put aside the model of Technical Rationality which leads us to think of intelligent practice as an application of knowledge to instrumental decisions, there is nothing strange about the idea that a kind of knowing is inherent in intelligent action... it does not stretch common sense very much to say that the know-how is in the action – that a tight-rope walker's know-how, for example, lies in and is revealed by, the way he takes his trip across the wire... There is nothing in common sense to make us say that the know-how consists in rules or plans which we entertain in the mind prior to action" (Schön, 1983, p.50).

To Schön, this illustrates the distinction between 'knowing how' and "knowing that", and this similar to the difference in German, 'können' and 'wissen', 'knowing how', and 'knowing what'. Reflection-in-action is the reflective form of knowing-in-action (Schön, 1983, p.8). Much of design knowledge is considered as tacit knowledge (Wong & Radcliffe, 2000); "a competent professional knows more than he can tell" (Schön, 1983) is the dictum of many designers. Schön's ideas widely influence design practice (Cross, 2011), yet it is important to note that, Dewey's pragmatism provided him with the lenses of reflective thought.

Scholars also mentioned that there exist difficulties as a result of the tacit dimension of design knowledge. For example, Love (2007) explores the dynamics of design knowledge with respect to factors that lead to growth or loss of design related knowledge. He argues that tacit knowledge and intuitive design do not contribute to the collective design knowledge; codifying and systematising tacit knowledge are required to inform design activity (Love, 2007). Similarly, Friedman (2000, p.13) states that

rendering tacit knowledge to explicit is needed to form the ground of shared understanding; creating a common ground of understanding matures the discipline and "distinguishes the work of a research field from the work of the profession". He claims, "the challenge of any evolving field is to bring tacit knowledge into articulate focus" (Friedman, 2000, p.13).

### **The transfer of tacit knowledge**

Tacit knowledge is also dependent on "knowing subjects" (Lam, 2000). A knowing subject represents a mind with acquired knowledge. In the particular context of design support interventions, knowing subjects include both designers and SMEs. Lam (2000) states, "the transfer of tacit knowledge requires close interaction and the build-up of shared understanding and trust among them". Similarly, Athanassiou and Nigh (2000, p.474) claim that the transfer of tacit knowledge "depends on the credibility of the transferer". Lucas (2005) in his empirical study identifies that trust and the reputation of the knowledge provider are important for knowledge transfer activities. In addition, Foos et al. (2006) claim that trusting relationships reduce the level of risks and uncertainty that is associated with tacit knowledge transfer. This is perhaps important when undertaking innovation activities, which involve a high degree of uncertainty as discussed in Section 2.2.6 (e.g. Jalonen 2012).

Nahapiet and Ghoshal (1998) link trust and knowledge exchange and suggest that trust may be a multidimensional construct that includes distinct, cognitive and affection/relationship-based components. Good personal relationships, particularly those with a long and favourable history, facilitate strong trust and can further improve the prospects for successful knowledge transfer (Child & Rodrigues, 1996).

### **2.3.5 The generalist-specialist dilemma of design expertise**

To Holyoak (1991), the theories of expertise have passed through two generations. The first generation builds on the early insight of Allen Newell and Herbert Simon (1972): 'problem solving as search'. Their specification of a small number of heuristic methods for serial search applies across the specific content of any particular domain. The General Problem Solver (GPS)

was a theoretical approach (Newell & Simon, 1972) and aimed to provide a core set of processes, which can be applied to a variety of problems, such as proving theorems in logic or geometry, word puzzles and chess.

The second generation reacted against the heuristic search on the grounds that heuristic search methods are general but weak and represent the characteristic of novice rather than expert performance (Holyoak, 1991). Expertise depends crucially on detailed knowledge. "Knowledge is the power" is the dictum of the second generation. Instead of relying on search strategies, this new form was a 'knowledge-based' strategy relying on facts and rules rather than search strategies. The realisation of "knowledge is the power" has generated an extensive interest in knowledge acquisition, knowledge elicitation and knowledge representation (Feigenbaum, 1989). It was becoming clear that expert problem solving could not be attributed to any problem or any strategy, domain-specific facts and rules are required for success (Holyoak, 1991).

These two frameworks underpin the generalist-specialist dichotomy discussed in this study. Historically, specialism is often used as a synonym with being an expert. The generalist-specialist dichotomy relates to domains of design expertise and represents the breadth and depth of design knowledge and the experience of a designer. A vivid implication of the first generation theory, seeing design as a general problem-solving tool, corresponds to the concept of design thinking. For example, Owen (2006) states that design thinking is generalist in preparation and application. Treating design as heuristic, a way of thinking, or as a tool that can be applied to a broad range of contemporary issues encourages a generalist mindset. However, design thinking has been subject to criticism on the grounds that it has been extended too far, leading to a dilution of meaning (Badke-Schaub et al., 2010).

Some other scholars support the generalist view of design. For example, Buchanan (1992, p.16) says, "Design has no special subject matter of its own". Similarly, Rust (2004, p.84) claims, "designing - it takes place in almost every context and can contribute to understanding and our experience in almost every context". Farson (2008) refers to design as a

force for transforming everything, which can address the needs of all people across societies. The Bauhaus school tradition and the concept of design thinking are based on this generalist mindset (Kolko, 2011). An implication of this for practice is that Kolko (2011) believes that design education creates “generic” designers who lack deep skills and knowledge in their fields. He notices that a company hire a designer for his specific skills and knowledge within a narrowly defined area, and thus he claims that the market needs more design graduates with specialised knowledge and skills. Companies want to work with the best employees who exemplify the skills specific to their businesses’ domain.

“today's design consultancies and corporations demand from potential employees highly focused, specialized courses of study [...] the designer is hired based on their specific demonstration of skills within a narrowly defined space”. (Kolko, 2011)

Therefore, to Kolko (2011), design graduates who have a diverse selection of projects in their portfolio may find it difficult to persuade companies to secure their job. However, the source of his claims is no-specific, not supported with empirical data or validated with theory.

The generalist approach, in the sense of doing a little bit of everything in a contemporary and complex design project, may result in insufficiently performed tasks and poor results. Krippendorff (2009) provokes designers by claiming: “designers who know a little bit of everything, none too deeply, are universal charlatans.” Conversely, Norman (2012a) thinks, “Great designers are generalists, knowing a little about many different topics”. In contrast with his previously expressed view, Norman (2011) also argues, “designers are not generalists, they are specialists in design, and what they offer is a unique point of view and approach to problem solving.” Owen (2006) states designers are specialists of the design process, but generalist in design content.

Kelley and Littman (2005), on the other hand, propose the notion of “T-Shaped individuals”, based on his observations in their company IDEO. These individuals have deep knowledge and experience in one particular skill set and have also a number of complementary or tangential skills that are shallower. The issue is whether they have sufficient depth of understanding within a particular domain and whether they have sufficient

complementary skills to provide effective innovation advice to SMEs. Many more examples and provocative discussions can be found in the literature and academic forums questioning whether designers are/should be specialists or generalists (Norman, 2010; Kolko, 2011), but these discussions are not based on academic methods of investigation or supported with empirical data.

The majority of the studies dealing with design knowledge and the generalist-specialist dilemma are composed of non-peer reviewed articles and discussions. No study investigating the dilemma within design consultancy and SMEs collaboration through empirical data are found during the time of this research study.

### **2.3.6 Summary of studies on professional design expertise and expertise theories**

The design profession has been facing several challenges. These include recognition for their profession, credibility for their expertise and articulation of their knowledge. The review has illustrated that much of design expertise is categorised under the heading design skills and design traits rather than design knowledge.

The literature review has revealed that there is no empirical study looking at SMEs perception on design expertise and how the depth and breadth of a designer's knowledge influences the collaboration between SMEs and designers. The following section moves on the design support for SMEs.

## **2.4 Design support for SMEs**

In comparison to innovation or R&D literature, the design literature has been far less thoroughly studied from a social science perspective (Borja de Mozota, 2002). The role of design in business has been studied under the field of 'Design Management' since the 1960s (Best, 2006; Borja de Mozota, 2003; Cooper & Press, 1995; Farr, 2011; Gorb, 1986; Kotler & Rath, 1984; Lorenz, 1986; Topalian, 1980). Design management has been considered as having a co-ordinating role between different functions and departments of a business, and Bruce and Bessant (2002) claim that professionally managed design projects produce better results than an ad-hoc design

process; therefore, design management is a strategic resource for businesses.

This section, which is divided into sub-sections, is organised as follows; first, the relationship between design and business performance is considered. It then goes on to describe briefly the role of design in innovation. The sub-section covering the role of design for SMEs is followed by the subject of outsourcing design expertise. The effectiveness of design consultancy support is presented before moving to government-funded design support mechanisms. Finally, the studies evaluating DSPs are reviewed.

#### **2.4.1 Design and business performance**

The rationale for businesses to use design is often explained through the effectiveness of design on business performance, which has been extensively discussed by many scholars (e.g. Black & Baker, 1987; Borja de Mozota, 2002, 2003, 2006; Bruce et al., 1995; Bruce & Biemans, 1995; Bruce & Bessant, 2002; Candi, 2007; Cooper & Press, 1995; Gemser & Leenders, 2001; Hart et al., 1989; Hertenstein et al., 2005; Heufler, 2004; Kotler & Rath, 1984; Lester et al., 1997; Nussbaum, 2004; Oakley, 1984; Perks et al., 2005; Press & Cooper, 2003; Rich, 2004; Trueman & Jobber 1998; Ulrich & Eppinger 2003; Walsh, 1996; Walsh et al., 1992). In the UK, the Design Innovation Group at The Open University through several studies (e.g. Potter et al., 1991; Roy and Potter, 1990, 1993; Roy, 1994; Walsh, 1996; Walsh et al., 1992) has contributed to the empirical literature on various aspects of design and innovation and design in business. Amongst these extensive studies, *The Handbook of Design Management* edited by Cooper et al. provides a historical perspective and bring together the key studies contributing to design management theory and practice (Cooper et al., 2011).

Borja de Mozota (2006) identifies four main contributions of design with respect to company performance and endorses this framework by using the balanced scorecard tool of Kaplan and Norton (1996). The first category is “design as differentiator”; design increases the competitiveness of

companies in the market by improving their brand equity and customer loyalty (customer perspective). Secondly, "design as integrator" refers to design as a resource that coordinates different functions and team members (process perspective). The third category is "design as transformer", which regards design as a resource for generating new business opportunities (learning perspective). Finally, "design as good business" refers to the contribution of design to return on investment (ROI), higher margins and revenues (financial perspective).

Heskett (2009) states that design adds value to the products and services by responding to the customer needs, which subsequently generates economic benefits for companies (Borja de Mozota, 2006; Heskett, 2009). Value is difficult to understand and therefore widely discussed in economics, as Menger (2007, p.121) suggests, "Value is thus nothing inherent in goods, no property of them, nor an independent thing existing by itself. It is a judgment economizing men make about the importance of the goods at their disposal for the maintenance of their lives and wellbeing. Hence value does not exist outside the consciousness of men". Value created can be categorised as tangible or intangible value. Tangible value is quantifiable in financial and physical terms and includes increased profitability and savings, whereas intangible value is harder to quantify i.e. they are dependent on the perception of the customers and their level of satisfaction. Tukker (2004, p.250) suggests, "Intangible or subjective value is a little less straightforward as a concept, but is currently the key to success or failure of many products and services in the consumer market".

Roy and Potter (1990) state that design contributes not only to non-price factors but also to price factors by improving the usability, reducing manufacturing costs and increasing the lifetime of a product. From a service design perspective, Candi (2007) states that firms are motivated to use design to establish the distinguishing characteristics of their services to compete in the market. These characteristics of services are "intangibility, inseparability, heterogeneity and perishability". The commercial value of design is often recognised through its input on market differentiation (Black & Baker, 1987; Gemser & Leenders, 2001; Hertenstein et al., 2005). Trueman and Jobber (1998) propose a four-stage framework to be used by

firms to analyse design dimensions of product development to gain competitive advantage by design. These dimensions in their frameworks are values (perceived added value), image (product image and brand identity), process (new product development process) and production (cost reduction/efficiency).

Design is seen as an important strategic resource and a vehicle for change (Dumas & Mintzberg 1989; Lorenz, 1994; Kotler & Rath 1984; Ravasi & Lojacono, 2005; von Stamm, 2004; Trueman & Jobber, 1998). Lorenz (1994), for instance, highlights the strategic role of design and notes that the traditional methods of growth, such as cost-cutting and advanced technologies, fail to provide sustained growth. The study suggests that design as a strategic asset should become the core of company operations and strategy. Like Lorenz (1994), von Stamm (2004) highlights that existing approaches in businesses do not lead to sustainable growth. Von Stamm (2004) claims that innovation, for example, does not flourish when there is no innovation culture in the company; that is, existing structures within companies promote change, experiments or risk taking. To her observation, organisations tend to have a culture that focuses on day-day operational activities, emphasises cost-cutting and encourages incremental changes.

The Design Council categorises the value of design for businesses as follows: a "narrow, short-term approach" and a "broad, long-term approach" (Design Council, 2005a). A narrow approach refers to the use of design applied for product design. Its application is limited to aesthetics and form and not integrated into the wider business strategy. Design applied at a later stage results in small incremental innovations. A broad and long-term approach, on the other hand, exploits design capabilities at an early stage for the purpose of guiding the business strategy and shaping products and services. This integrated approach addresses components such as branding, corporate identity and communications while improving products, services and operations. Similarly, Roy and Riedel (1997) state that using design holistically without being restricted to styling leads to commercially successful products.

Perks et al. (2005) identified three potential roles of design in new product development (NPD) process by investigating eighteen mid-size to large UK manufacturing firms. These roles are "design as functional specialism (1), design as part of a multifunctional team (2), design as NPD process leader (3)" (Perks et al., 2005, p.119). The first role is limited with the contribution of design in accomplishing basic design tasks. In this role, designers carry out the development of a design task but other tasks that follow the design task, such as testing, validation and launch phases, are undertaken by other specialists, such as marketing specialists or engineers. The second role is that design contributes to NPD along with other experts and designers who are part of a team developing a product throughout the NPD process. In the third role, design drives innovation across all activities of business. The designer takes ownership of the product development management by undertaking non-design functional activities including observation, research and business analysis yet informs the marketing interim points throughout the NPD process (Perks et al., 2005).

A number of scholars have quantified strong links between design, innovativeness and organisational performance (Gemser & Leenders, 2001; Hertenstein et al., 2005; Potter et al., 1991; Roy & Potter, 1993). Herteinsten et al. (2005) indicate that within the four industries of motor vehicle, computer, electronic appliance and furniture, the correlation between design effectiveness and business success was quite consistent. The firms in these sectors with high design effectiveness experienced "higher returns on sales, returns on assets, growth rates of sales, net income, and cash flow than firms with low design effectiveness" (Herteinsten et al., 2005, p.3). Gemser and Leenders (2001), who conducted a survey with 47 Dutch manufacturing firms, found a positive relationship between design investment and company performance, and this performance is associated with the specific design industry sector and the type of design strategy adopted. Factors including evaluation of the industry, the capabilities of design practitioners and the ease with product design affect this relationship. Within industries where design is established, the same scholars also acknowledge that design on its own is not adequate to make a business successful. The authors (e.g. Dumas, 1996; Walsh et

al., 1992; Weiss, 2002) highlight that preaching good design alone does not ensure business success. Walsh et al. (1992) list cases of companies that are renowned by their design quality but are not commercially successful.

The Danish Design Centre developed the Design Ladder, which aims to measure the level of design involvement within a company (Ramlau & Melander, 2004). The ladder presents four steps including "(1) no use of design, (2) design as styling, (3) design as process, (4) design as strategy" (p.50). The centre then used this framework in a survey involving 1500 respondents to measure the impact of design on business. Their results indicated that "the higher a company is placed on the Design Ladder, the better its gross performance" (Ramlau & Melander, 2004, p.50).

Some empirical results in the literature that are displaying the value of design for businesses are to some extent inconsistent. The Design Council national survey conducted in 2004 shows that 37% of respondents claim that design has no role in their business, 35% believe design has a limited role, 16% claim design has a major role, whilst just 12% claim design is integral in the company (Tether, 2005a). In contrast, a national survey, which was conducted by the Design Council in 2005 with 1500 firms with ten or more employees in the UK, displays positive results. It shows that almost half of the respondents see design as a key driver for maintaining competitive edge and two third of respondents consider that design is essential to sustained economic performances of companies (Design Council, 2007).

#### **2.4.2 The role of design as a driver of innovation**

There are several positive assumptions and generalisations about the role of design in innovation and the importance of design for businesses. For example, Cox (2005) claims, "design is what links creativity and innovation"; the UK government states in their white paper on competitiveness in 1995: "The effective use of design is fundamental to the creation of innovative products, processes and services" (HMSO, 1995 cited in Bruce et al., 1999, p.297).

The roadmap to innovation using design is exemplified through different approaches. These include human/user-centred design (e.g. Chayutahakij & Poggenpohl, 2002; Veryzer & Borja de Mozota, 2005) participatory design (Sanders, 2002) design thinking (Brown, 2008; Martin, 2009) and design-driven innovation (Ravasi & Lojaco, 2005; Verganti, 2008). The recent DMI conference in 2012 on "leading innovation through design" illustrates that design scholars and practitioners sometimes refer to these approaches as design-led innovation. For example, to Bucolo and Wrigley (2012, p.2), design-led innovation "is the ability of the firm to build deep customer insights through co-design". Conversely, based on the view of Beverland and Farrelly (2007, p.12), design-led innovation means that design plays a strategic and central role in innovation; for instance, companies such as Apple, Vitra and Dyson provide "new-to-the-world products, services and experiences" that are centred on design. The design process generates innovations that have been unforeseen by the market.

The basic assumption of user-centred design is users can provide valuable insights informing the design process. These insights can be obtained by asking questions to users or preferably by direct observation while they are using the product or service (Patnaik & Becker, 1999). Participatory design or co-design, on the other hand, blurs the boundaries between creators and users. Users are becoming a critical stakeholder in the design process. It advocates "power to the people", and considers ways in which we can get greater benefits from new co-designing relationships within a network of participants (designers, practitioners, users and other stakeholders) whose roles have been evolving. The difference between user-centred design and participatory design is that indirect involvement of users in the design process cannot be considered as participation. For example, users can have passive roles in ethnographic studies or empathic design, in which their contribution may consist of being the subject of an observation. However, the user's role in participatory design is mostly active, and the user can engage in the development process of a product or service, including defining the problem, co-creating, evaluating and testing.

Design thinking has also been found to be a promising approach to harnessing innovation capabilities of a company (Owen, 2006). Brown (2008, p.86) defines design thinking, as a human-centred approach to innovation, "uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity". Design thinking blurs the professional boundaries of design and shifts designing from an isolated and specialised activity to an instinctive approach or a method that can be undertaken by any individual (Brown, 2008). Design thinking has raised great interest and mixed reactions amongst design practitioners as well as design scholars (Badke-Schaub et al., 2010; Cooper et al., 2009; Hassi & Laakso, 2011).

Both participatory design and design thinking have a user focus to achieve innovation. Verganti (2008) problematises the user focus in innovation processes and questions how some companies including Alessi, Artemide, Apple or Bang & Olufsen succeed in the market without being user-centred. To him, the reason behind the success of the abovementioned companies is that they apply design-driven innovation. Design-driven innovation stresses the relationship between the vision of the company and new product meanings. Innovation is based on creating new meanings. These new meanings, messages and languages are diffused in society, 'design is the brokering of languages'. His view alters the approach that is design as being solely driven by user needs or new technologies, new functions i.e. 'technology push' and 'market pull' models. Verganti (2003, p.36) defines design-driven innovation "as an innovation where novelty of message and design language is significant and prevalent compared to novelty of functionality and technology". Norman and Verganti (2014) suggest that user-centred design is based on 'market pull', which leads to incremental innovation rather than radical innovation.

A prevailing view amongst numerous scholars is that the role of design in innovation has been insufficiently investigated (Gemser & Leenders, 2001; Perks et al, 2005; Trueman & Jobber, 1998). Bruce (1996 cited in Borja de Mozota, 2003) is critical of various studies that tend to segregate design from the other actors of innovation and credit only design amongst other

factors while building a consensus on the importance of design in the process of innovation. Candi (2006) stresses the difficulty of evaluating the role of design in business performance and competitiveness. She proposed a three-dimensional evaluation model based on Norman (2004) that includes categories of the visceral, behavioural and reflective nature of design. Similarly, Moultrie et al. (2007, p.350) present a design audit tool for SMEs. The tool aims to identify the maturity at different levels as "project generation", "requirements capture", "concept design", "implementation" and "project management". There are also projects that aim to develop a methodology to measure the ROI of design (cf. Design ROI, 2012; Westcott et al., 2013).

### **2.4.3 The role of design in SMEs**

The study conducted by Borja de Mozota (2002) with thirty-three European SMEs suggest that SMEs think that design creates product value associated with better quality, appearance, user satisfaction and product functionality. Moultrie et al. (2007) examine the role of design in terms of organisational competence within SMEs. They consider that design contributes to market differentiation, innovative capabilities of business and improved company-customer communication. Other studies investigated innovation and design management in SMEs and have highlighted design as an important competence for a SME in order to achieve a better strategic position and improve its flexibility and responsiveness to the market (Ward et al., 2009; Bruce et al., 1999). Jeffrey and Hunt (1985) conducted a survey with ninety-nine small manufacturing companies in Scotland and identified a positive attitude to design. However, they also found that their sample companies have not consulted professional design when developing products. A small number of companies collaborated with universities or colleges to address their particular specific technical design problems. The majority of their survey participants viewed these organisations as unapproachable, expensive, and difficult to communicate with. They concluded that many firms when designing and developing their products adopt ad-hoc or unstructured methods.

Although there are positive findings about the value of design that is recognised by SMEs, the widely accepted view is that SMEs have consistently failed to acknowledge the full potential of design and do not appreciate the value of it (Er et al., 2013; Moultrie et al., 2007; Utterback et al., 2006). Table 2.4 summarises some of the reasons for this problem derived from the literature. Brazier (2004) believes that some of the challenges can be overcome by attracting the attention of SMEs to the essence of design in business success and by demonstrating explanatory case studies of other companies successfully using design.

Table 2.4 A summary of the main causes used to explain why SMEs fail to exploit design to its full potential

<b>Causes</b>	<b>Explanation retrieved from the literature</b>
Perceiving design as styling	SMEs associates design with aesthetical activities only (Utterback et al., 2006)
Marginalising design expertise	SMEs are often technology-driven and are making "silent design" decisions (Gorb & Dumas, 1987)
Financial difficulties within SMEs	SMEs' inadequate financial and human resources inhibit them to make long-term and systematic design investment (Er et al., 2013). SMEs consider design as a cost-increasing factor (Brazier, 2004).
SMEs do not know how to work with designers. A lack of design management function.	SMEs often lack the skills and don't know where to turn to engage with the design industry (The Work Foundation, 2007). The most significant barriers for use of design in SMEs are a lack of knowledge about how to use and where from take design service (Brazier, 2004). SMEs do not possess the knowledge and skills to work with designers effectively (Bruce et al., 1999; Er et al., 2013).
Vague concepts and practices existing design process	Vague design practices, unskilled designers undertaking design tasks leads to marginalisation of design profession. (Moultrie et al., 2007) Designers tend to have limited knowledge regarding management concepts; instead they rely on vague concepts such as creativity (Borja de Mozota, 2006). Designers have difficulty in implementing a value model in their everyday practices (Borja de Mozota, 2006).
Cultural barriers	"The assumption around designers—or creative people in general—cannot be 'managed'" (von Stamm, 2004). There exist cultural differences between business people and designers (Gorb, 1986).
Insufficient concepts and theories to support design	"Academics and consultants have failed to develop a powerful typology of the various constituents of design—the equivalent of marketing's '4 Ps'" (Lorenz, 1994, p.74).
Design status	"Design tends to be overlooked in the strategic concepts which most managers use, notably the 'Business System' and the 'Value Chain'. Hierarchically lower positioned than marketing and engineering specialist" (Lorenz, 1994, p.74). SMEs perceive design as luxury (Brazier, 2004).
Communication	SMEs perceive designer and design organisations unapproachable, expensive, and difficult to communicate with (Jeffrey & Hunt, 1985)

	Inadequacy of an interface between SMEs and designers (Brazier, 2004).
Design gap in management education	Management education rarely includes design and design management as part of many managers are unaware of design resource (Boland Jr. & Collopy, 2004).
Other factors	There is inadequate customer demand for design (Brazier, 2004).

#### 2.4.4 Outsourcing design expertise

Companies make use of design through in-house, outsourced design expertise, or both<sup>7</sup>. Through outsourcing, non-value-added activities are provided by using a specialised service provider, so that companies focus on their core competence (Grant, 2000). Grant (2000) claims that product design, as a competence, should be considered as a core capability within the company. The reason is that design competence provides access to markets and shapes customer preferences, and it is difficult to replicate that skill. Similarly, von Stamm (2004) uses the “artificial limb” metaphor to describe the value of outsourced design; she indicates that it may not be adequately integrated to the company strategy.

“to gain the full benefits of design—and innovation, for that matter—an organization needs to develop internal capability for its management and delivery. Bringing in outsiders might help to kick-start the process, but ultimately it will remain a bolt-on, an artificial limb that is useful but not quite part of the core. In worst-case scenarios, outside help becomes a transplant that is rejected by the organism” (von Stamm, 2004, p.18).

Roy and Riedel (1997) state that segregating design tasks by breaking them down into separate tasks is likely to result in disjointed outcomes and inhibits design outputs from reaching its potential impact unless there is a strong leadership that ensures coherent and holistic design outcomes. In contrast, Bruce and Morris (1994) justify outsourcing design expertise on two grounds; firstly, a variety of expertise, including design consultants, is required to address the complexity, competition and short life cycle of products in the market. Secondly, an increase in outsourced technical experts facilitates the use of technology for product development. Likewise, Sunley et al. (2008) present a historical perspective and state that while in the Fordist era, design activities were carried out in-house, since the 1950s due to the increased externalisation of economic activities, design jobs have been outsourced to design consultancies.

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<sup>7</sup> See the definitions of terms for in-house and outsourced design Section 1.6

In the light of the in-house limitations of SMEs that have been previously discussed (see Section 2.2.2), SMEs have increasingly been forced to seek external advice from professional consultants in areas of engineering, process design and research (Rothwell, 1984). Nieuwenhuis et al. (1999) state that SMEs need to collaborate with external knowledge sources since they usually do not possess large internal knowledge bases. SMEs regularly invite outsiders to assist at professionalising their business (Ramsden & Bennett, 2005). Internalising design becomes economically unfeasible for SMEs; therefore, they outsource design expertise (Er et al., 2013). Walsh (1996) also states that some companies, such as Herman Millar and Alessi, employ consultants as part of their company strategy in order to maintain a flow of fresh ideas. This approach is applied when design is central to the company strategy (Walsh, 1996). Munsch (2004), a director in the creative office at Herman Miller, confirms that they experienced many advantages and benefits as a result of using external designers.

#### **2.4.5 The effectiveness of design consultancy support**

Many studies mostly investigate the effectiveness of design consultancy support through conducting case studies (Amaral et al., 2012; Barragan et al., 2003; Bruce & Morris, 1994; Munsch, 2004; Parker & Anderson, 2002; von Stamm, 1998, 2004), expert opinions (Engardio & Einhorn, 2005; Goering, 2006) and some studies provide quantitative data to test their deductions (Amaral & Parker, 2008; Berends et al., 2011; Bruce et al. 1995; Palm IV, 2011; Roy & Potter, 1993). Roy and Potter (1990, 1993) investigated the outsourcing of design by British SMEs and found that project failure is due to the insufficient briefing of the design consultants and in-house disagreements within the company regarding the project.

A recent comprehensive study on the effectiveness of design consultancies provided by Palm IV (2011), in his PhD, which examined the success of product design outsourcing in companies, without making a distinction between small to large enterprises. Via use of interviews, he identified how design consultancies and client firms perceive success differently. His study suggests that consultants considered a broad range of factors for defining success including originality and design satisfaction, and clients prioritised

deliverable quality and value. He tentatively suggests that this misalignment of objectives can result in unsatisfactory project outcomes. Based on cross-case studies, he found that design consultancies are least effective at radical innovation, rather they are better at "rapid innovation in familiar product categories, designing products far more quickly than bureaucratic organisations and inexperienced start-ups" (Palm IV, 2011, p.3).

Some scholars (e.g. Ravasi & Stigliani, 2011; Walsh et al., 1992) report that at least one third of design projects fail within SMEs. Amaral and Parker (2008) present the results of their survey conducted with a hundred outsourced design projects at Fortune thousand companies. They found that approximately 30% worked flawlessly, as a result of flexible designs, efficient design management, or both. The other two-thirds failed or encountered problems due to three main causes. Similar to Palm IV's (2011) findings, misaligned aims and inconsistencies between design consultancies and client firms lead to problems. Secondly, the issue is unanticipated rivalries. If solutions require that rivals collaborate, this can create problems because rivals typically lack aspirations to source from one another. Finally, if clients of the design consultants fail to keep track of critical details concerning the process and revision of the product specification, the project is liable to fail. Mokhoff and Wallace (2005) underline a problem with the outsourcing of product development, such as failure to meet deadlines, exceeding the budget or failing to meet requirements.

Von Stamm (1998), based on three case studies, states that design outcomes received from external design providers are difficult to execute due to the lack of skills, machinery and resources available to the SME. In addition, alterations or redesigns to the original brief resulted in a delay in the delivery of the product or dilution of the original design. To von Stamm (1998), this happens because the designer fails to invest enough time in gaining an understanding of the requirements of company. She highlights the significance of understanding constraints of the project completely "not to work within them but to be able to work around them" (von Stamm, 2004, p.16). To Bruce et al. (1995), the main reasons for design project

failure include insufficient financing, poor senior management, incomplete design briefs and commissioning inappropriate design consultancies.

According to Ravasi and Stigliani (2011), SMEs do not sufficiently evaluate and appreciate the quality and potential of design proposals that come from design consultancies. Their evaluation measures are simplistic and personal such as based on like/dislike or focused on aesthetic attributes. To them, the reason is that SMEs do not have the expertise to evaluate proposals and do not want to take risks, which leaves little room for innovation and which in turn affects the flow of new design projects (Ravasi & Stigliani, 2011). Similarly, Roy and Potter (1990) claim that SMEs are inexperienced in dealing with design professionals, especially when this expertise is outside their subject domain. Additionally, SME directors/owners have not got enough time to thoroughly manage design projects. These factors lead to getting external design help at an inadequate level, or else not getting help at all. Most of these studies reached the conclusion that a lack of design management capability within businesses affects the collaboration between companies and design consultancies in a negative way (Berends et al., 2011; Bruce et al., 1995, 1999; Cooper & Press, 1995; Ravasi & Stigliani, 2011; Walsh, 1996).

Surveys of product development professionals find that many companies are suspicious of outsourcing product design, yet with nearly a third of those at large firms believing that design outsourcing is a net liability to their company (Rayner, 2005). The design-outsourcing survey conducted in 2005 by EE Times and Electronics Supply & Manufacturing demonstrates that large companies outsource design noticeably more often than SMEs, in addition "the larger the company, the lower the satisfaction level". Twenty-four per cent said "poor communication with the third party had a negative impact on the outsourcing decision" (Rayner, 2005).

The design consultancy model is also criticised by practitioners. A critical self-reflection from a design practitioner, Clement Mok (2003), identifies problems concerning the structure and delivery of design consultancy support. Mok (2003) says,

“Think about it. The way we run our businesses now is no different than it was thirty years ago. It's like a fast-food take out service: we get an order; we discuss the assignment; we go back to our studios and perform our magic; we return to our clients with three choices. Given the myriad delivery options, why is it three choices? Why not ten? Why not just one? The most appropriate one? The fundamental model of design consulting practice has lost its relevance and become another revenue-focused exercise in consumption”.

A reoccurring issue with respect to design consultancy support is that there are a considerably large number of journalistic articles and books (e.g. Brown, 2008, 2009; Esslinger, 2009; Kelley & Littman, 2001, 2005) written by founders and spokesmen of design consultancies. These publications promote the effectiveness of design consultancies in a potentially biased manner without providing independent validation. Books and non-peer-reviewed articles written by practitioners cause several problems. These problems include the poor use of terminology such as the use of the terms 'creativity', 'design' and 'innovation' interchangeably or 'innovation' and 'growth' interchangeably. In addition, they provide easy to apply guidelines for success, which may lead to a too simplistic understanding of design innovation.

#### **2.4.6 Government funded design support-DSPs**

This section describes government-funded design support schemes by providing background information about their structures, their methods of implementation and the development of DSPs. The studies about their effectiveness are presented in the following section.

The importance of SMEs for economic growth and the acceptance of design as a driver of innovation (DTI, 2005) have led to policies that promote and facilitate design innovation support for SMEs. “The Cox Review of Creativity in Business” commissioned by the UK Government, aimed to improve the competitiveness of companies through the strategic use of design and presented “design is what links creativity and innovation” (Cox, 2005, p.2). It highlights five key recommendations (Cox, 2005, p.4):

- “Tackle the issue of awareness and understanding” within SMEs by implementing national design for business programmes
- “Improve the effectiveness of Government support incentive schemes”.

- “Tackle the issue, in higher education, of broadening the understanding and skills” and broaden the understanding of tomorrow’s business leaders.
- “Take steps to use the massive power of public procurement” to drive imaginative solutions.
- “Raise the profile of the UK’s creative capabilities by way of a network of centres of creativity and innovation across the UK, with a national hub in London.”

The UK Government’s response towards these suggestions was positive, some of which have been partially implemented (Raulik-Murphy, 2010). Following the Cox Review, several DSPs have been established.

### **The visions and strategies of DSPs**

There are diverging support mechanisms with varying strategies, methodologies, infrastructures and resources depending on the economic, social and political circumstances of the country (Cawood et al., 2004). One strategy aims to fill the gap between design and SMEs by raising design awareness within a company and encouraging design practice, while another strategy aims to improve business efficiency (Tether, 2006). Borja de Mozota (2005) recommends that DSPs choose their strategy first, either for creating the customer, performance, strategic or financial value, and they should follow strategies with suitable actions.

Tether (2006) categorises the modes of design support in five groups by analysing the different types of support strategy amongst the SEE (Sharing Experiencing Europe) design project partners<sup>8</sup>. The first group is “the direct

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<sup>8</sup> The SEE Project, Sharing Experience Europe - Policy, Innovation & Design, is a “network of eleven European partners engaging with national and regional governments to integrate design into innovation policy” (SEE Project, 2013). Design Wales / Cardiff Metropolitan University (Lead Partner), Design Council, UK; Design Flanders, Belgium; Regional Development Agency of South Bohemia (RERA); Czech Republic; Danish Design Centre, Denmark; Estonian Design Centre, Estonia, Aalto University School of Art and Design, JAMK University of Applied Sciences, Finland; Business and Cultural Development Centre (KEPA), Greece; Border, Midland and Western Regional Assembly, Ireland, Castle Cieszyn, Poland. SEE platform was established in 2005, since then its role has been evolving. It used to concentrate on the effectiveness of DSPs. Between 2008 to 2011, the platform was “co-financed by the European Regional Development Fund through the INTERREG IVC programme” and focused on the policy at regional and national levels (Design Wales, n.d.).

provision of design consultancy to individual firms". In this case, the DSP functions as a design consultant. He states that this mode is not applied amongst the SEE partners. The second mode is "subsidising investments in design in individual firms" applied by The Danish Design Centre, in the 'Icebreaker' project. This mode also refers to design placements within companies and is applied by the Czech Republic scheme. The third mode is "individual counselling and advisory services". Unlike the first two modes, in this mode, a design support agency helps companies identify their needs and provide a bridge between design consultancies but do not directly address the problems of companies being supported. This support may ease the collaboration between design consultancy and the client firm. For example, the 'One-to-One Advisory programme' (Design Wales, UK), and the 'Design Pilot programme' (Centre du Design Rhône Alpes, France) use this model. The fourth mode is "workshops or seminars providing design advice". This refers to providing support and information to many companies in a one group. Examples of this type of provision include the 'Trend, Style and Colour Events' (Design Wales), and the 'Design Makes a Difference Workshops' (Design Flanders, Belgium) belong to this mode. The final mode of design support in his categorisation is "recognition of design achievements through awards or certification". This mode provides endorsement through design certificates and prizes. As recognised by Tether himself, this mode is different to the rest of them because it gives recognition to a design outcome instead of providing direct support for the design process. The Green Home scheme run by the Experimental Centre for Furniture and Furnishing, in Tuscany, Italy are some examples given by Tether.

To Tether's observation, the existence of different modes of delivery suggests that design support has "been developed on an ad hoc basis in response to actual or perceived local needs" (Tether, 2006, p.9). Er et al. (2013), on the other hand, suggest that the variety of design support is related to the level of design development. For example, in countries, such as Brazil, Turkey and the Czech Republic, where there is not enough

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Since 2012, the platform has been operating European Commission's European Design Innovation Initiative (EDII) (SEE project, n.d.).

experience of DSPs, the funded services mainly focus on new product development, while a holistic approach to design support is observed in developed countries, such as Denmark and the UK.

"In countries like the UK, where there is approximately 30 years of experience in government funded design support, there is a wide range of programs offered to companies and they also involve design consultancy on more complex issues like "design thinking", whereas in developing countries like the Brazil and Turkey, efforts concentrate on more concrete aspects of design, i.e. new product development" (Er et al., 2013, p.8).

Yet, a product-based approach can be observed in the UK; for example, iCentro de Design do Paraná, in Brazil, by adopting a Scottish model derived from Glasgow Collection, developed product designs within an 18-month timeframe (Wood et al., 2004). Their process focused on concrete design development; forty-one prototypes were displayed at the end of the project. To Wood et al. (2004), as a result, forty local companies literally saw the potential of design for improving their businesses.

### **Examples of DSPs**

The 'Funded Consultancy Scheme/Support For Design (FCS/SFD)', which was implemented in the UK between 1982-1987 (Roy & Potter, 1993), provided small subsidies for SMEs to use design consultancies. This appears to be the first government funded DSP. 'Business Links', a government-funded business advice and guidance service in the UK, provided services from various professions including design (Bennett & Robson, 1999). Its face-to-face service operated in the English regions between 1992-2001. It employed design advisors to support SMEs and to mediate between SMEs and design professionals (Bruce et al., 1999). Some other UK examples are the 'One-to-One Advisory Service' (1994-present), the 'Designing Demand' programme (2002-2010), the 'WINNOWATE Programme' (2004-2006) and the 'Brand Essentials' (2006). The other European examples include in the Czech Republic, the 'Design Programme' (1999- present); in Finland, the 'Design Start' (1999) and the 'Design 2005!' (2002-2005); in France, the 'IBC' (2002-2004) and the 'Design Mecaloire' (2005-2006); in the Netherlands, the 'Design Pressure Cooker Plus' (2005-2007); in Norway, the 'Design Support Programme' (1998- present); in Ireland, the 'Innovation by Design' (2007-2008); in Spain, the 'Predica' (2005); in

Turkey, the 'Industrial design for SMEs' (2002-present). DSPs in the world also include in Brazil, the 'Criacao Programme' (2000-2005) and in Canada, the 'Design Advisory Service' (2009).

The Designing Demand programme, a national DSP assisting SMEs, was developed by the Design Council and delivered with the collaboration of 'design associates' who are designers and who have undergone training by the Design Council and considered to be of an approved standard (Design Council, 2012). The Design Council mentions three phases in the development of the programme (Design Council, n.d.). The initial programme 'Design Works' piloted in Yorkshire for a year (2006-2007) was the first phase. The second phase was delivered between 2007-2010 in seven of nine English regions with the funding of regional development agencies<sup>9</sup> (RDAs). Delivery partners were contracted by RDAs for implementing the programme. The programme was re-structured in 2010, leading to this third phase being directly delivered by the Design Council with alternative funding from the BIS. In this phase, 50% of participant costs have been subsidised by the government. After the last re-structuring, the Designing Demand programme has been positioned under the 'Design Leadership' programme (Design Council, n.d.). Choi et al. (2012) explain the complicated structure of the second phase with a flow chart illustrating the different actors and the funding mechanism behind it, based on the data collected through interviews and desk research.

The general aim of DSPs is to increase employment (Criacao Parana Programme, 2006); to introduce design to delegates (Design Advisory Service, 2011); to support regional innovation (Design Industry Insights, 2010); to give insights to traditional manufacturers (Ceramic Workshops in Tunisia, 2007); to integrate design into research, education, and business organisations (Design 2005!, 2011); and to increase awareness towards design related subjects such as eco-design, sustainability and policy making (Design Centre Rhone-Alps, 2007). Table 2.5 exemplifies key aims of some of the UK DSPs.

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<sup>9</sup> The RDAs are partners with the Design Council, fund the programme and implement it in collaboration with the delivery team their specific region.

Table 2.5 A summary of some of the UK DSPs' aims and key objectives

Stated aim	Key objective
Winnovate- "The prime aim for the Winnovate programme is to make companies realise how they can best engage in design for themselves" (Winnovate, 2007).	Increasing SMEs' capacity to use design
CDI- "The CDI seeks to bring together design practitioners, academic colleagues, students and business partners, in order to provide innovative solutions to communication design challenges" (CDI, n.d.).	Collaborative solutions for innovation  Creating synergy
UK Brand essentials - "The aims of the workshop are to give the delegates, an awareness of the branding process, sense of ownership over the design of their own brand, advice on how to construct a design brief, advice on how Design Wales can support a branding project" (Design Wales, 2007).	Raising awareness and ownership of design process in branding
One-to-one advisory support - "Design Wales acts as an independent advisor, to raise awareness of a company's aims and to guide them through their chosen route, whether this is to find an external consultant, develop their own internal expertise or recruit experienced designers" (Design Wales, 2006).	Raising awareness and improve their capacity to use design

### The development of DSPs

In Cardiff (UK), the first international workshop on the subject of DSPs was held in 2004 (Raulik-Murphy, 2010). This event initiated the launch of the SEE design project in Wales in May 2005 in order to better promote and support the effective use of design within SMEs. The project provided important contributions to the design support area. The SEE Design Bulletin magazine, which was dedicated to inform DSPs by providing relevant information about design support, was the only publication on the topic worldwide (Raulik-Murphy, 2010). It also presents a large collection of case studies that reflect the experiences of design programmes and practices, design provision and promotion. The sixty-four case studies reported in the project provide information on the design interventions, which have been undertaken by various organisations in worldwide.

A key aim of the SEE design project is defined as "the development of techniques to evaluate, as rigorously as possible, the impact of design" and the DSPs (Tether, 2005b, p.11). However, the criticality has not been fully achieved, rather it represents a collection of studies presenting the design support projects. This bias can be observed in Tether's (2005a, p.11) quotation, "an aim of the SEE design project is to develop evaluation methodologies to show that design support *works*" [emphasis added].

Subsequently, the project has focused on the policy rather than improving the effectiveness of DSPs. Most of these reports are non-peer-reviewed papers published by programme deliverers who promote the process used in programmes and do not employ academic methods of investigation or academic theories. Papers underline mainly positive aspects of support and fail to present a comprehensive analysis of the projects including the theories underpinning implementations, the structure of operations and difficulties encountered.

#### **2.4.7 Studies on evaluating the effectiveness of DSPs**

The effectiveness of a programme can be assessed through the systematic investigation of the "worth or merit of a given intervention" (Rossi et al., 1998, p.390). Tether (2007) presents an evaluation of design support as part of the SEE project publication. His findings are based on the use of short questionnaires sent to firms which were about to receive support and which had already received support in the past (retrospective). The answers from the first group give insights about their requirements and expectations and suggest that when the company is less experienced in using design, they expect more impact from design. His findings indicate that amongst firms that received design support, 85% of them became more aware of design, whilst 80% increased their investments in design. Nearly 60% experienced an increase in sales and turnover, 50% increased their exports and 40% had increased their employment. Tether provides few details about how the research was conducted; there is no information about the number of companies that responded to the questionnaire, how the sampling was done and when and for how long these companies received design support.

Amongst peer-reviewed studies, Whicher et al. (2011) raised the question of how effectively DSPs were evaluated. Whicher et al. -organisers of the SEE project at the same time- investigated the research question by using a self-assessment questionnaire that was sent to the eleven project partners. It was found that, although the programmes ran between three to five years on average, only four programmes were evaluated annually, and five of them were evaluated at the end. Whicher et al. (2011) also observed

that the self-evaluation conducted by the programmes focused on the number of activities, such as the number of seminars held, publications produced and SMEs offered advice rather than the impact of these activities. Another finding of their study was that DSPs have intangible aims and targets. The study suggests that these intangible aims, such as to enhance the competitiveness of SMEs and to raise design awareness, are not quantifiable and objective, hence difficult to measure. Tether (2005a) also recognises the quantitative analysis is found more reliable than the qualitative analysis by many disciplines and government agencies, but he acknowledges that it is not feasible to apply quantitative analysis to design interventions. This dilemma makes it very difficult to communicate the effectiveness to non-design disciplines. Tether (2005a) suggests that measuring the 'additionality' of the programme by comparing the results of a company that has received the support, with a company, which has not received similar support. However, he fails to clarify the ways in which and how this 'additionality' can be understood.

Raulik et al. (2006), from Design Wales, reported on the findings of seventy-five case studies with the aim of evaluating the effectiveness of the transfer of knowledge as a result of design assistance provided by Design Wales to businesses. The advice is provided on an individual basis -in one-to-one meetings with Welsh companies- to address their issues. Their results show that the majority of them found the service excellent or good (n=63), while only a few of them found their service poor and two unacceptable. Most of the participants did not measure the impact of the service with any objective measure; they provided an emotional response based on feelings of satisfaction (n=21). Eleven of the participants declared that they experienced a financial impact. The data was collected using Design Wales' evaluation forms and client logs. However, the study does not present when these participants received the DSP service and when the data was collected. Although the different types of services were identified, such as web design, design management, branding, the sector/size of the businesses were not stated. Their study is also limited to the evaluation of a single DSP, which has an impact the generalisability of their findings.

Roy and Potter (1990, 1993), Bruce et al. (1995) and Choi et al. (2010, 2012) are the only independent and peer reviewed research studies found as part of this study (researchers are not the programme deliverers) that investigate the effectiveness of DSPs on SMEs in the UK. Roy and Potter (1990,1993) and Bruce et al. (1995), who investigated the effectiveness of the FCS/SFD programme, found that successful projects were achieved (especially in product and engineering design) despite receiving a relatively small subsidy. The success of the outcome is highly dependent on the motivation of the companies to continue to invest its own resources in design consultants.

The recommendation provided by Potter et al. (1991), who published a report on the effectiveness of FCS/SFD programme, is to develop a financial system that supports long-term design and innovation work in British industry, such as through bank credits-exemplifying the practice of German industry-, rather than providing a series of small subsidies to "plug a few gaps where the system failure is at its worst" (Potter et al., 1991, p.74). One of the objectives of the FCS/SFD programme was that "design should become an integral part of corporate strategy and should be incorporated into all stages of product development"; their study report that this objective was not achieved. As a follow up study, Bruce et al. (1995) surveyed 200 companies 3-6 years after their FCS/SFD projects, which allowed time for projects to be implemented. Their study suggested that the majority of the SMEs used design expertise to develop new designs, to update existing products based on existing technologies (incremental) and to obtain an outsider view of their problems, only very few businesses used design to develop technically innovative products based on new technologies or components.

Choi et al. (2012) compared two national DSPs: Designing Demand (UK) and Design Innovation (South Korea) through desktop research, in-depth interviews conducted with experts from the Design Council and the Korean Institute of Design Promotion and surveys with SMEs. Their study looks at the effectiveness in relation to the national design system and provides recommendations for DSPs. It was found that because the Designing Demand programme was delivered by RDAs, their autonomy and flexibility

appeared to be critical. They recommend context specific regional models for delivering DSPs. Choi et al. (2010) highlight the strategic relationship between design policies and design support and industrial context. Based on archival data, they illustrate that the sectors that were supported by the Design Council were not same the sectors that were rising economically. Therefore, this strategic decision also influences the effectiveness of design support.

Some other studies based on the views of experts provide recommendations on the effectiveness of DSPs. For instance, Cawood et al. (2004) suggest that since small businesses are mostly managed personally by the owner, getting into contact with him/her individually and communicating one-to-one could increase the effectiveness of interactions. Borja de Mozota (2005) criticises design promotion centres by claiming that traditional craftsmanship culture influence their strategy that essentially focuses on product design and the performance of products in the market place. She highlights that fundamental changes occurring in the design profession. Packaging design, corporate design and web design, which have become increasingly important, should be recognised as 'driving forces' and incorporated into their strategy (Borja de Mozota, 2005).

#### **2.4.8 Summary of the studies focused on design support for SMEs**

The review of studies on design support for SMEs has shown the positive value of design in innovation and competitiveness. It has indicated that the majority of design support studies concern the economic impact of design on businesses. However, measuring this impact is a challenging task. Isolating the contribution of design from other contributing elements of innovation and business growth and collecting data that can be comparable are amongst the challenges that need to be faced when measuring the outcomes of design support. The lack of definition and agreed indicators of design value makes it difficult to obtain comparable and accurate data.

The review suggests that the lack of design management capability within SMEs has been identified as a particular problem. The difficulties faced by SMEs include the solicitation of design advice, the preparation of a design

brief and the use of design in a strategic way. These issues often cause consultancies to deal with an informal brief, a tight time frame and limited resources during their collaboration with SMEs. From an SME's perspective, they also have doubts about whether or not the design consultancy sufficiently understands their needs and whether the consultancy's capabilities fulfil the needs of the company. The review also highlights the importance of a well-constructed design brief for the effectiveness of design consultancy.

The review demonstrates that the design consultancy model is also criticised by both researchers and practitioners. In the design consultancy model, design appears to be more of an operational tool than an organisational competence with strategic value. With the exception of a handful of studies, the design provider's perspective is not represented; the focus is on the client perspective that is critical to gaining understanding the problem.

The review confirms that there are a number of non-peer-reviewed papers and reports on DSPs published by programme deliverers that do not use academic methods of inquiry when presenting their results. The purpose is typically to endorse the process used in programmes; it is, therefore, unlikely to provide reliable data on the performance, the implementation process, possible challenges and guidance for progress. A few peer-reviewed papers present the opportunities and difficulties experienced implementing DSPs with some recommendations but fail to provide a theoretical framework that can be used to plan and evaluate such programmes.

The national design systems and design policies were not considered in this review.

## **2.5 Summary of chapter 2**

Chapter 2 has presented the building blocks of the contextual review. A multidisciplinary literature review was employed to identify the concepts and issues related to design support for SMEs. It provided background

information about SMEs, innovation, organisational learning and knowledge. The chapter presented studies examining professional design expertise along with the role of design in business performance and in innovation, in addition to the effectiveness of outsourcing design expertise and government funded design support mechanisms.

The studies on design expertise and depth and breadth of knowledge indicated that there is a lack of empirical data on the generalist-specialist dilemma that designers faced while supporting SMEs. This justifies the research question:

- What are the required expertise, knowledge and skills, an external designer needs to have to work with SMEs effectively?

Examining the current stage of knowledge concerning DSPs has justified the relevance of this PhD study to the field of design and evidenced two gaps that this research seeks to address: to reveal how and why DSPs are effective/ineffective; to provide a theoretical framework that can be used to plan and evaluate such programmes. This corresponds to the following research questions of this thesis:

- How, when, and in which contexts are DSPs effective/ ineffective and why?
- How can the success of DSPs be evaluated?

The missing criticality and positive assumptions that designers have in supporting SMEs were identified during the literature review. This has informed the research question of:

- What are the existing assumptions of DSPs and design consultancies while they are supporting SMEs and to what extent they are valid?

As a result, the effectiveness of design support for SMEs which is studied in Chapter 5 and 6 will be evaluated based on the detailed background information about the characteristics of SMEs and innovation and theories and key concepts relevant to (i) OL theories (e.g. experiential learning,

individual learning); (ii) designers' knowledge and expertise; (iii) explicit and tacit knowledge.



# 3 Methodology

## 3.1 Introduction

In the previous chapter, the review of the literature has helped to scope the topic and provide an overview of design support for SMEs' innovation and growth. This chapter describes the research methodology, assumptions within which the researcher is working and the design of the research study. It begins by presenting the paradigm adopted and the justification of the paradigm why it was appropriate for the research undertaken in this study. This research applied an interpretive paradigm, wherein the reality is considered as multiple, local and socially constructed. Events are understood through interpretation. This perspective views the relationship between the inquirer and the research phenomena as value laden.

The chapter also describes how the research was undertaken in order to achieve the research aims and objectives. This includes the chosen methods of data collection and analysis along with the rationale for their use strengths and limitations. Interview and participant observation methods were chosen to gather data. Interviews were undertaken with individuals representing SMEs; design consultancies and DSPs assisting SMEs and government support agencies. Ten design-led innovation and business support events that were delivered for SMEs were directly observed as an additional source of data. DSPs' websites, documents, reports and existing published case studies as well as interviews that are conducted elsewhere have also been used as secondary data. The data has been analysed in a two-fold analysis: a thematic analysis and a systematic metaphor analysis.

Appropriate criteria and methods of qualitative research are discussed thus ensuring the quality of the research. This research employed a triangulation method that enabled the researcher to gather comprehensive information about the phenomena and crosscheck the consistency of the findings in order to enhance the robustness of the research. This chapter concludes with an explanation of the ethical considerations that could have arisen during in this research.

### **3.2 Research approach and selection of the research paradigm**

Paradigm, in the most generic sense, refers to the basic set of beliefs that guides action. In a research context, by providing lenses, paradigms regulate the research inquiry. Paradigms are underpinned by philosophical assumptions determining what valid research entails and which research methods are most suitable to undertake a given inquiry. To Guba (1990), the research paradigm is characterised by the responses to ontological, epistemological and methodological questions. The answers to these questions set the basic belief system (Guba, 1990, p.18):

- “What is knowable, what is the nature of the reality? (Ontology)
- What is the nature of the relationship between the knower (the inquirer) and the known (or knowable)? (Epistemology)
- How should the inquirer go about finding out knowledge? (Methodology)”

Wand and Weber (1993, p.220) define ontology as "a branch of philosophy concerned with articulating the nature and structure of the world."

Ontological claims are the assumptions concerned with what constitutes reality. Epistemology is also a branch of philosophy that focuses on the theory of knowledge with reference to its limits and validity. Epistemology considers how knowledge can be acquired and alternative methods of investigation. Positivism, post-positivism, critical theory, constructivism, interpretivism and pragmatism are examples of research paradigms. There is no right or wrong paradigm; there exist more appropriate paradigms for particular inquiries. Although paradigm debates have dominated the methodology discourse over five decades, the current landscape enables

researchers to overcome the methodological barriers by being more flexible and less defensive in terms of applying mixed methods and meta-triangulations and to be more critical about the hegemony of paradigms.

This research has adopted the paradigm of interpretivism, which is appropriate for this PhD context. It served to gather rich data and help to comprehend the complexity of the evaluation of design support for SMEs where the reality was multiple and socially constructed. Making sense of data requires the researcher to be immersed in the research phenomena. Interpretive approaches enable the researcher to ask why and how questions and to address issues of influence and impact (Krauss, 2005).

The inquiry also draws on constructivism, which shares similar attributes with interpretivism with respect to ontology. Constructivists hold that reality is constructed in the mind of the individual, rather than it being an external single unit. The ontological position of the investigation builds on multiple realities/truths, which depends on one's construction of reality. On an epistemological level, the research assumes that the investigator is interactively linked and dependent on the object of study the object of the study shapes the investigation (Guba & Lincoln, 1998). Therefore, the findings of the research are mutually created (Sale et al., 2002). This philosophical stance is well suited to the complexity of the phenomenon being investigated.

The interpretive perspective relies on the researcher using data to create meaning. Making sense of the data requires situated knowledge.

"Knowledge is negotiated-inter-subjective and context bound, it is a result of personal construction"(Gray & Malins, 2004, p.21). In this research, the researcher was aware of her subjectivity and avoided false separations. The neutrality of the researcher was also addressed since the researcher is a designer herself. Overcoming the subjectivity was achieved by acknowledging this position, rather than neglecting it and served to question the assumptions of designers and to create critical knowledge for the discipline.

### **3.2.1 Qualitative vs. quantitative research methodology**

The research methods are often classified under quantitative and qualitative research approaches. Historically, at one level, quantitative and qualitative methods are used to refer to the distinctions about the purpose of the research, nature of the phenomena and the ways in which an inquirer ultimately understands the world. At another level, and now more often, the terms determine the ways in which the data is gathered and analysed, and the conclusions that can be derived subsequently from that data.

Researchers increasingly use a mixed methods approach in order to take advantage of both.

This study is situated in the design field, which lacks studies that are based on empirical data to reveal the value of design knowledge and design interventions for SMEs and to evaluate how and to what extent the heuristic-general problem solving methods support the design profession. The term 'measurements' refers to the assignment of numerals to objects or events according to rules (Stevens, 1946). Based on this definition, 'measurements' build on objective, quantitative and statistically relevant data. The majority of published research focuses on the effectiveness of DSPs applying a case study method and is undertaken by the programme deliverers. These studies are typically anecdotal and descriptive in nature and subject to selection bias. In addition, the nature of the data, which is complex and interwoven, includes unstructured information, hence the resulting difficulty in managing it.

The effectiveness of design interventions can be evaluated through systematic investigation of 'added value' or by measuring the merit of an activity. Nevertheless, there exist uncertainties about dimensions and characteristics of the effectiveness of design interventions. The nature of the present study requires an exploration of the issues surrounding it. Although quantitative analysis is found more reliable than qualitative analysis by a variety of disciplines such as economics or political sciences (Tether, 2005a), its use raises some concerns. For example, the Design Council (n.d.) uses some numerical results to communicate the value of design interventions, such as "consistently delivering a return of over £20

on every £1 spent on design". This claim can be interpreted easily by SMEs. Nonetheless, it reduces the unit of analysis down to its simplest terms, with the aim of achieving statistical generalisations. Thus, it fails to answer some context-related questions, such as 'in which circumstances do they spend this money'? Or 'when or how do they spend it'? The goal of this research is not related to measuring and analysing the causal relationships between variables within a value and context-free framework. This research aims to understand how, why and in which context design support for SMEs is successful. The present study undertook research to deeply examine the content, rhetoric, procedures and general principles of design interventions and identified the importance of design expertise in undertaking these roles. This research focuses on the evaluation of design support activities rather than their measurement.

Quantitative methods may fail to provide in-depth rich data (Yin, 2003). For example, Michlewski (2006), as part of his doctoral research, set up a questionnaire method to investigate differences between designers and managers. He concluded that the research process yield "a lack of meaningful and quality results" (Michlewski, 2006, p.107).

The exploratory nature of this research requires rich data that enables the researcher to become familiar with the phenomenon and to clarify the topic and develop hypothesis based on the data. Although the data was collected to describe settings and relationships within DSPs, design consultancies and SMEs, the inquiry investigated causal relationships. Therefore, it is not descriptive.

Owing to these circumstances, the data gathering was best approached by qualitative research methods. This led to setting up a series of interviews with key stakeholders of this process to obtain their opinions and experiences. This method leads to 'soft', non-numerical and 'rich' data. In addition, participant observation was employed to inform the researcher's impressions and reactions about the phenomenon. The data collection methods used in this research are explained in Section 3.4.

### 3.3 Completed PhD studies

Examining the previous PhD studies conducted in the design field reveals the use of multiple methods. Coley (2008), in her thesis, investigated 'whole system design', employed a case study method (Yin, 2003) and adopted a triangulation approach (using multiple sources to gather data to maintain reliable, less biased and critical research (Patton, 2002)). She obtained multiple measures of the same phenomenon in order to increase the validity of her results. Lera (1980) examined "designers' values and the evaluation of designs". He proposed an experimental programme in order to test a tentative theory and the value of design judgements. The experiments were devised to provide data for testing a number of specific hypotheses. McKelvie's (2007) thesis investigated the innovation processes in new firms and analysed "the role of knowledge and growth willingness" in an innovation process. It uses longitudinal study techniques, which is an observational research method that is based on collecting a series of data from the members of the study at different time periods in order to compare the findings. Michlewski's thesis (2006) aimed to clarify the role of design and designers in an organisation by conducting in-depth interviews with senior designers and design managers. He employed a grounded theory approach to establish an overall picture representing the role of design. Another PhD example from the mechanical engineering field investigated the success and failure in outsourced product development by means of design and innovation consulting (Palm IV, 2011). His research employed a combination of interviews, cross-case analysis and survey data to examine the topic. Palm IV used in-depth interviews and surveys to identify success criteria and undertook the cross-case analysis method to apply these criteria to determine the success of the selected case studies. Choi's PhD aimed to understand national design policy in relation to DSPs assisting businesses (Choi, 2009). She collected data by examining archival records and by undertaking interviews and surveys. She analysed the historical development of design policies through archived data from the Design Council and the Institute of Design Promotion (South Korea). By using an interview method, she collected data about two DSPs: Designing Demand in the UK and Design Innovation in South Korea.

### **3.4 Research design: methods adopted for data collection**

The data collected for this research is comprised of both primary and secondary data. Interviews and participant observation encompass the primary sources of data. Secondary data included DSPs' websites, documents, reports and existing case studies along with participant SMEs' websites and relevant support organisation.

#### **3.4.1 Interview procedure**

A semi-structured interview method selected for pursuing in-depth information about the effectiveness of design support offered by DSPs and design consultancies (Patton, 2002). A semi-structured approach is thought of as a hybrid method falling between structured interviews and open interviews (Wahyuni, 2012). It takes advantage of the use of predetermined themes and questions as in a structured interview but it still provides enough flexibility to allow participants to share their perspectives openly about any topic raised during the interview. This enables the researcher to uncover emerging new information or an unexpected direction in the inquiry (Rubin & Rubin, 2005). The interview method was selected as the main method for collecting empirical data concerning design interventions.

There are several recognised disadvantages associated with a semi-structured interview method. One of them is that participants may be affected by some of the findings prior to the interview process. For that reason, in this study, the participants were not informed about the findings prior to being interviewed. Another potential drawback is that participants may not have sufficient time to establish a level of trust with the researcher making it difficult to establish their true position on a given topic. This shortcoming is unavoidable to some extent; however, in this inquiry, the interviewees did not share their own personal life experiences, they shared their professional experiences. It has been recognised that there might be an issue of political sensitivity. DSP respondents might have a tendency to protect the public image of support programmes by not revealing where initiatives have failed to reach their stated objectives. Securing

confidentiality ensured a degree of trust between the researcher and interviewees (see Section 3.7 for consideration of the ethical approach).

### **3.4.2 The design and development of the interview questions**

The key themes and questions were developed based on the research questions and problems that were identified following the review of the literature review. Prior to each particular interview, relevant publications related to participants and their company websites or industrial research were consulted to gather information about the participants to guide interviews.

The researcher also considered the construction of the sentences to avoid predetermining responses. Wahyuni (2012) recommends that a researcher should hold mock interviews with peers to establish clarity before the formal interview process commences. Therefore, two mock interviews were conducted with the supervisory team. The interview schedule was also modified during the research as a result of findings derived from the earlier interviews. The interview schedule can be found in Appendix B.

### **3.4.3 Sample selection**

The key stakeholders with an interest in design innovation support to be interviewed belonged to one of the following categories: SMEs, DSPs, design consultants, and government support agencies<sup>10</sup>. To avoid the problem of perpetuating the myths of the designers it was considered better to include perspectives from other key stakeholder categories. Similarly, building solely on the experiences of SMEs can be problematic; in comparison to design consultancies, SMEs may have a limited experience in working with designers externally.

To study DSPs, seven representatives were interviewed about their experiences involving work with SMEs. The interviewees were selected from amongst design associates, project managers and directors possessing either a business background or a design background and who were

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<sup>10</sup> Government support agency in this study means non-departmental public body that encourages economic development, enterprise, innovation and investment in business.

involved in design support activities. To gather perspectives from SMEs, eight directors or owners of SMEs, who have worked with either these support programmes or design consultancies externally within the last five years, were interviewed. The companies were selected from various commercial sectors (shown in Table 3.1). In addition, six design consultants and three representatives from government support agencies were also interviewed (see Figure 3.1).

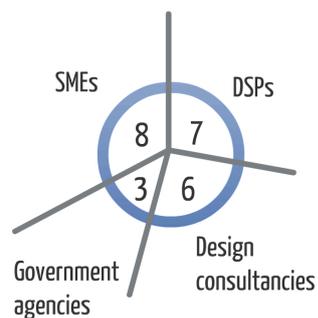


Figure 3.1 Number of interviews conducted with key stakeholders

The interviews were conducted over a fifteen-month period in 2012/2013. Each interview was between 30-90 minutes in duration and audio-recorded.

A potential drawback of qualitative studies is that sources or subjects may not all be equally credible and representative. To overcome this drawback, this study used purposeful sampling rather than random sampling. Purposeful sampling is more appropriate for qualitative studies and refers to selecting participants due to the certain characteristics that are determined by researcher's perception and research aims (Patton, 2002). The subjects should be able to provide required information for study in depth. SMEs that have been active for the last five years and external designers with a minimum of ten years experience were selected to be part of the study to overcome this potential drawback. In addition, representatives from government support agencies who had experience working with SMEs in the innovation field were selected.

To select interviewees, three approaches were used. First, some interviewees were contacted following recommendations from the researcher's own professional network. The contacts obtained in such way

originated from different sources, with no more than two distinct interviewees per peer contact, minimising the risk of the introduction of bias. Second, networking events such as non-design business support events and academic seminars offered the opportunity to get in touch with some professionals that agreed to take part in the study. Finally, most of the interviewees were contacted through 'cold calling' without the existence of previously established links. Contacts details for the latter category of interviewees were typically obtained from their respective websites. The details of the sample selection are illustrated in Appendix C.

Despite contacting a large number of stakeholders, the response and acceptance rate was low. SMEs presented the lowest response rate (8 out of 28) while the highest one was found amongst DSPs (7 out of 16). In addition, with the exception of two DSPs from Wales and England, all the respondents that were interviewed later represented Scottish stakeholders. This may be due to the fact that Scottish professionals are more prone to assist Scottish universities than professionals from other areas of the UK, and to the fact that networking events attended were held in Scotland. Note that all DSPs from Scotland and Wales responded positively to the interview requests. As a result, the majority of interviews are mainly from Scotland, all SMEs, government support agency, and design consultancy representatives interviewed are based in Scotland. The details of the interviews are shown in Tables 3.1, 3.2, 3.3 and 3.4.

Table 3.1 Details of the SMEs interviewed

Respondent of SME		Type of the industry	How the interview was conducted	Rationale for selection: The nature of their experience with designers		
				DSP	Design consultancy	In-house design
R1	Firm1	Food industry	In person	√	√	√
R2	Firm2	Oil and gas	In person	√	√	√
R3	Firm3	Timber building	In person	Firm has participated in knowledge transfer partnership with an architecture		
R4	Firm 4	Aquaculture	Phone	√	√	
R5	Firm5	Manufacturer - electronics	Phone	√		√
R6	Firm6	Sport	In person		√	

				Firm has also participated in innovation and business support event.		
R7	Firm7	Software	In person		√	
R8						

Table 3.2 Details of the government support agencies interviewed

Respondent of government support agency		Method	Rationale for selection
R9	Gov 1	In person	Engineering background. Expert work with SMEs and support SMEs Innovation.
R10	Gov 2	In person	Business background. Innovation specialist. Support SMEs
R11	Gov 3	Phone	Design background. Provides support for SMEs

Table 3.3 Details of the DSPs interviewed

Respondent of DSP		Status of the DSP	Setting of the DSP	Method	Rationale for selection	
					Interviewee's role in DSP	Interviewee's related experience
R12	DSP1	Inactive	Public funded Academic led	In person	Deliverer	Business background, with years of experience with business. Now also work for a government support agency
R13	DSP1	Inactive	Public funded Academic led	In person	Deliverer	Senior designer used to work in a design consultancy
R14	DSP2	Active	Public funded Academic led	Phone	Director	16 years experience working with SMEs.
R15	DSP3	Active	Public funded Academic led	In person	Deliverer	Experienced in design-SME collaboration. Academic.
R16	DSP4	Active	Public funded Academic led	Phone	Director	Over twenty year experience in design support for SMEs. The interviewee had run several funded programmes
R17	DSP5	Active	Public funded Practitioner led	Phone	Project manager	The participant had run several funded programmes over twenty years.
R18	DSP 6	Active	Public funded Academic led	In person	Deliverer	Academic with a business background, used to work with small businesses

Table 3.4 Details of the design consultancy agencies interviewed

Respondent of Design consultancy		Method	Rationale for selection	
			Experience/role in the company	Setting
R19	DC1	In person	Managing director/ design background	Product design and engineering support for SMEs and large enterprises. Working in a variety of sectors.
R20	DC2	In person	Managing director / design background	A design agency doing brand management, corporate identity and web design.
R21	DC3	In person	Senior product designer	An internationally recognised design consultancy firm for product design.
R22	DC4	In person	Creative director	A design agency doing brand management, corporate identity and web design.
R23	DC5	In person	Creative director	A design agency doing brand management, corporate identity, web design and packaging design.
R24	DC6	In person	Senior product design engineer	A design engineering consultancy working for oil business. He has also participated in DSP events.

In addition to the interviewees mentioned in Tables 3.1 to 3.4, a business coach-consultant who has been providing business and innovation support to SMEs for over ten years was interviewed [R25]. This was undertaken to establish the differences in approach between business advisors and designers, also to provide more insights into problems faced by SMEs. The interview was conducted in person. An academic product designer who also works as a design consultant for SMEs and runs innovation workshops with SMEs in the Netherlands was also interviewed via Skype [R26]. In addition, the respondent is a specialist in the use of design methods and tools for innovation; he is running courses in a university and a recognised author on the subject. A representative from a knowledge transfer partnership centre in the UK was interviewed in order to understand how other centres in universities support businesses [R 27]. Coincidentally, this centre was assisted by a government funded DSP to improve its practice. This helped to provide insights into the ways in which other audiences perceive design interventions. Appendix C summarises the process used by the research to contact the respondents.

### 3.4.4 Participant observation

The data collection process was supported by participant observation. The researcher directly observed a number of events (workshops, lectures and networking activities) held for SMEs. The participant observation technique allows the researcher not only to observe, but also to experience the phenomenon (Gill & Johnson, 2002). In management research, Mintzberg (1973) claims that with participant observation, the claims of organisations could be compared with the actual actions of them. This method was applied here to enable the researcher to become immersed completely in the inquiry and to experience the business support activities with SMEs to compare the claims of the DSPs with actual events. Within ten observation activities, three of them were master class-lectures facilitated by a designer; two of them were innovation workshops provided by DSPs; three of them were start-up essentials workshops held by business experts, and two were innovation workshops run by business advisors (see Figure 3.2).

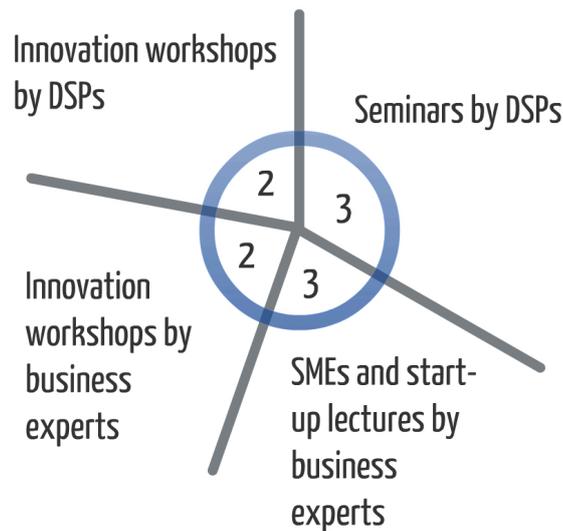


Figure 3.2 Number of observations

Non-designer events were observed in order to understand the differences in approaches and how this can influence the effectiveness of interventions. Details of the events are given in Tables 3.5 and 3.6.

Table 3.5 Details of workshops observed

<b>Format</b>	<b>Topic</b>	<b>Facilitator</b>	<b>Participants</b>	<b>Data source</b>
One-to-many workshop	Innovation and design	Design experts	20-30 SMEs	Participated in the activities, observed participant reactions to the activities, took notes about the conversations.
One-to-many workshop	Innovation and design	Design experts	20-30 SMEs	Participated in the activities, observed participant reactions to the activities, took notes about the conversations.
One-to-many workshop	Innovation	Business experts	10 SMEs	Participated in the activities, observed participant reactions to the activities, took notes about the conversations.
One-to-many workshop	Innovation	Business experts	10-15 SMEs	Participated in the activities, observed participant reactions to the activities.

Table 3.6 Details of seminars-lectures observed

<b>Format</b>	<b>Presenter</b>	<b>The details of participants</b>		<b>Data source</b>
		<b>Venue</b>	<b>Number of participants</b>	
Seminar & cocktail networking	A senior designer from a leading design consultancy	Hotel	A large group of SMEs- start ups A small group of academics.	Observation Evaluated the presentation Talked to SMEs after the presentation
Seminar & cocktail networking	A senior designer from a leading design consultancy	Hotel	A majority SMEs A small group of academic and students	Observation Evaluated the preservation Talked to SMEs after the presentation
Seminar & cocktail networking	A senior designer from a leading design consultancy	University Business school.	A small group of SMEs- a large group of design students	Observation Evaluated the presentation
Workshop-Lecture	A business expert	Business centre	SMEs and starts-ups app. 10 people	Observation Evaluated the presentation
Workshop-Lecture	A business expert	Business centre	SMEs and starts-ups app. 12 people	Observation Evaluated the presentation Talked to the participants
Workshop-Lecture	A business expert	Business centre	SMEs and starts-ups. App. 12 people	Observation Evaluated the presentation Talked to the participants

### **3.4.5 Additional sources of data**

The research also considered sources of secondary data. Secondary data was collected to obtain a more comprehensive understanding of DSP activities and to crosscheck the consistency of the findings by making comparisons between what is observed and what is studied in order to enhance the robustness of the research (triangulation). Secondary data included programmes' websites, documents, reports and existing published case studies.

The websites of all the DSPs interviewed together with the websites of the Design Council and the Design Wales were included as part of the data collection. In addition, all of the websites of the SMEs who participated in the study as well as eight SMEs that were mentioned in case studies were included in the data collection. Twenty-one case studies conducted elsewhere were included in the data gathered. These case studies were mostly retrieved from the websites of DSPs or evaluation reports. Eight reports of the UK DSPs published in the SEE project websites were examined and two additional reports published independently were also studied. In total, ten evaluation reports were gathered for analysis.

In addition, twenty-five interviews that were conducted with designers by other journalists or researchers elsewhere were used as secondary data. These additional interviews were analysed by using a systematic metaphor analysis (Schmitt, 2005; see Section 3.5.2). The majority of these interviews were often undertaken by journalists and published in magazines in the last five years. Amongst these secondary interviews, there are also a small number of interviews that were conducted by researchers for other purposes and published in the academic literature.

## **3.5 Research design: methods adopted for the analysis of data**

This section describes the ways in which the data was analysed. Since the interviews form the primary source of data, a larger part of this section focuses on describing the analysis of the interviews. The researcher employed two different analysis methods, namely a thematic analysis

method and a systematic metaphor analysis method. The thematic analysis of data served to evaluate the effectiveness of DSPs and design consultancies when supporting SMEs. During the thematic analysis of data, the interviews were first approached as statements evidencing opinions. The researcher did not look beyond what participants had said. Then, a systematic metaphor analysis was employed to look beyond what was said and written in order to present richness and complexity of meaning that might be lost through a thematic analysis method. The systematic metaphor analysis helped explore the issues related to the designer's self-image, expertise and identity in the wider context and overcome the myths of designers and SMEs.

### **3.5.1 Thematic analysis**

A thematic analysis is a flexible method that is widely used in qualitative data analysis. It was selected to uncover the prevalent patterns in interviews, the significance of responses and their broader meanings and implications (Patton, 2002). To Boyatzis (1998, p.161), "A theme is a pattern found in the information that at minimum describes and organizes the possible observations and at maximum interprets aspects of the phenomenon". To Bryman, (2012, p.580),

"A theme is a category identified by the analyst through his/her data that related to his her research focus (and quite possibly the research questions); that builds on codes identified in transcripts and/or field notes and that provides the researcher with the basis of for a theoretical understanding of his or her data can make a theoretical contribution to the literature relating to the research focus".

The thematic analysis is based on coding; it is a process of labelling themes and categories that 'emerge from the data' (Patton, 2002). Although it is often articulated as emergent themes, Braun and Clarke (2006) criticise this rhetoric in the sense that themes do not just emerge; they are a result of the researcher's active judgement. Identifying a prevalent pattern/theme is dependent on the researcher's judgement in relation to the overall research question. Coding is not necessarily dependent on quantifiable measures such as repetition of themes (Braun & Clarke, 2006; Bryman, 2013; Fereday & Muir-Cochrane, 2008). This approach allows the researcher to categorise common and repetitive themes that appeared in the interviews and also not to disregard themes that appeared only once if they are

considered to be important in relation to the context (Fereday & Muir-Cochrane, 2008; Patton, 2002).

Thematic analysis also has its disadvantages. A frequent criticism of the method is the lack of clear and concise guidelines that explains how it should be conducted (Braun & Clarke, 2006). That opens up the research to potential criticism that 'anything goes' (Braun & Clarke, 2006). This critique is not specific to the thematic analysis method. A variety of methods in qualitative analysis are criticised in terms of lack of clarity and vagueness. Sandelowski and Barrosa (2003, p.906) state, "what constitutes a grounded theory to one scholar might be nothing more than a content analysis to another" thereby highlighting the divergent views amongst scholars on what a method entails. To address the acknowledged limitations, the process of analysis adopted in the present research is further explained in the following sections.

#### **The procedure applied to analyse the effectiveness of DSPs**

The present research applied a hybrid approach of thematic analysis (Fereday & Muir-Cochrane, 2008), which involves a deductive approach that is using a priori template of themes and an inductive approach that incorporates data-driven themes. In order to achieve a systematic analysis, a template of themes was used by adopting the structure outlined by Rossi et al. (1998), in their seminal book, "Program evaluation: a systematic approach", on social programme evaluation (see Table 3.7). To Fereday and Muir-Cochrane (2008), the use of a priori template increases the credibility of a study by providing a clear trail of evidence and transparency. The categories that form the template are "evaluation of programme need", "evaluation of the programme theory", "process evaluation" and "result evaluation". These categories guide the researcher in identifying areas to look at and organising the text and themes. Rossi et al. (1998) also include "efficiency assessment" which is concerned with evaluation of the programme cost. The cost-effectiveness aspect was considered to be beyond the scope of this research because this research approached evaluation as a knowledge production mechanism to inform the theory and the practice of design research rather than to identify whether a particular

programme is successful or not. The role of cost efficiency is less relevant for the development of design knowledge and methods to deliver design for SMEs. Moreover, this type of data is sensitive and rarely available for researchers, therefore this step is omitted.

Table 3.7 Deductive themes based on Rossi et al.' s (1998) programme evaluation

<b>Evaluation of the need for the programme</b>	<b>Evaluation of the programme's theory</b>	<b>Process evaluation</b>	<b>Result evaluation</b>
What is the nature of the problem that the programmes aim to address?	What are the assumptions and theories that the programme adopts in order to solve the problems of the target group?	How is the programme implemented? What types of activities are involved in the programme?	What are the results of the programme? Is the intervention effective in achieving the desired outcomes?
Objective: To define the problems of the target group	Objective: To elicit the programme theory To assess the programme's theory in achieving its aims and assess whether this theory is plausible.	Objective: To identify the structure of operations and service delivery To identify whether these operations coincide with the programme's theory	Objective: To identify the outcomes of the programme To identify whether these outcomes are the best for the target group

Inductive approach, as a more typical form of thematic analysis, refers to the process in which significant texts form the themes and codes. The coding process was conducted in following steps as described in Figure 3.3. Although the process of analysis is presented as a step-by-step procedure, the process was iterative rather than linear.

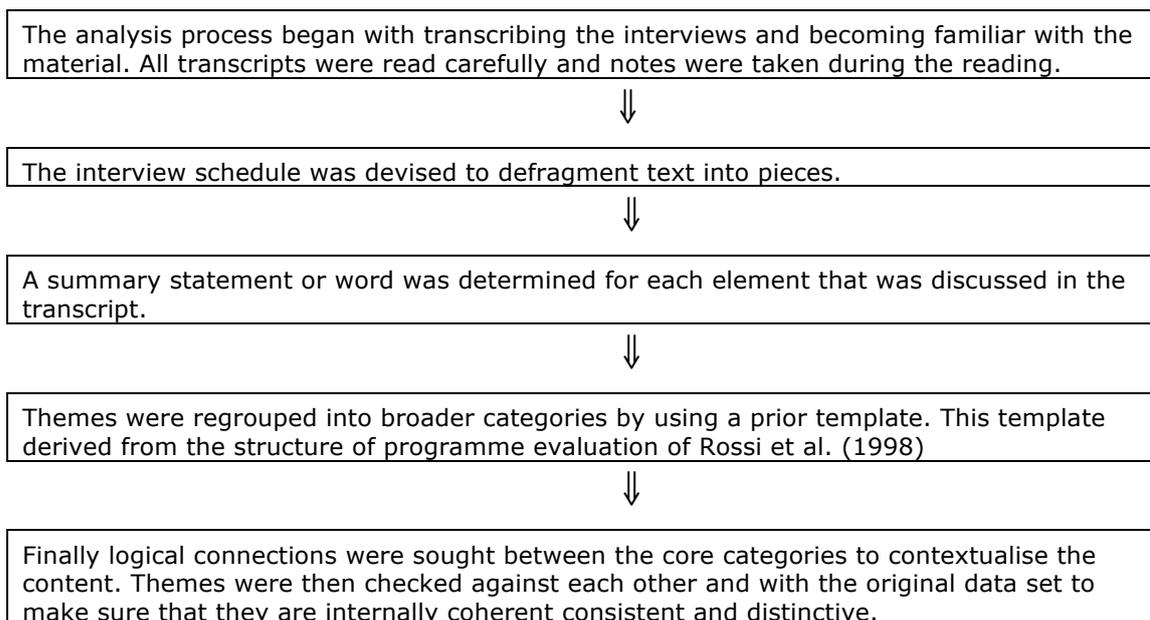


Figure 3.3 Steps undertaken to analyse the data

Table 3.8 exemplifies the inductive process of data analysis to reveal themes in relation to interview questions. Table 3.9 illustrates how the hybrid approach was applied.

Table 3.8 An example of data driven codes (inductive process)

<b>Interview question</b>	<b>Excerpts from SMEs' responses</b>	<b>Summary of the data driven from excerpt</b>	<b>Theme</b>
What does innovation mean to you?	"Obviously doing things differently. But the construction industry is very <i>conservative</i> , because it is producing a long-term durable product. If something is <i>tried, tested, and proven</i> we are keen to keep doing that, because we know it is <i>safe</i> ". R3, SME owner-manager	Cautious against innovation because of the industry Value of tried and tested methods	Risk averse and cautious
	"Innovation is to me when you come up with a new way of doing something that has obviously got benefits so everybody else is doing so. I don't think we do that in how we deliver services. It is more <i>small innovations rather than one big tada</i> . It is all about lots of small improvement you can make in how we work." R7, SME owner-manager	Cautious against big-sudden changes Value small improvements	Incremental change
	"You've got to be <i>careful</i> that you don't become <i>too innovative</i> ". R2, SME non-owner manager	Cautious avoid big changes	Risk averse and cautious

Table 3.9 The hybrid approach applied to evaluate effectiveness of DSPs

<b>Deductive themes Rossi et al.'s framework of programme evaluation</b>	<b>Areas to look at Emerged from the literature, interview questions and responses</b>	<b>Examples of inductive themes</b>
Need assessment	SMEs' approach to innovation	'Innovation and growth'; 'risk averse and cautious'; 'incremental change'
	Sources of innovation	'Personal knowledge'; 'customer feedback'; 'external support'
	Barriers to innovation	'Lack of time and resources'; 'lack of planning and strategy'
	SMEs' approach to design	A positive approach (that goes beyond style and form): 'design as a process'; 'design as an iterative process'; 'design as an integrator'; 'design as problem solving'; 'design as a software tool'  Designers' perspective: 'SMEs are result-oriented'; 'a lack of understanding of strategic design'
Evaluation of the programme theory	DSPs' approach to addressing SMEs' problem	Support SMEs with a design methodology without designing on their behalf
	Theories used	'Design thinking'; 'human-centred design'; 'design strategy'; 'service design'
	Barrier to design innovation	Limited understanding of design at government level
Process evaluation	The structure of the DSP operation	The sequence of DSP support Elements of DSP operations: 'one-to-one workshops'; 'one-to-many workshops'
	DSP workshops	Effective content and delivery: 'a common language'; 'relevant content'; 'clarification of value'; 'experiential'; 'time management'  Limitations of workshop format: 'SMEs unfamiliarity'; 'lengthy'; 'a common method'; 'not immediate outcomes'; 'not enough PR'; 'last minute cancellations'
	The role of advisors	The importance of facilitators and design expertise: 'facilitator/advisors influence the process'; 'characteristics and expertise of facilitator'; 'sector specific knowledge'
	The types of support provided by DSPs	'Signposting-promoting'; 'facilitating-empowering'; 'advising'
	The focus of DSPs	Positive aspects Narrow project definition: 'better communication'; 'better use of expertise'  Negative aspects of narrow project definition: 'similar results'; 'restrictive'; 'hampered by the barriers of sector'.
	The position of the DSPs in design industry	'Intermediate role'; 'independent advisory role'
	Design tools and methods used for design interventions	The value of tools: 'articulating tacit knowledge'; 'identifying problem root' Selection of tools: 'developing tools vs. using an existing tool'

		Characteristics of tools that are effective in DSP workshops: 'intuitive and interactive'; Criteria for selection: 'Engaging and collaborative; 'appropriate use of language for the context'; 'clarity of instructions'; 'appropriateness for tackling the design problem'; 'depending on the SME's needs'; 'depending on the size of workshops'; 'appropriateness to the audience's background and learning styles'
	The Selection of SMEs participating in DSPs	'Responsiveness', 'potential for growth'; 'curiosity'; 'financial readiness'
	The duration of support	'Longer-term funding more effective'; 'not enough time for operations'; '1 <sup>st</sup> year is setting up'; 'high level planning'; 'Not enough time to follow-up'
Evaluation of the results of DSPs	Outputs	'Number of workshops-seminars-events'; 'number of participants-SMEs attention to DSP activities'  Tangible design outputs: 'design audit reports'; 'creation of design brief'; 'new actionable ideas for products and services' Relevance: 'the value of design outputs for SMEs'
	Outcomes	'Satisfaction'; 'new perspective'; 'behavioural change'; 'learning-knowledge sharing and use'; 'business outcomes; cultural change'  Opportunities: 'networking and interaction' Barriers faced by DSPs: 'information flow'; 'innovation is harder to achieve'; 'impact now'  Barriers faced by SMEs: 'no time for reflection on the DSP outputs'; 'not many solutions to apply in the commercial realm'; 'it takes time to apply suggested solutions'
	Measuring the results of DSPs	'Qualitative measures vs. quantitative measures'; 'isolating DSP outcomes amongst other factors'; 'a lack of systematic measurements amongst SMEs'
	Clarifying the results of DSPs	'Potential misalignment between SMEs' expectations and DSPs' delivery'; 'Being transparent to SMEs'

### **The procedure applied to analyse the effectiveness of design consultancies by focusing on expertise**

To analyse the generalist-specialist dilemma, again a hybrid approach of thematic analysis (Fereday & Muir-Cochrane, 2008) was adopted. The critical framework of expertise formed the deductive approach. Unlike the analysing the effectiveness of DSPs, in which a predetermined template was used, when analysing design expertise, the theories of expertise as described by Holyoak (1991) was used as an overarching framework (as

discussed in Section 2.3.4). Theories or the concepts of a particular theoretical orientation serve to analyse and to interpret the research data in qualitative studies (Braun & Clarke, 2006). The thematic analysis method enables researchers to use different theoretical frameworks to interpret the data (Braun & Clarke, 2006).

Data-driven inductive themes emerged in relation to the overarching framework are 'sector and task specific knowledge', 'creativity' and 'collaboration and mutual understanding'. The generalist-specialist dilemma is a dichotomy, based on oppositional values; therefore, who owns the value is critical. In addition, the literature review showed that the design provider's perspective is often not represented; the focus is on the client's perspective (see Section 2.4.8). To stress the different views on the subject matter, SMEs' and designers' perspective were analysed separately. Tables 3.10 and 3.11 illustrate the thematic analysis of data.

Table 3.10 An example of coding process

Quotation	Summary Statement	Theme
"I just would not use any designers. Here, we need marine designers, or someone who spent a lot time on boats, something like that. We had some work with designers who did not have that kind of background, what he did was completely wrong and we just had to walk away from each other. So he worked for us a couple of times, but still it was wrong. So the thing is to get designers who have relevant background". R4, SME owner-manager	Working with a non-specialist designer lead to unsatisfactory experience	Sector specific knowledge
"A good portfolio is not enough to take the risk and work with a design consultancy that has not designed a climbing wall or a skateboarding path before." R6, SME non-owner manager	A record experience in the SME's sector is sought after otherwise it can be risky	
"I think there is a barrier to designers not knowing the capabilities of the technology." R7, SME owner-manager	A lack of knowledge in their field.	
"If there is somebody else who has been doing sport specific work and advertising marketing work for the last ten years I go with them." R6, SME non-owner manager	Looking for designers with experience in their own field.	

Table 3.11 The framework applied to analyse design consultancies in relation to design expertise- the perspectives of SMEs and designers

<b>Themes</b>	<b>SMEs' perspective</b>	<b>Designers' perspective</b>
<b>Sector specific knowledge</b>	Sector specific knowledge is essential for SMEs to commission design consultants	It is difficult to enter and compete in a market without a specialist portfolio Type of industry dictates the specialist knowledge required
		The size of the design company affects the decision whether to recruit specialist or generalist designers
		Availability of jobs in a geographical location affects the generalist-specialist career decision of designers
<b>Creativity</b>	Decline of creativity in time with expertise	Being specialist is mundane and surpass individual creativity
	Sought novelty and different solutions	Being generalist provides more sources of inspiration
<b>Collaboration and mutual understanding</b>	Difficulty of articulating their needs to designers Importance of being understood	SMEs do not understand the design service provided
<b>Conditions leading to mutual understanding</b>	Importance of face-to-face communication SMEs' ideas should be incorporated in the process SMEs' knowledge should be valued during collaboration	Removing the barriers of consultant and client- a personalised relationship Importance of first meeting Importance of trust Long-term relationship

### 3.5.2 Systematic metaphor analysis

Systematic metaphor analysis as a qualitative research method (Andriessen, 2006; Andriessen & Gubbins, 2009; Schmitt, 2005) is based on the conceptual metaphor theory of Lakoff and Johnson (1980). Their theory suggests that metaphors are not ornaments of our language; they structure our perceptions and understanding. Metaphors affect the way we categorise experiences and organise our ideas. This theory makes it possible to reveal both individual and collective patterns of thought and action by analysing metaphors (Schmitt, 2005).

Investigating the design expertise from solely interviews conducted with designers might result in a situation that propagates designers' own myths and aspirations. Based on this theory, this analysis investigated the visual and cognitive metaphors related to design, in particular, design expertise, to uncover patterns of thought and controversies. The analysis was applied

to disclose what patterns of thought were evident those related to designer's self-image, design expertise, credibility and trust.

Systematic metaphor analysis is an inductive approach that seeks to discover those underlying metaphors that are already in use, as opposed to a deductive approach, which involves taking a metaphor and imposing it on a particular organisational phenomenon (Schmitt, 2005). The procedure for undertaking a systematic metaphor analysis suggested by Schmitt (2005) and Andriessen (2006) was adopted. The procedure utilised in this analysis included four steps.

The first step was to define a target area for metaphor analysis, and the area selected was design expertise. The second step was to sample a selection of text from the field of investigation. The sample texts were chosen from both primary and secondary data sources and some central texts that discuss key theoretical concepts or debates on design expertise from the literature. Thirdly, the researcher identified the related metaphors through review i.e. scanning the texts. Critical and relevant metaphors were selected based on the following criteria:

- Re-occurrence: Is it frequently used? Is it a repeating metaphor?
- Representational quality: Is it clear and expressive? Is it valid?
- Relevance: Is it related to one of these topics; design knowledge, design skills, the design process, and the role of design?

Fourthly, these metaphors were analysed within a framework focusing on their linguistic roots and associated mindsets and theories. Schön's generative metaphor framework was utilised to interpret the metaphors (Schön, 1979). He investigates the implications of 'seeing as' within concrete experiences in which metaphor acts as a generative force for the construction of meaning and becomes the framework for interpretation which creates particular ways of knowing. This method goes beyond using metaphors as a matter of comparison i.e. mapping meaning between the source and target domain. A typical example of this type of mapping is perhaps the Apple Macintosh desktop metaphor.

Schmitt (2005) also suggests a final step that involves determining the rate of recurrence of metaphors use by counting the number of metaphors and dividing this by the total number of words and phrases in that particular text. To his view, the frequency will show the significance of a metaphor in a text. Perhaps, this step is useful for analysing primary metaphors (Lakoff & Johnson, 1980) such as collecting- recalling knowledge and for seeking the most common metaphor. However, if it is a discourse metaphor (e.g. Europe is a house), the numerical calculation will not uncover the importance of metaphors and will not contribute to the overall discussion. As a result, the researcher believes that this step is not essential for this analysis; hence, it was omitted.

There are a number of limitations when using a systematic metaphor analysis. A limitation is that not all metaphors maintain the same meaning when applied by individuals from different cultures. Slight differences in meaning occur between different languages, and context-dependent thematic shifts may arise (Chilton & Ilyin, 1993). Interpretation is the basis of analysis. Metaphors functioning in public discourse cannot be fully analysed separately from factors such as local tradition, history or culture. Therefore, the reader should note that metaphors occur within this study are based in a western culture. Selected metaphors were interpreted by a Turkish researcher who speaks English as a second language. This limitation should be noted with the concern that metaphors are cognitive tools rather than aesthetic elements of the language (Lakoff & Johnson, 1980). Moreover, the cultural framework for interpreting the metaphors is design and therefore the researcher's design experience would ensure sufficient familiarity, allowing her to interpret the data correctly.

### **3.6 Quality of research**

Validity, reliability and generalisability, which have origins in a positivist paradigm, are important for establishing the quality of research and enhancing the legitimacy of the findings from the research study (Golafshani, 2003).

Positivism puts an emphasis on certainty as part of validity, which is determined by data that truly measure validity. In an interpretive paradigm, on the other hand, validity relies on defensible knowledge claims. Validity should be linked to 'trustworthiness', rather than 'truth' or 'value', which are fundamentally positivist (Guba & Lincoln, 1998; Sandelowski, 1993). Guba and Lincoln (1998) state that qualitative studies must satisfy the criteria set for trustworthiness. These include credibility, transferability, dependability and confirmability. Credibility concerns the truthfulness of the data collected.

As this research applies interpretivism, the researcher has emphasised the trustworthiness of the findings to ensure the robustness of this research. Triangulation ensures the trustworthiness of qualitative research findings (Patton, 2002). Triangulation is an approach that enables researchers to gather multiple perspectives arising from multiple data sources in order to enhance the reliability of the research (Patton, 2002). Within this research, trustworthy findings were achieved by using methodological triangulation and data triangulation. In this study, methodological triangulation was undertaken by using multiple methods to collect data including interviews, participant observation and desk research. Data triangulation, consulting multiple informants, enabled the researcher to compare opinions from different sources and to decide if these opinions and experiences can be corroborated. In addition, these different perspectives served to obtain a more comprehensive view of the effectiveness of design support for SMEs. The findings of each method along with the secondary data were compared. The theories and concepts also served to question the findings. This cyclical process verifies the findings of the research and confirms its validity.

Reliability can be defined broadly by the "dependability, consistency, and/or repeatability of a project's data collection, interpretation, and/or analysis" (Given, 2008, p.753). There are different perspectives on how reliability is perceived. In principle, a positivist perspective expects that the research can always be replicated to yield the same results as long as the same research procedure is followed (Yin, 2003). It produced the same results without depending on the researcher carrying out the inquiry (Yin, 2003). Instead of repeatability, Sandelowski (1986) suggests 'leaving a decision

trail' to achieve reliability in qualitative studies so that the reader is able to track and verify the research process. This entails precision in the research steps and analysis. In this research study the 'decision trail' was achieved by application of relevant theories and frameworks to guide the design, data collection and analysis (see Section 3.5 and Chapter 4).

In an interpretive paradigm, reliability also concerns interpretive awareness. In this inquiry, the researcher recognised her subjectivity and avoided misleading errors during interpretation. The researcher also acknowledged that this inquiry is prone to participant/observer bias. Second-hand data gathered from design associates also involves risk because it may only reflect successful involvements, creating a confirmation bias resulting in problems with comparing and measuring achievements of design interventions. The websites of companies and DSPs, their brochures and documents are also examined for consistency and accuracy in order to minimise possible bias and errors.

A positivist paradigm approaches generalisability with concerns such as how likely the observed patterns in a sample will apply to an entire population. It emphasises the measurement through experiment sampling process to ensure generalisability. Repeatability allows the positivist research to arrive at high levels of generalisability. Instead of generalisability, transferability is often used in qualitative studies (Golafshani, 2003). Generalisability in qualitative research, on the other hand, focuses on the findings generated in one setting, or from the study sample, to ensure that it will have wider applicability (Myers, 2000). Myers (2000) claim that generalisations in qualitative research are fundamentally context specific, and the representativeness of participants is important for achieving generalisability. She also claims that although it is possible to reach partial generalisations for similar populations, generalisations "should not be a primary concern of qualitative research". Because reality is socially constructed, it is subject to change (Berger & Luckmann, 1991), and with a different construction, the reality would look different. Therefore, an interpretive paradigm is not concerned with the generalisability of the research. Following an interpretive paradigm, this research did not aim to reach an absolute or certain truth, but rather representations of truth that

are socially constructed to improve the effectiveness of design support for SMEs. This research aimed to reach research findings that are used by other DSPs, design consultancies and researcher's peers in this domain.

The research also sought to satisfy both methodological and interpretive rigour. Methodological rigour refers to good practice in undertaking the inquiry, and interpretive rigour refers to the trustworthiness of the interpretations made (Fossey et al., 2002). Tables 3.12 and 3.13 illustrate how the quality of research was achieved through methodological and interpretive rigour that is guided by Fossey et al. (2002).

Table 3.12 Evaluation of the quality of research methodology adopted in this study through methodological identified by Fossey et al. (2002)

<b>Methodological rigour</b>	
<b>Consideration</b>	<b>Steps that are taken to address the issue</b>
Congruence	Chosen methodology fits the research questions and chosen methods are suitable for the methodology as discussed in Section 3.2.
Responsiveness to social context	Research design developed in this study was responsive. The researcher engaged with participants and became familiar with the context (see Sections 3.4 and 3.4.4).
Appropriateness	<p>Sampling strategies were suitable for this study as discussed in Section 3.4.3 and Appendix C.</p> <p>The key stakeholders that are identified through the literature review were included in the sample. However, DSPs were not keen on sharing their SME contacts for an interview. Therefore, not all the SMEs interviewed were supported by DSPs.</p> <p>The research aim informed the interview schedule. The linkage between research aim and interview question is plausible (see Appendix B).</p>
Adequacy	<p>A sufficient number of sources were consulted to develop a full description. There exists a consistency in respondents' claims. In addition to interviews, the participant observation method provided deep familiarity with the phenomena and helped to view the full picture.</p> <p>This thesis provided a detailed description about participants and why and how they were selected (Section 3.4.3.).</p> <p>Data gathering and analysis were undertaken in parallel, in a cyclical manner.</p> <p>Emerging ideas and themes derived from the analysis were checked by using multiple methods and sources of information.</p> <p>The written findings chapter have been adequately detailed to enable reader to understand the context.</p>
Transparency	<p>The data gathering and analysis process have been undertaken to be as transparent as possible. Verbatim interview transcripts are available yet not published to maintain confidentiality.</p> <p>Competing and rival accounts were addressed in the analysis and these points were presented.</p>
Authenticity	<p>Participants' quotations were presented in their own voices.</p> <p>A range of voices and views were presented.</p> <p>Participants who requested reviewed the analysis. However, participants were not involved in data analysis</p>

Table 3.13 Evaluation of the quality of research methodology adopted in this study through interpretive rigour identified by Fossey et al. (2002)

<b>Interpretive rigour</b>	
<b>Consideration</b>	<b>Steps that are taken to address the issue</b>
Coherence	Coherence means the linkages between data and findings are plausible. All interviews were taken into account to see overall picture. Amongst them 24 respondents directly quoted at least once. No other researchers were involved in analysing the data, therefore considering corroborating and competing interpretations were not applicable.
Reciprocity	Participants were not involved in presenting the study.
Permeability of the researcher's engagement and interpretations	The researcher role is discussed widely and made transparent. The study changed the researcher's initial values about design thinking, design expertise, design support and SMEs.

### **3.7 Ethical considerations**

Ethics is a question of responsibility (House, 1990; Joungtrakul & Allen, 2012) and primarily focuses on responsibilities against research participants. House (1990) states social and moral responsibilities of the researchers; researchers have to respect the participants' rights, values, needs and wants before, during, and after the research had been conducted. In this study, respecting the privacy, confidentiality and anonymity of participants was the most essential obligations of the researcher. Consequently, these issues were considered throughout the research and how they were addressed in this inquiry are summarised in Table 3.14.

Table 3.14 Ethical considerations

Ethical considerations	Steps that are taken to address the issue
<p>Informing participants (Are participants informed about the scope of the study and what is expected from their contribution?)</p>	<p>Each participant was sent an invitation email that clearly states the aim of the research and why he or she was asked to participate in the research. In line with this, the letter that was provided to participants is given in Appendix D. At the beginning of the interview, this information was also repeated to notify the participants and confirm their permission. At the end of the research, respondents were given the opportunity to ask questions about the interview, the inquiry or the researcher to add any information that was not discussed during the interview (see Appendix B).</p>
<p>Voluntary participations</p>	<p>It was made clear to the participants that their participation was voluntary. Interviews were finalised when participants indicated they wanted to finish.</p>
<p>Risk to participants (Is there any risk that this study may harm participant?)</p>	<p>Due to the nature of the study, there is no risk of personal injury either physical or psychological to participants within this study. The researcher duly respected cultural sensitivities and avoided questions that might offend participants.</p>
<p>Privacy, confidentiality and anonymity (Does the researcher uphold participants' privacy, confidentiality, dignity, rights and anonymity?)</p>	<p>Privacy and confidentiality were the most significant obligations concerning this study. All the participant data was kept confidential.</p> <p>Any identifying characteristics revealing participants' identity was removed before dissemination of information with third parties in the form of publications or presentations.</p> <p>The information that respondents provided has not been used for any other purposes, which are not relevant to this study.</p> <p>Accountability was emphasised. Where applicable and when required, the written transcripts of interviews were returned to participants prior to further analysis so that they could check the accuracy of the transcriptions.</p> <p>For the sample interview transcriptions, the interviewees were asked for permission. For participant observations, the researcher did not record audio or visual data.</p>
<p>Honesty and trust (Does the researcher truthfully represent the data?)</p>	<p>The research evidenced all the claims by respecting the context of their use. No data was removed from the original context and used partially to mislead the research.</p> <p>In all publications and in the analysis section of this thesis, where a direct quotation with their name was used, the participant were asked for their permissions to be quoted and the context was shared with the interviewees.</p>
<p>Advocacy (How should researchers deal with the situation if participants display illegal behaviour or harmful attitudes?)</p>	<p>This issue did not arise during this study.</p>

### **3.8 Summary of chapter 3**

The research adopted an interpretive paradigm. In this research study, data was collected in the form of primary and secondary data. The primary data was gathered through a series of interviews with stakeholders of design support systems and through participant observation. The secondary data constituted the reports and case studies provided by DSPs, the websites of SMEs and centres and other publicly available data that were relevant to the research. The emergent data was analysed by adopting a thematic and a systematic metaphor analysis approach. A thematic analysis method was selected to evaluate the effectiveness of DSPs that are assisting SMEs with innovation, so the data was used as evidencing themes. Following this, to evaluate design expertise in the wider context a systematic metaphor analysis approach was employed. Triangulation was adopted to reduce possible biases, minimise ambiguity and improve the robustness of findings.

# 4 Findings concerning the effectiveness of DSPs

## 4.1 Introduction

Chapter 2 demonstrated that despite considerable time and effort spent on design-led business support for SMEs, there is still a lack of knowledge about the mechanisms for delivering it effectively. This chapter, therefore, presents the key results of analysis of interviews conducted by the researcher by using a thematic analysis method along with participant observations, reviews of websites and reports of DSPs in the UK. The procedure adopted for data collection and analysis was described in detail in Sections 3.4 and 3.5.1.

Key findings have been divided into four headings by building on the structure that was identified by Rossi et al. (1998) on social programme evaluation (see Section 3.5.1, Tables 3.7 and 3.9). The chapter begins by introducing the results of the first theme, which is the 'need for the programme', by looking at the conditions that DSPs are intended to address. Then, it moves on to the 'evaluation of program theory' theme, which presents the findings concerning the underlying model of DSPs. Thirdly, the 'process evaluation' theme covers the findings related to program operations, implementation and service delivery. The final theme of the chapter is 'evaluation of the outputs and outcomes', which presents the results of programme interventions.

## **4.2 The need for the programme**

Rossi et al. (1998) suggest that an evaluation should start with a needs assessment by identifying the specific problem areas that necessitate to be addressed. "If there is no significant problem or no perceived need for intervention, there is generally no basis for affirming the value of a program that purports to address this non-problem" (Rossi et al., 1998, p.64). The rationale for mechanisms supporting SMEs externally to enhance their competitiveness and business performance has been presented in previous chapters. Sections 2.2 and 2.4 have presented the key difficulties for SMEs in engaging with innovation and design as indicated by the literature review. This study further elaborates on the issue by presenting the findings of this research, as it is a key step for evaluation, and concepts derived from these findings will support the assessment of DSP implementation and outcomes. To understand the need for the programme, themes including (i) SMEs' approach to innovation; (ii) sources of innovation; (iii) SMEs' barriers to innovation; and (iv) SMEs' approach to design are presented.

### **4.2.1 SMEs' approach to innovation**

Regarding their understanding of innovation, the majority of SMEs that were interviewed for this study expressed a belief in the potential value of innovation for improving their competitive position, reducing costs and expanding their customer base. Amongst the SMEs interviewed, incremental innovation through smaller improvements were usually preferred to radical innovation steps (R2, R3, R7). Some SMEs from oil and gas and construction industries described themselves as 'conservative' and highlighted the importance of tried and tested methods (R3, R2). These SMEs were cautious in terms of embracing innovation because the studied SMEs avoided taking risks. Two medium sized SMEs mentioned they considered both incremental and radical innovation steps. Only one small business respondent, R4, said that he is pursuing radical innovation steps because of his personality indicating the influence of the owner-manager in the company's strategy.

“...Because, that is in my nature I guess, [Laughing] because, I found that it much more “exciting and interesting and I am much more passionate about radical or disruptive innovation. I’m not about some slight changes and improvements.” R4, SME owner-manager

Table 4.1 evidences the opinions of SMEs regarding their approach to innovation (an extended version of this table is in Appendix E, Table E.1).

Table 4.1 SMEs’ approach to innovation

<b>Example quotation</b>	<b>Summary statement</b>	<b>Theme</b>
“We’ve planned to double our profit in the next 10 years. Large part of that is through innovation, so new products, new product introduction.” R1, SME non-owner-manager	Innovation is important for growth	SMEs’ approach to innovation
“You’ve got to be careful that you don’t become too innovative”. R2, SME non-owner-manager	Cautious-avoiding major innovations	
“[Innovation is] Obviously doing things differently. But the construction industry is very conservative because it is producing a long-term durable product. If something is tried, tested and proven, we are keen to keep doing that because we know it is safe.” R3, SME owner-manager	Important of tried and tested methods	
“Innovation is to me when you come up with a new way of doing something that has obviously got benefits so everybody else is doing so. I don’t think we do that in how we deliver services. It is more small innovations rather than one big ta-da. It is all about lots of small improvement you can make in how we work.” R7, SME owner-manager	Small changes rather than big steps	

#### 4.2.2 Sources of innovation and how it is developed

The majority of the SMEs (R1, R2, R3, R4, R5, R6, R7) approached for this study uses their customers and employees as a source of information and the basis for developing innovation. Amongst this group of respondents, R1 and R2 reported that they had developed ideas for innovation on a systematic basis. These initiatives included the use of an idea-box, internally held meetings and workshops held with external or internal facilitators. The other SME respondents (R3, R4, R5, R6, R7) did not mention a systematic process for developing ideas for innovation. Their expertise in there is often the source of their ideas and do not have a systematic method for an idea generation process. It appears that most of the knowledge within these companies is tacit. Table 4.2 presents the findings with respect to the ways and means SMEs develop innovation.

Table 4.2 Sources of innovation and how it is developed

	<b>Sources of innovation</b>	<b>Systematic/established approach or methods</b>
SME1	<p><b>Customer feedback and idea generation sessions</b></p> <p>"We have lots of ways of doing that. Some of the ideas come from our customers. [...] They contact us and describe, "we want xyz". The ideas may come from other business functions. We have run idea generation sessions internally sometimes with external facilitators. We have a range of projects. There are 6 projects running in collaboration with external research partners, universities and research institutes." R1, SME non-owner manager</p>	<p><b>Systematic approach</b></p> <p>We have a computer system called 'ABCD'. We enter all the ideas, categorise them, and then decide how they would be carried out. They are also tracked in the system. R1, SME non-owner manager</p>
SME2	<p><b>Customer feedback, internal idea generation and following competitors and novelties</b></p> <p>"I guess we have two ways of doing that. Customers are frequently asking for either a new product or new hybrid solutions, and there is the internal debate on where we should be going. The percentage is about 50/50 between internal idea generation and external customer feedback. [...] We read what's on websites, what's in publications, go to conferences, go to exhibitions, just try to get a sense of what the competitors are doing, competition analysis, geographical analysis, is there a particular country doing more than gas work or country that has a security problem, maybe the UK has a project that need our help. [...] We have a marketing team which looks after them for us. We also have a very good PR marketing tool. We are very well connected with the general agencies out there. R2, SME non-owner manager</p>	<p><b>Systematic approach</b></p> <p>"We have a system called 'ABCDE'. It is a discipline that we introduced in the last 3-4 years. When the idea comes in, it is described commercially given some figures to support the development. Then, it is reviewed by the technical and the marketing team, and the decision is made whether to progress with that idea, and at various stages, we review the idea. We evaluate again whether it is still the product we need or whether there is a technical issue, we can't deliver it or marketing has gone from it. So it is a kind of process that typically last from start to delivery between 12 and 18 months". R2, SME, non-owner manager</p>
SME3	<p><b>The owner's experience in the sector and customer feedback</b></p> <p>"Simply, I was born and brought up in the countryside, which leads me perhaps to think a bit differently from people who are from the cities. While working in the countryside, we meet a lot of people, listen to them and hear their needs. You pick up what people tell you basically. We have a very small advertising budget. To some extent we use it for doing market research. But our main source of business is recommendation from satisfied customers. We listen to our customers carefully". R3, SME owner-manager</p>	<p><b>No systematic process mentioned</b></p>
SME4	<p><b>Owner's experience in the sector, customer feedback and consulting people</b></p> <p>"I have been working in the market for 20 years. I understand the market fairly well. Not only I am picking up knowledge on that but also if I have a specific question that needs answering, I can actually ask them directly to</p>	<p><b>No systematic process mentioned</b></p> <p>Researcher: "Do you use specific methods and systematic method to understand what your customers' need?"</p> <p>R4: "No"</p>

	the market because I know people and companies within the market. It is done by actually consulting people in the market." R4, SME owner-manager	
SME5	<p><b>Customer feedback and collaboration with other experts</b></p> <p>"That information, in general, is supplied to us from our customers and the decision agreed during meetings or changes about the design of the product. [...] We have mechanical engineers, but I have, what would you say, electronic consultancy which helps me with software. I also have usability engineers and various others who would, what would you say, help us out when required. [...] The strategy we are building on is to try and get more customers in the door. That is not always an easy avenue. We do a bit of marketing, but I wouldn't say we were successful at that. So our strategy for continuous growth is a bit suspect". R5, SME owner-manager</p>	<p><b>No systematic process mentioned</b></p> <p>Researcher: "Do you have an established method to collect information from customers?" R5: "No"</p>
SME6	<p><b>Employees and customers</b></p> <p>"To be honest in Company X innovation comes from the people who were involved and because the majority of people working here are involved with the sports, they are the ones who come up with the ideas. We try to listen to our customers as much as we can as well. They have a lot of ideas. They are also experts in their sports. We encourage people to run the idea where we can. It ends up really messy to begin with but we just try to encourage them. As a team of people who are passionate about these activities, if it does not work you know it is no big deal we just jump on into something else. [...] The biggie kind of for me is in encouraging the staff to bring forward their ideas at the same time as consulting the customers". R6, SME non-owner manager</p>	<p><b>No systematic process mentioned</b></p> <p>Researcher: "Do you use a systematic approach or particular tools or methods to encourage customers to bring their ideas or staff to bring their ideas forward?" R6: "This is something we are frankly very bad at as well, so we would not get written kind of suggestions or things like that."</p>
SME7	<p><b>Owner's experience, tacit knowledge in the sector, customer feedback and consulting people</b></p> <p>"It is through 12 years of building software. Having built loads and loads of systems, see what worked, what did not work." R7, SME owner-manager</p>	<p><b>No systematic process mentioned</b></p> <p>Researcher: "Do you have systematic approach or established methods to record this?" R7: "No, unfortunately it is just in people's head."</p>

#### 4.2.3 SMEs' barriers to innovation

The main barriers to innovation put forward by SMEs were the lack of time and resources. As Table 4.3 shows, small sized businesses investigated for this were occupied with day-to-day issues more than medium sized ones, which may result in them failing to seize innovation opportunities (R3, R5, R6, R7, R25). Interviewees indicated that because of their busy schedules,

they do not have time to reflect and plan ahead and instead focus on short-term results and easy-to-apply solutions. Observations and interviews showed that some SME owners have extensive field experience but lack a systematic process to record this experience; thus, they often rely on a gut feeling to make business decisions regarding innovation (R4, R7, R3, as presented in Table 4.2). Most of the knowledge within the company is personal knowledge and is absorbed by a number of individuals in the company. As a DSP associate mentioned, an innovation process that is solely based on individuals' knowledge may hamper the development of continuous innovation (R11). From a DSP perspective, DSP director R16 commented, *"They [SMEs] need help, I think they need to understand a lot about their end-users, what their end users need and want. So that's the big, I think"*. Although the SMEs in this sample are aware of the importance of their customers for innovation, small businesses in particular need to capture information from their customers more systematically.

Table 4.3 Barriers to innovation

<b>Example quotation</b>	<b>Summary statement</b>	<b>Theme</b>
"I think there are opportunities for innovation that we missed a lot in the past because we are so busy fire fighting and just dealing with day-to-day". R6, SME non-owner-manager	A lack of time to recognise the opportunities	Barriers to innovation
"Everyone is so busy running around to get the day to day work done, they can't look forward and plan what they are doing." R7, SME owner-manager	A lack of time to plan	
"It is a long established family business. There are no external shareholders. We can afford longer-term outputs than many businesses. The current climate is ironic though. You need longer-term view, but the pressures force a short-term view that will damage people being more innovative." R3, SME owner-manager	Short term view puts pressure	
"The other thing is we have a limited amount of time to observe innovative changes. The Internet helps to track changes and availability of technology, but I have not been to a building exhibition for years, which used to be a good means of getting information". R3, SME owner-manager	A lack of time to observe and update themselves with technology	
"Business owners tend to try to do everything themselves. Because they get caught up in the day-to-day operational activity in the business, who is working on the business? Who is looking after the strategies, the planning, the forecasting, the goal setting, checking if the plans are being achieved and so on? And the answer is nobody because you're so immersed in the business." R25, Business coach	Overwhelmed with operational activities leading to a lack of time to plan	
"He was a very skilled electrician, nobody had taught him about running a business [...] They literally do not know anything about how to defend a business, how to protect the business. And they'll go and ask friends and other electricians	Securing the essentials of running a business.	

<p>who are probably suffering from the same problem” R25, Business coach</p> <p>“So 5-6 years ago we took on a non-executive director. The first thing the non-executive directors did was to make sure we had a really good system in place for tracking how much money was earned each month. [...] Before then, when we had got enough money in the bank, that was fine”. R7, SME non-owner manager</p>		
<p>“You can have a very enthusiastic manager and sort of champion innovation processes. If he then leaves, you go back to square one”. R11, Government support agency representative</p>	<p>Individual knowledge rather than organisational knowledge.</p>	

#### 4.2.4 SMEs’ approach to design

Many SMEs in this sample presented an understanding of design that goes beyond style and form and acknowledged the value of design in improving their business capabilities and recognised design as a process (R1, R3, R4, R5). One SME recognised the value of design in changing their company strategy (R2). One SME respondent (R6) mentioned that they had tried to reach new customers by consulting marketing expertise, which indicates bringing new customers and is related to the marketing function rather than design. It was also observed since design is a broad discipline that a respondent (R7) used to associate design with graphics and visual elements of a software application. Later on through learning about UX design<sup>11</sup>, he recognised the value of it for the company. From the perspective of design consultancies and DSPs, SMEs often do not appreciate the full potential of design (R17) and do not know why they need design (R22, R23). In addition, the design needs of SMEs are found to be result-oriented (R15, R16, R22). Table 4.4 presents interviewee’s viewpoints on SMEs’ approach to design.

Table 4.4 Different perspectives on SMEs’ approach to design

<b>SMEs’ perspective</b>	<b>Designers’ perspective</b>
<p><b>Design as process</b></p> <p>“Design covers everything from the inception of the project to the finished product.” R1, SME non-owner manager</p>	<p><b>Result oriented-urgency</b></p> <p>“They’d [SMEs] just come and say ‘we need a logo’ or ‘we need packaging for this’. R22, Design consultant</p>

<sup>11</sup> UX Design or user experience design aims to design user experience by enhancing the usability, interface and the interaction between users and products.

<p><b>Design as strategy</b></p> <p>"That's a classic example of the value of design. The way a particular product came out of 60 products [...] When this design was shown to me, straight away I realise it was something unique, something nobody ever thought of before. That's when we created different distribution model for that particular product. Because it was so good, it has taken us to new areas of business that we would not expect to go to". R2, SME non-owner manager</p>	<p>"Quite often, SMEs come for help when they're in trouble, so it's fire-fighting rather than being proactive to do something". R16, DSP director</p> <p>"Quite often when they come to a workshop, they have an idea that 'I need a website, I need a brochure, I need a packaging'". R15, DSP associate</p>
<p><b>Design is an iterative process</b></p> <p>"Probably like most design processes, you come up with a model then you refine it. It is an iterative process; you refine it and refine it. It is always the same thing." R3, SME owner-manager</p>	<p><b>The lack of understanding of design by SMEs</b></p> <p>"So, I do feel that there is a lack of understanding in small companies about what design can do, what good design can do, and what mediocre design can achieve." R17, DSP project leader</p>
<p><b>Design integrates elements and functions</b></p> <p>"It [design] means combining some elements which have specific functions into something with a wider set of function, with a good user interface. Design may not be something concrete that I can hold in my hand. It may be the way people interact you are designing around; then design is more virtual than real." R4, SME owner-manager</p>	
<p><b>Design as problem solving</b></p> <p>"It [design] is the ability of problem solving to obtain a solution nearest to requirement of the customer." R5, SME owner-manager</p>	<p><b>The lack of understanding of using design by SMEs</b></p> <p>"A lot of times they [SMEs] don't really know what they are after". R23, Design consultant</p>
<p><b>From design as a visual element to design as software tool through UX design.</b></p> <p>Their [graphic designers] job is to give us visuals and assets; our job is to write the software. The application was not as efficient as the more boring plain application. We decided not to put a kind of design into software in the future [...] But recently I have been learning about UX designers. There seems to be a lot of theory about how progressive display of information [...] Design is very applicable to software I have not realised". R7, SME owner-manager</p>	

### 4.3 Evaluation of the programme theory

The programme theory refers to approaches and assumptions that programmes adopt to resolve the problems of a target audience (Rossi et al., 1998). In this section, themes including (i) DSPs' approach to addressing SMEs' problems; (ii) design-led innovation; and (iii) the barriers to and opportunities for design innovation are presented.

Table 4.5 illustrates DSPs' views on ways to address SMEs' problems. The DSPs studied aimed to increase the design capacity of SMEs and help SMEs to identify opportunities for design-driven innovation without doing the design on their behalf (R14, R15, R16, R18). The underlying model of DSPs studied relies on the strategic use of design. Most of the DSP respondents highlighted that only when design is used strategically, can it bring desired and effective changes (R12, R14, R17, R18). Almost all design consultancies approached also stressed the strategic and integrated use of design to create an impact; design does not generate an impact in isolation.

"Our argument is that an integrated approach is what works. You look at any global brand, and it's when they integrate marketing, integrate the design side of it, integrate advertising online-offline, it is when they get results. [...] We get clients saying 'we want an ad'. We say, 'is that just one advert?' 'Yeah that's all'. 'Don't bother. It won't do anything'." R23, Design consultant

Table 4.5 DSPs' approach to addressing SMEs' problems

Example quotation	Summary statement	Theme
<p>"We don't design for them. We just facilitate their ability to commission designers or to solve the problems themselves". R14, DSP director</p> <p>"What we are doing is using a design thinking approach to help them to explore the opportunities for their business. So we are not designing things for them. [...] We also give them a little guide on how to go about commissioning a designer" R15, DSP associate</p>	<p>Not designing for SMEs. Facilitate the process of commissioning designers.</p>	<p>DSPs' approach to solve SMEs' problems</p>
<p>"So most of the time, it's focusing on helping small-to-medium sized companies understand specific aspects of design, to hold their hands about how to understand what design is about and hold their hands about how to process managing design and using design [...] we don't actually do the design work for them. We're helping them to understand what design is about. So, they still got to go find that design expertise externally to have the graphics or the branding or the product." R16, DSP director</p>	<p>To improve SMEs' understanding of design Not designing for SMEs.</p>	
<p>"The idea is really to build capacity within the non-design sectors. So non-design sectors can understand and use design more effectively". R15, DSP associate</p>	<p>Increase the design capacity of SMEs</p>	
<p>"The aim of the workshop, we said was to get more small businesses to use design to innovate in their businesses." R18, DSP associate</p>	<p>Using design to innovate</p>	
<p>"[...] Because we are thinking strategically, it is not about you need a website, it is about what you need to do with the strategy of the business. They might not need a website, they might end up with something else so we take them back to be thinking about the strategic intent of a project. We do get them to think strategically." R15, DSP associate</p>	<p>Encouraging strategic use of design</p>	

The DSPs that were studied regarded their innovation approach as design-led and human-centred, rather than being dependent on technological advances. Design thinking, user/human centred design, service design and co-design are some of the common approaches referred to by DSPs. Sustainability (covering eco-design and green design) has been observed in addition to these approaches. An emphasis on sustainability is sometimes included as an added aim to business support or sometimes put forward as the principal aim of the interventions. There was no political theory or social underpinning observed by the researcher which indicated the premise on which the DSP is based. Although the DSP respondents pursued different approaches, only minor differences were apparent. Both design thinking and human-centred design encourage the collaborative approach with

stakeholders. These approaches place an emphasis on methods to enable the analysis of user needs to achieve innovation goals.

Interviewees were also asked about the helpfulness of the concept of 'design thinking' as a way of illustrating the value of design actions. The question was included in the interviews because of the ongoing debate surrounding the effectiveness of design thinking as a methodology (Badke-Schaub et al., 2010; Norman, 2010). Table 4.6 illustrates the different viewpoints for and against design thinking. These different viewpoints indicate that the use of the term appeared to appeal more to non-designers. Designers appeared to be more sceptical about using the term design thinking. The view of the government support agency representative shows that the respondent is less interested in design thinking and design-led innovation approaches and is sceptical about its value and credibility.

Table 4.6 Contrasting views for and against the use of the term design thinking

<b>For</b>	<b>Against</b>
<p><b>Discovering the opportunities for innovation and collaboration</b></p> <p>"Being introduced to design thinking just opened up possibilities to do something different, something innovative, involving staff in a really positive way. It was just wonderful." R12, DSP associate with a business background</p> <p>"I discovered transformation of design, co-creation and all the terminology that is associated with design thinking. [...] I suppose for me, in my own personal experience, these are tools and techniques that work. I have seen them working in different applications so it makes sense to bring them together under design thinking." R15, DSP associate with a business background</p>	<p><b>Foundational problems</b></p> <p>" [...] I think it is a dreadful term. The rhetoric behind it is again lovely. You have got very persuasive writers about it, Tim Brown, Roger Martin, David Kelly, they are all very persuasive about what design can do. But thinking is completely wrong because the whole point of design thinking is about doing. [...] It is not really about thinking, actual thought processes. [...] What happens in the neurological level is not really articulated in the literature, so I think design doing and design practice do not sound glamorous but they are better representations of what design can do." R13, DSP associate with a design background</p>
<p><b>Credibility depends on the use and expertise</b></p> <p>"It is about how you use it. I can see how it will be used very poorly. But I think we also have our research culture in our space. We use it in a much more robust way". R15, DSP associate with a business background</p>	<p><b>Credibility problem</b></p> <p>"I would never be able to mention if I would use design thinking. Because the perception of that. I don't think it's accepted". R10, Government support agency innovation specialist with a business background</p>

Another government support agency representative (R9) expressed the view that a design innovation is often a result of aesthetical novelty of the product with no technical development. To R9, design innovations are less important for the economy in comparison to technical innovations.

“Design innovations, if you look at what they actually do for the Scottish economy, maybe they helped branding more than anything else but technical innovation, the effect of it on Scottish economy has a deeper and more profound effect, I say” R9, Government support agency representative.

Some of the DSP deliverers and government specialists commented on a lack of understanding by the policy makers on design-led approaches to innovation.

“...I think as far as the government is concerned [...]. I don't think for a moment they understand the concepts of design thinking and don't embrace it in any shape of form” R12, DSP associate

#### **4.4 Process evaluation**

The following section presents results in relation to the programme implementation, including structure of operations and service delivery. First, an introduction of the process is provided to identify the structure of operations before moving on to presenting results relevant to elements of implementation and delivery. These elements are (i) workshops; (ii) the role of advisory support; (iii) the position of DSPs; (iv) design tools and methods used for design interventions; and (v) the duration of support.

##### **4.4.1 The structure of operations**

The DSP reports reviewed and interview findings show that business support incorporates several activities including telephone and online support, workshops, advisory meetings and seminars. A more generic support perhaps is provided through emails or via telephone to companies. Based on the programmes studied, it was found that, occasionally, design and innovation subject experts contributed to design seminars and events. In such cases, events were followed by a discussion and networking activities. For example, Wayne Hemingway, from Hemingway Design was invited by both the Centre for Design and Innovation (c4di) and Design in Action, two university-based DSPs. Josephine Rydberg-Dumont, a chief

designer from IKEA, and John Thackara, a well-known design writer, gave talks to SMEs about the value of design and business as part of Design in Action.

Design and innovation support workshops are found to be the predominant form of activity for DSPs and are conducted on either a one-to-many or one-to-one basis. The one-to-many workshops aim to gather many companies together to introduce design and creative thinking. The length of one-to-many workshops varies. Shorter workshops usually last around two hours, while longer ones can be run for up to three days. One-to-many workshops introduce design-led approaches to companies to encourage them to achieve innovation and business growth and typically aim to reach approximately 10 to 20 SMEs in one workshop. A one-to-one workshop or sometimes called an advisory support session is delivered to a single company. It is thus more tailored to the individual company needs. This type of intervention may often take two days or more. DSP deliverers aim to explore the company's culture and values, product potential, and market opportunity with the SME. These activities, which may occur within the company premises or offsite, may involve hands on and visual activities such as sketching and rapid prototyping of ideas (the methods used for this process are discussed in Section 4.4.4).

A common approach applied by the UK organisations observed during this study is comprised of several steps that are illustrated in Figure 4.1. An SME is invited to take part in a DSP workshop that includes other companies. If the SME is interested, it moves on to the next stage, which is a one-to-one workshop or advisory support. As a result of the one-to-one support, the company may have several actionable ideas, a design audit report is delivered to the SME communicating where design can help and a specific design brief for a new or improved product or service may also be outlined. The SME is encouraged to commission a design consultant who will realise the design brief or occasionally agree to work with the DSP in order to complete the initiated work. The anticipated outcomes reported by the DSPs may include increased capacity in using design, the employment of a designer in-house, developing innovation and some financial outcomes such as increased sales or new customers. The model presented in Figure 4.1 is

a generalisation and does not necessarily fit all DSPs. For example, some DSPs derive actionable new ideas from one-to-many workshops, removing the need for one-to-one support. Looking back at Figure 4.1, this process can be represented by the sequence of steps 1, 2, 3, 4, 5, 6, 7 and 8. A shorter alternative can be described when one-to-many support (3) is not used. SMEs can also directly engage with DSPs through one-to-one activities that may result in the formation of a design brief. This model follows the sequence of steps 1, 3, 4, 5, 6, 7 and 8.

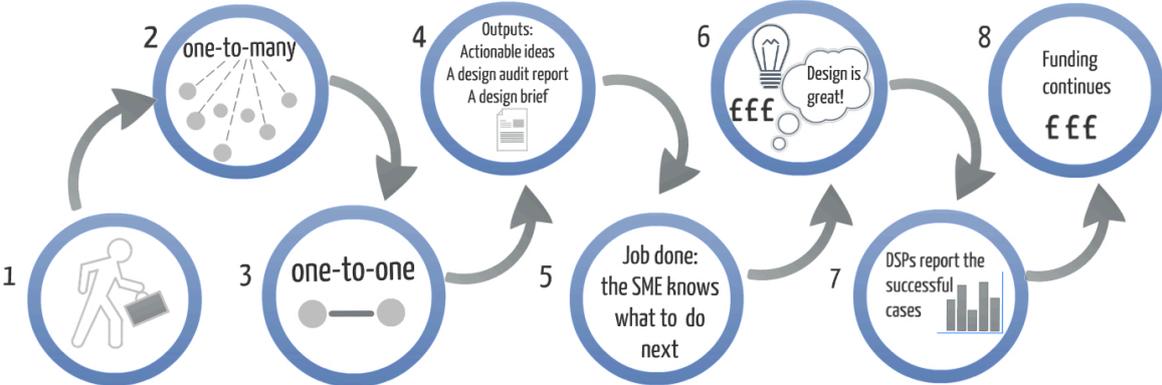


Figure 4.1 A typical design support process

Three DSPs interviewed offered incentives for the SMEs to take this initial intervention further. One DSP offered an additional service for SMEs to develop design work on the proviso that the cost will be covered by the SMEs. The interviews indicated that the rules of funding schemes define timeframe, scope and general principles for implementation. Even though DSPs may prefer to give more extended support to an SME or monitor them for further evaluation, this may not take place if these activities are not specifically outlined within the funding proposal (R15, R17).

**4.4.2 DSP workshops**

All of the DSP representatives interviewed were undertaking one-to-many or one-to-one workshops with participants in order to deliver design-led business support. This section presents the findings concerning workshop content and delivery and the limitations of DSP workshops.

The DSP interviewee R13 defined their DSP workshops as a “structured learning journey for companies” based on “an academic teaching model”. The majority of the programmes and the reports that were analysed stated that the workshops were specifically tailored for a business audience in terms of language and structure. Two interviewees R11 and R26 mentioned that they avoid using design jargons and terms specific to the design discipline, such as design thinking and user-centred design during business support workshops. On the other hand, DSP workshops that were observed and other interviews results showed that some of the concepts of design; for instance, ‘design thinking’, ‘service design’ and ‘human-centred design’, were used to better communicate their content to their participants. Some DSP associates (R13, R14, R16) stated that companies struggle to contextualise the DSP workshop content and apply it to their existing problems if the content is generic. R14 indicated that when DSP workshops were tailored to the company's fields of interest and requirements, the best results were achieved. DSP associates R12 and R13 mentioned that informing the participants about the activities and outcomes at the beginning of their workshops contributes to the effectiveness of workshops. This information helps them to understand the rationale of the approach taken by the DSP.

A point concerning the delivery of content is that the design knowledge needs to be experienced with hands-on activities (R12, R13, R15, R16). R18 indicated that the timing of the hands-on activities is critical to ensure successful events. Carefully planning the order of the activities during an event, such as including the time of keynote speeches, was considered as helpful to encourage discussion and reflection (R18). Another approach applied by a government support agency is to spread workshops over time in order to enhance reflection and networking amongst participants. Table 4.7 illustrates a number of viewpoints drawn from the interviews concerning workshop content and delivery.

Table 4.7 Interviewees' viewpoints on DSP workshop content and delivery

Example quotation	Summary statement	Theme
<p>"I spoke in a way absolutely trying to be away from jargon, so we cannot just speak about design as such, we just tend to speak about the practical tool that can help you start your business. I think that's really important [...] instead of telling them about what the methodology actually was, we just explained it in terms of what they needed to know, you know, so I think terminology is great in the back end but in the front end -public facing side- we try not to". R11, Government support agency representative</p> <p>"So you need to talk a common language. They are not interested in academic blah blah." R26, Design consultant/facilitator</p>	<p>Avoiding jargons and academic language</p>	<p>Content and delivery</p>
<p>"...Careful not to make them [workshops] too generic because then they just become another off-site training day." R14, DSP associate</p>	<p>Specific and relevant content for the SME's needs</p>	
<p>"A written proposal would be formulated as a kind of outline of the activities that we are going to do, why we are going to do them and what the proposed outcomes of the workshop are". R13, DSP associate</p> <p>"We realised that when we give briefing to them [SMEs] on the outcomes, they don't feel that 'it is just a day of diving' that just physically turn them off". R12, DSP associate</p>	<p>Informing the SMEs about the rationale and value of activities in workshops</p>	
<p>"It has to be experiential, even if it's only for a couple of hours, it has to be something that engages oneself and I don't think explaining it on a one-to-one basis gets anywhere or within a book would not make any sense of it". R12, DSP associate</p> <p>"I think it is only by going through the process that people understand it. It is really difficult to communicate it if you have not been through. It is experiential. I think once you have been through the process you can get it. But [...] I don't know how easy it is to communicate an experience" R15, DSP associate</p>	<p>Importance of experiencing design content</p>	
<p>"[Following the keynote speech,] there would always be a coffee break and that really invigorates people. They would say 'was not that great? Was not that fantastic?'" R18, DSP associate</p>	<p>Time management during workshops</p>	
<p>"So we had to understand our customers, we realised our time is limited, that it is better to do it in their own premises and that we had to work with their time scales. If they wanted something starting at 8 o'clock in the morning, we would do it or if they wanted something in an extended lunch break or at another time, we had to accommodate them". R12, DSP associate</p>	<p>Working with SMEs' time schedule</p>	
<p>"Spreading workshops out over four month allowed people in the group to come together and form quite a strong bond which is important to have [...] but also to go away and reflect and then I think that was really important to have that to go think about what to do next". R11, Government support agency representative</p>	<p>Spreading over time to encourage reflection and networking</p>	

Although it was observed that SMEs enjoyed participating in these events and DSP Interviewees also confirmed this positive reaction and satisfaction

(R14, R15 and R18), attaining the desired level of participation in DSP workshops appeared as a difficulty noted by respondents.

“The main difficulty was convincing people in the first place to even embrace a workshop.” R12, DSP associate

A number of possible limitations were identified as reasons for SMEs’ lack of interest in DSP workshops. These issues include SMEs’ unfamiliarity with a workshop format, workshops run by several training programmes (apathy), last minute cancellations because of free workshops, the long duration of workshops and the lack of promotional activities for workshops. The interview results indicated that if an SME attending a workshop is unfamiliar with the method, they might perceive it as unproductive and lacking tangible outcomes until they recognise the value of the activity and observe its results (R7). Yet, DSP interviewee R13 claimed that it is difficult to show end results through workshops, those being more focused on initiating actions.

It was found through interviews that adopting a completely new perspective as a result of a workshop might be challenging for SMEs because SMEs tend to change things incrementally (R7 and Table 4.1). Another drawback about conducting a workshop may lie in the fact that it is a very common form of delivering knowledge in adult learning and training and has been adopted by several training organisations. It might be difficult for SMEs to differentiate one workshop from another (R12).

R17 indicated a dilemma about the workshop format in relation to the funding framework. R17 stated that when a workshop is free, SMEs may register but they may not attend on the day. When it requires a fee, although reasonable and affordable, SMEs concentrate on the return on investment and may not register for the workshop. DSP respondents R12 and R13 also indicated that more workshop cancellations happened because it was free of charge for SMEs.

Interviews indicated that SMEs are rather inward-looking and busy with daily operations, therefore often unaware of the activities of DSPs. When SME respondents who had not participated in DSPs were asked about their familiarity with DSP activities in their own cities, they indicated that they did

not hear of them (R4, R6, R7). Similarly, A DSP associate indicated that promotional activities could be improved. R12 suggested that the delivery method and expected results could be presented to SMEs in advanced of participating in a DSP workshop. In this way, SMEs would be clearly informed, see its value and come to the workshop with a positive and receptive mindset.

Interviews indicated that a full day or longer workshops seem to require a great commitment from the majority of SMEs. A DSP associate mentioned the difficulty of convincing individuals to allocate time for a two-day advisory support event in their busy schedule (R12, R17). Another DSP respondent stated that it was not easy for companies to focus on workshops for an entire day without being distracted although this was vital if concrete results were to be achieved (R13). It was pointed out that the long duration of workshops fails to attract the attention of busy and active SMEs. It was reported that critical decision makers do not always attend long full day workshops and that administrative or marketing personnel from the company attend instead. These participants are not always influential decision makers in the company, which could disrupt the information flow (R12). Attendance of a decision maker, that is either the owner or a director, might show that the SME is not a high growth company, the time they are able to allocate being proportional to their level of activity (R12). DSP associate R18 recognised the duration of a workshop as a barrier to SMEs' participation, but at the same time R18 suggested that the time that SMEs spare for that event could demonstrate that they are keen on learning and apply these learning outcomes. A two-day-long workshop also gave them an opportunity to stay away from day-to-day operation and think about the their business in general. From a facilitator's perspective, preparing and running DSP workshops requires a great deal of time. It was suggested that tailoring the duration of the DSP workshops was important in order to meet SMEs' needs and accommodate working schedules (R18). Table 4.8 evidences and summarises the findings regarding the limitations of DSP workshops format. These issues might influence the SME's interest in DSP workshops.

Table 4.8 Limitations of DSP workshops format

Example quotation	Summary statement	Theme
<p>"We never really go away into an office and come out and say 'that is the whole new way we are going to work' and it has been a completely new innovation. It organises itself gradually." R7, SME owner manager</p>	<p>Unfamiliar type of experience</p>	<p>Limitations of workshops format</p>
<p>"They had a workshop like blue sky thinking. It felt fluffy to me. It was more like everybody in the room was there to discuss X [the company name]. We did not have a name at that time. It [the workshop] was more about what a business is; what it means; what it does; what the core values are, and all of that the agency needed in order to create a brand. And I did remember thinking it was a waste of time, a bit fluffy, but it gave us good results. It was maybe when I learned they needed that information in order to come up with a brand [...]. They needed it [the information] in one way or another, whether they extract it from you or whether you hand it to them." R7, SME owner manager</p>	<p>Finding workshops unproductive until results observed</p>	
<p>"But because of the funding you could only spend up to 5 days in the company. What can you achieve in 5 days? You can start a process but you cannot take it any further really." R13, DSP Associate</p>	<p>A difficulty of finishing projects and showing outcomes</p>	
<p>"It is just another workshop, we can get around to it some other time". R12, DSP associate</p>	<p>A common method in adult training</p>	
<p>"If we give it for free, which we have to do under our projects and they don't buy you and don't turn up, it's because something more important in the business has come along. If you charge a lot of money which is what it's probably worth, then people have to think companies have to think very carefully about if they're going to get a return on that investment". R17, DSP project manager</p>	<p>The issue of free workshops</p>	
<p>Researcher: "Have you heard of design centres in X [the SME's city] that are helping SMEs for their innovation process?"                      "No, we will be interested to learn about that" R7, SME owner manager                      "No, I did not even know about the design support at the X University. So I haven't worked with them". R4, SME owner manager                      "No I have not actually. No. I must admit we are kind of inward looking sometimes for things like that". R6, SME non-owner manager</p>	<p>Not being informed about DSPs</p>	
<p>"We wanted to be actually worthwhile by having a pre-workshop where we could have had a presentation and said 'this is all about this, this impact should be expected so watch and learn to begin with and then the workshop will take place a week later' and by then we could be onboard. Maybe we could have sent them something for them to think alone and actually getting them to a stage we really want before the workshop, so there are all sorts of things we could have done in a longer-term". R12, DSP Associate</p>	<p>The need for different strategies for promotional activities</p>	
<p>"Typically a 2 hour one, because we tend to find long two day. Long full day thing [workshop] can be difficult [...] Because it's difficult to get companies in this current economic climate to take time out." R17, DSP project leader</p>	<p>The length of workshop  Busy SMEs</p>	

<p>“We would have day long workshop, we would have lunch in between with lots of chances and opportunities for networking. Personally I don’t think we invite the right people in that way because they have got time to take a day out, off work, whereas the ones who really do things don’t have that much time.” R12, DSP associate</p>	<p>are not willing to come to long workshops</p>	
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**4.4.3 The role of DSP advisors and the focus and position of DSPs**

With the exception of one DSP, all the programmes analysed consisted of a small team of up to six people. The core team was usually a combination of product, graphic or interior designers, collaborating with business advisors. Some DSP respondents claimed that the expertise and credibility of the facilitators and associates played a key role in the success of programmes (R11, R16, R18). The role of design expertise in these workshops is associated with the use of design tools and facilitators having the appropriate skills including a process oriented approach and looking at problems from different angles. Two DSP respondents mentioned the difficulty in accessing SMEs in specialised sectors such as the oil and gas sector, which is predominant in the North East of Scotland. A DSP associate suggested that collaboration between DSPs and other specialist academics within the university can act as a broker between SMEs and develop their credibility to deal with the difficulty mentioned above (R12). Table 4.9 provides an overview of interview findings concerning the role of advisors and the importance of their expertise for the effectiveness of DSPs.

Table 4.9 The role of advisors

Example quotation	Summary statement	Theme
<p>"I think the facilitator has a strong role in keeping everybody on board and everybody moving towards the goal." R18, DSP associate</p>	<p>Facilitator influence the success of workshops</p>	<p>Importance of advisors and design expertise</p>
<p>"The best approach is individual advisors giving one-to-one support. The character and capability of the adviser is going into the company. Manager or whoever in the company work with them; the advisors get their <i>trust</i> quite quickly." R16, DSP director</p>	<p>Design advisors skills went in to the company The importance of building trust</p>	
<p>"The impact and credibility of facilitators is absolutely everything. We only use trainers and people that we <i>trust</i> quite frankly. There is a lot of people out there understandably who are trying to make a living out of design-led approaches. People are really interested in this area because it is kind of a hot topic. It is timely just now but that does not necessarily mean that the person is suitable. We just make sure that we train the right people I suppose." R11, Government support agency representative.</p>	<p>The suitability of facilitator for the job</p>	
<p>"Some of the visual activities that we get people to do, I think not everyone can do them and [...] there is something there which is distinct and needs specialist about design aspect of design thinking and design facilitation" R15, DSP Associate</p>	<p>Not everyone can do design specific aspects of facilitation</p>	
<p>"I think it [design] brings a lot of tools from the design background, it brings a theoretical understanding of things like co-creation. There is a focus on it, there is a lot of interests in how we can support it. I think it definitely brings all that expertise and maybe confidence in doing things in a different way, I think because design has a process of looking at problems that we don't have in the business background, I think they [designers] bring that process to it to look at problems from different angles, so I think it's very beneficial". R18, DSP Associate</p>	<p>Bringing the confidence in doing things differently</p>	
<p>"Another thing we came across was when we started to get into specific industry sectors like oil and gas. There were significant difficulties in trying to persuade people. Although we were not specialists in their sector, we could provide them a methodology that they could apply within their sector, but that was really really difficult. [...] We started to think about how we could specifically involve other specialists within the university about what we are doing and gain credibility along the way." R12, DSP associate</p>	<p>The specialist knowledge is required for some industries</p>	

### A narrow project definition for DSPs

Although programmes sometimes focus on particular sectors, such as food or renewable energy, they more often work across sectors. Table 4.10 compares the opinions of DSP respondents with respect to a narrow focus

for DSPs such as sectoral focus. DSP associates commented that sectoral focus is a strategic decision that is aligned with the funding framework (R16, R18) or the DSP's own decision (R12, R13, R15). One DSP respondent indicated that better results were achieved when the programme focused on one particular sector, such as the food sector or health and well-being, or one type of design activity, such as packaging or branding (R17). This focus enabled them to send a design mentor with the right expertise and helped them communicate more effectively to SMEs the type of support they were offering. The report from a one-to-one advisory support provided by Design Wales (2007) also presents focus as critical in relation to the characteristics of SMEs and the broadness of design. On the other hand, the focus of support can create conflicts of interest in small regions, as explained by a DSP representative (R12). Two DSP respondents claimed that it might be restrictive in terms of finding SMEs (R15 and R16). R15 indicated that a lack of sectoral knowledge enables the facilitators to ask naïve questions to underline the problems of that sector and retain objectivity.

Table 4.10 Contrasting views on the focus of DSPs on one sector

For	Against
<p><b>Defining the project in a narrower way may lead to better results</b>                      “What I found under the projects that we worked with is that if we can define the project in a narrow way, you can get better results from that project.” R17, DSP project leader</p>	<p><b>Workshops may lead to similar results</b>                      “We would encounter conflicts of interest along the way. Because you are working in one sector, workshops may lead to similar outcomes.” R12, DSP associate</p>
<p><b>Sectoral focus enables better communication</b>                      “I think it is very much better to focus on a specific sector, if you do, you know what you are offering.” R17, DSP project leader</p>	<p><b>It can be restrictive</b>                      “It depends on where the funding comes from for the programme. If it’s a publicly funded support, the government normally give funding for a particular region, a particular sector such as the manufacturing sector and medical sector. It can be effective but also it can be restrictive” R16, DSP director</p>
<p><b>SMEs respond to their own specific issues</b>                      “Focus is also an important consideration – design is a broad subject area but small and medium sized businesses only usually respond to specific issues they might be aware of or are actually facing during a particular period” (Design Wales, 2007).</p>	<p><b>It encourages asking naïve questions because of not being hampered by the historical barriers of sectors</b>                      “It is better when you are going to complex sectors like social care, even libraries. Any sector actually has its own complexities. Hmm you don’t really know your way but it means you’re not in any way hampered by the history of the sector, where the barriers are. So you can ask difficult or silly questions quite freely and in that sense I think not becoming an expert is a positive thing but what often happen with us is that we do a whole project and they ask us to do other projects so you actually become one [expert], you have a level of expertise in that sector which can be helpful actually; it is a balance. You don’t want to go native because that way you just be like a social care person or a libraries person and you don’t want to do that. You want to retain that objectivity because I think it is important” R15, DSP associate</p>
<p><b>It enables to focus on a high growth sector</b>                      “X is such a huge sector in the UK economy you know it's very important [...] it is a sector with a lot of promise”. R18, DSP associate</p>	

Focus on a region was also observed but the majority of the respondents stated that it was insignificant in relation to how the support was delivered (R14, R16, R17). The geographic region covered by the DSP was a result of the criteria set out by the funding framework (R16, R17).

### The types of support provided by DSPs

Following the interviews with DSPs, it appears that there exist three main functions of design support for SMEs: signposting-promoting, facilitating-

empowering and advising for SMEs. Signposting and promotion introduces design to SMEs, increases their design awareness and lead them to design consultancies (R16). The empowering function aims to enhance SMEs’ capacity of using design through transferring to SMEs the knowledge of design and innovation or a methodology of design (R13, R14). Advisory support aims to increase the effective use of design within SME through providing them tangible and intermediate outputs, such as design briefs (R15). Table 4.11 presents the different types of support.

Table 4.11 Types of support provided by DSPs

<b>Signposting-promoting</b>	<b>Facilitating-empowering</b>	<b>Advisory</b>
“Then parallel to that, we raised awareness of service innovation and design in the manufacturing sector” R16, DSP director	“We don’t design for them. We just facilitate their ability to commission designer or to solve the problems themselves. We’re more of pointing in direction of water rather than giving them fish.” R14, DSP director	“I find it relatively easy to interpret the results and then enhance that with general business advice”. R12, DSP associate

The types of design support provided by DSPs may appear to be confusing for both SMEs and the DSP associates. It may be unclear whether the support is intended to offer a design guidance service, an empowering-training or design consultancy service as experienced by R12. One respondent identified that a neutral role was found be more appropriate for empowerment and knowledge sharing and for creating a non-hierarchical environment for collaboration; however, an advisory role could have been more effective (R13). Although R16 used “raising awareness” himself, he demonstrated a strong criticism against the possible overlap between design promotion and design support

“I was aware of that and wondered actually when the enabling stopped and when the straightforward consultancy kicked in”. R12, DSP associate

“There are accepted rules of how you facilitate workshops, which is about being quite neutral. I think in these cases, it would have been better to have been less neutral and more in that advisory role although the rhetoric of all those workshops is to empower companies and make them understand how design can be used in a strategic level”. R13, DSP associate.

“That’s what we’ve been trying to do rather than simply raising awareness [...]. We’re not doing design promotion, which is about shouting out loud about design and helping the people buy that message.” R16, DSP director

### The position of DSP in design industry

Interview results identified two different attitudes expressed by DSPs within the design industry with respect to design consultancies. Of the first approach, the DSP respondent assumed the role of a mediator and found it encouraging that a design consultancy participated in the DSP workshop. The second approach was highlighted by another DSP, which did not want design consultancies to participate in its workshops. This was motivated by the fact that the DSP wanted to protect its knowledge base, which indicates that potential competition exists between DSP agencies and consultancies. In addition, it was found that another DSP offered an additional service to companies in order to develop design work on the proviso that the SMEs would cover any costs incurred. This service may be perceived as a potential element of competition between consultancies and DSPs. Table 4.12 identifies the different attitudes of DSPs concerning design consultancies.

Table 4.12 Different positions of DSPs concerning design consultancies

<b>Intermediate role between SMEs and design consultancies</b>	<b>Independent advisory role</b>
<p>“It was good to see that the design consultancy kind of engaged in what we were doing rather than to think we were sort of taking over their role and activities. They could see the value of us bridging between their creative ideas and the businesses’ objectives. We are kind of mediating between the two”. R13, DSP associate</p>	<p>“We have a priority knowledge, so what we don’t want is design companies to come and take what we have and apply it elsewhere.” R15, DSP associate</p>

#### 4.4.4 Design tools and methods used for design interventions

Various techniques for providing problem definition, idea generation and low fidelity prototyping were found to be used in one-to-many and one-to-one workshops. Some examples of these tools and methods that were mentioned include ‘Brainstorming’ (Osborn, 1963), the ‘Customer journey mapping’ (Richardson, 2010), ‘5-Why’ (Bulsuk, 2009), ‘Personas’ (Pruitt & Adlin, 2010) and the ‘Business model canvas’ (Osterwalder & Pigneur, 2010). One DSP focusing on sustainable design mentioned that they also use specific technical tools to evaluate how sustainable SMEs are, for instance, a life-cycle analysis tool (Environmental Protection Agency, 2012)

and a quick carbon calculator (Carbon footprint, n.d.). Interview findings indicated that these tools contribute to DSP interventions by helping participants to articulate their tacit knowledge regarding the company values and the root of the problems in the company and the requirements (R12, R15, R17, R13). Table 4.13 shows the findings concerning the value of design tools for DSP support.

Table 4.13 The value of tools for DSP support

Example quotation	Summary statement	Theme
<p>"I have many years of experience taking briefs from clients where they were unable to articulate the deeper, more intrinsic values of the organisations and just provided the same old stuff about quality and being better than everyone else [...] but with picture cards they suddenly become articulate people". R12, DSP associate</p> <p>"It was used to reveal what they felt the values of each of the organisations were and also to reveal whether or not they understood the values of the project going forward." R12, DSP associate</p> <p>"We have tool to help them. What are the brand values that underpin their organisation and who might be the kind of face of their brand and trying to get think in an emotional context as well as in a business context. Sometimes, we get them to write manifestos and we can then do shadowing, use emphatic modelling tools". R15, DSP associate</p>	<p>Articulating their tacit knowledge and company values</p>	<p>The value of tools</p>
<p>"Again, it's about developing that relationship with that company. First of all, finding out what their problem root really is. And one of the base tools I just use is the 5-why. If they tell me they want to rebrand, the tool helps them to say why". R17, DSP project leader</p>	<p>Finding out what their problem really is</p>	

Some respondents mentioned that they developed their own tools based on existing methods to better support SMEs (R11, R12, R13, R15). However, other DSP interviewees (R14, R16) indicated the relative unimportance of the techniques and methods and even found it difficult to name the tools they used. R13 commented that although many companies are competing to patent their tools, there are already hundreds of tools in the market. Some of them are more intuitive, tactile and nicely packaged than others, but they share a great deal of commonalities. He indicated, "*these techniques are just designed to help facilitate people's thinking*". Another

barrier to developing new tools is the time required for their development, which can lead to a reduction of the time available for the intervention with the SME.

“Simply developing the tools, which would allow us to launch a series of workshops left the window for engaging with SMEs too short”. R12, DSP associate

When it comes to selection of tools, there are different types of tools used with regards to the purpose and size of the workshop and the requirements of SMEs. Methods, which are intuitive, interactive and easy to engage with, were preferred for DSP workshops (R13, R15). The importance of the use of appropriate and clear language for instructions and of the use of suitable terminology that can be easily understood by audiences with different backgrounds was mentioned (R15, R17). It was reported by two respondents (R12, R13) that the level of engagement in using tools might differ for each company, depending on the background of participants. Another DSP respondent indicated that tools which have formal rigid structures, or that are not very collaborative, are difficult to engage with in large workshops. TRIZ (Altshuller, 1996) was mentioned as an example. TRIZ is largely used as a problem-solving tool, but the DSP workshops often focus on identifying problems. However, two DSP associates indicated that TRIZ is a method that people from technical backgrounds can engage in easily. R18 identified that selecting the appropriate tools depends on the type of event and the topics being covered and the problems being addressed. R17 indicated that the selection of the tools depends on the problems of SMEs and requires an understanding of the SME. Table 4.14 presents the important characteristics to consider while selecting tools to use in a workshop, based on respondents’ opinions.

Table 4.14 The important characteristics to consider while selecting tools to use in a workshop

Example quotation	Summary statement	Theme
<p>"I think the interactive approach always work better than the others. They [the SMEs] kind of own it, they are part of it." R15, DSP associate</p> <p>"Generally we found that being participative, being quite light hearted in some ways and all the stuff around serious play was generally quite effective". R13, DSP associate</p>	Engaging and collaborative	Selecting tools and methods
<p>"Sometimes the wording can be a barrier. It needs to be very clear what you are intending to do with the tool and to be very clear about the instructions on how you use it. We have had tools for which we tweaked how we present the information so that people can be clearly directed". R15, DSP associate</p> <p>"We try the tool in different contexts, we try with really non-typical engineers, industrial engineer start-ups, really science-driven start-ups. Adapting the language is important. [...] We found that some of the explanations are a bit too soft fluffy first, so we have just to shift some of the language for them so they are harder and more related to their sector. The materials sit in the context." R11, Government support agency representative</p>	Appropriate use of language for the context Clarity of instructions	
<p>"It's just a matter of finding which one [tool] reflects most accurately the questions that we are setting up at the start". R18, DSP associate</p>	Appropriateness for tackling the design problem	
<p>"That is a difficult one [topic], because again it's so much on what the individual SME needs [...], it's about developing the relationship with the company to understand where they're going what they're trying to do." R17, DSP project manager</p>	Depending on the SME's needs	
<p>"There were certain tools that were particularly effective in terms of approach, especially in larger workshops, where we have a variety of people, with very different backgrounds and learning styles [...] who will engage in the process in very different ways" R13, DSP associate</p>	Depending on the size of workshops	
<p>"I mean you know the TRIZ cards, we tried that in one-to-many workshops and that really did not work. We would have liked to try the TRIZ cards with some SMEs from the oil and gas sector, with an engineering background to see if in some other circumstances they would have been comfortable with that methodology" R12, DSP associate</p>	Appropriateness to the audience's background and learning styles	

Some respondents (R11, R12, R15, R17, R18) expressed the fact that innovation tools needed expert facilitation if they were to be effective. They also mentioned that SMEs have difficulties in integrating these tools into their own innovation processes without the help of an external expert facilitator. Table 4.15 presents the opinions of respondents regarding the importance of expert facilitation for DSPs. (Some of the opinions (R18, R11) were already evidenced in Table 4.9).

Table 4.15 The importance of expert facilitation

Example quotation	Summary statement	Theme
"To ensure they have the right information, that they have the right guidance and you drive them to do it." R15, DSP associate	Providing guidance	Importance of facilitator in using these tools.
"There are some specific tools that can help companies in the design process but usually it's the intervention of a human being that makes a big difference." R17, DSP project leader	Human intervention	
"You cannot tell people around the table, 'come up with ideas'. You need to provide inspiration. You have to design a brainstorming approach." R21, Design consultant	Inspiring and guiding	
"Some people thought, 'that is a bit stupid', we had occasionally people who turned around saying, 'I am not going to do this part at all'. But you manage to overcome those things just by sort of gently encouraging people to sort of move outside their comfort zone in a quite safe way". R13, DSP associate "If one person says 'I don't want to do it [the method], this is silly ', then you've got a problem coz that will spread around the room, so it's the facilitator's job to make sure people understand it [the method]". R18, DSP associate	Overcoming difficulties	
"And crucial thing is how it is facilitated and how it has been used. So you can buy the IDEO method cards, and sold thousands worldwide. The companies using them are going to be generally using it in a quite limited way. Not so fundamentally like IDEO itself." R13, DSP associate	Facilitation improves the efficiency of tools	

#### 4.4.5 The selection of SMEs participating in DSPs

All SMEs are eligible to participate in DSP workshops. SMEs' participation in these workshops is often subsidised by the funding providers depending on the funding framework. Participation depends on company's interest and commitment. DSPs sometimes have no criteria, except that of being an SME, for selecting participants because there may not be many participants (R18). However, a lack of clear criteria for selection may result in DSPs working with companies that do not need design-led support, that are not ready for pursuing innovation or that do not have the budget to take the initiated work further (R13). Some DSP respondents underlined the importance of having clear criteria to select participant SMEs in order for the initiated work to be completed. The criteria that were suggested by the two respondents (R14, R17) include financial readiness, curiosity, motivation, commitment and responsiveness. Two DSP associates (R12,

R13) and three design consultants (R21, R23, R24) highlighted that there exists a correlation between the size of the SMEs and the responsiveness of SMEs towards strategic design support. Family businesses were found to be more willing to embrace the DSP interventions because it was easier for them to guide their employees to a DSP workshop (R12). Larger businesses, on the other hand, are harder to access, but are more likely to achieve a positive outcome (R13). All these interviews indicated that having the right attitude and characteristics for the design support contributes to the effectiveness of design support. Table 4.16 presents different criteria for selecting SMEs for the effectiveness of DSPs, as indicated by interviewees.

Table 4.16 The selection of SMEs participating in DSPs

<b>Example quotation</b>	<b>Summary statement</b>	<b>Theme</b>
"We didn't have a huge number of SMEs, so there was no need to exclude anyone, but we didn't have any criteria in terms of 'you must be a family business', it was just 'are you a small business?' If they were, then they were welcome to come along". R18, DSP associate	No criteria for selection	Selection criteria
"The smaller life style companies are just happy as they are. I think it might be a waste of time in some ways to work with them [...], the larger ones are more receptive but also harder to get into with this kind of approach." R13, DSP associate	Responsiveness for growth	
"I go through a questionnaire with them which can be done over the phone to see whether they are willing to design, [...] I am looking at a design stipend, generally a minimum of £5000 to £6000 which a lot of companies can't afford, specially for a branding exercise". R17, DSP project manager	Financial readiness	
"There are companies who are already managed by the government agency X which means they are already identified by the government agency X as high growth and their account manager or innovation adviser could guide them in a straightforward way to one-to-one [workshops]." R15, DSP associate	High growth companies	
"It is curiosity [...]. And it's really the idea of being open to different ways of doing things, being very comfortable experimenting, being restless with status quo, making collaborative networks that are meaningful. So these are some of the things that we think are the set of characteristics that we would look for [...]. If the company is not receptive to what design can do, there is not much to do. So, I really think that it would be again important that the right people talk to each other". R14, DSP director	Curious and receptive companies	
"Again it is all to do with the mindset, as long as they have the right mindset. I don't think it is fortunate, I don't think it is just luck. We have done quite a lot again to make sure that people coming on the programme should have the right mindset, as it can be quite costly to run, you know the programmes that were free. We have a quite rigorous application form, not massive fill in the form you know with the million pages, as we are not into		

that but more about 'come along to have a chat with us, picture your ideas in a few minutes'. It gives us a chance to speak to them to understand if they have got the right attitude for the programme." R11, Government support agency representative		
"Family businesses in particular seemed to be very willing to accept it. [...] And I think that is because they are absolutely in control of everything they do in the business". R12, DSP associate	Family business are more receptive because they are in control of everything	

#### 4.4.6 The duration of DSPs

The duration of the programme is also relevant when considering effectiveness. Table 4.17 presents the views of interviewees on the duration of DSPs. It was reported that the time allocated for a project is often too short and does not support the achievement of long-term results (R12, R13). It was explained that significant time, often one year, is required to develop the centre to the operational stage and generate publicity (R13, R18). This short time frame requires high level planning of the project duration which directly relates to the effectiveness of the programme (R17). In addition, the short duration of programmes makes it difficult to follow up on completed tasks or achieve long-term impacts (12).

Table 4.17 The duration DSPs

Example quotation	Summary statement	Theme
"A whole year goes before you really get going and then you actually need a year and a half of time. Because the final six-month is about wrapping the project up, doing all the analysis of the impact, you really have got a year and a half window of operations." R13, DSP associate	1 <sup>st</sup> year is setting up, which leave less time for operations	Duration of DSPs
"I think these projects always take the 1st year to get everything in place, to get up and running, get the word out, let people know that there is that project that exists, there is that source of support and from there it really snowballs." R18, DSP associate		
"I have a high level project plan which basically says, first six months: get the ideas together, the first year: get your companies on board, second year: deliver, last year: mop up. That time limit requires a high level of planning otherwise it doesn't come up with effective results". R17, DSP project manager	Limited time requires high level planning	
"Time is really dictated by Government Agency X and what we have to deliver in that time." R15, DSP associate	The effect of funding framework	
"We were not around long enough to measure the medium and the long-term impacts. So we provided reports for running the workshops. We don't have long enough time to follow up on that." R12, DSP associate	Not enough time to follow up	

"I think 4 years is very good, a lot of these projects are 3 years, so to have the extra year is fantastic". R18, DSP associate "So the models that are more targeted and have much longer interventions, I think, are hugely beneficial". R13, DSP associate "I think, certainly longer lifetime. [...] 5 years that's quite good. Perhaps that would be better". R13, DSP associate	Longer time for operations	
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#### 4.5 Evaluation of the outputs and outcomes of DSPs

Rossi et al. (1998, p.36) examine the "impact on the conditions it is intended to ameliorate" in result evaluation. Different approaches are used for analysing the results of design interventions (Perrin, 2007); one approach is to separate the outputs of a project from its outcomes. Outputs are activities and facilities that DSPs offer to SMEs, whereas outcomes refer to the achievements resulting from the activities of the design intervention. Various outputs and outcomes are listed in Table 4.18 to illustrate the differences. The present section describes the outputs and outcomes of design intervention projects and how they were measured.

Table 4.18 Outputs vs. outcomes

Outputs	Outcomes
Number of workshops, meetings, seminars & events Number of participants Creation of design brief Design audit reports New actionable ideas for new products and services Networking	Awareness Motivation & opinions Skills, behaviours, practices Business change- financial outcomes Cultural change

##### 4.5.1 Outputs

According to the programme reports, the number of SMEs that participated in DSPs ranges from 60 to 1000 SMEs depending on the size of DSPs, the duration of support and objectives of the support. For instance, since 2007, the Designing Demand programme, a large-scale DSP that was delivered in 7 out of 9 English regions, has reached to 2000 companies and coached 700 of them (Design Council, n.d.). R17 indicated that they provided support sixty people in two years. Reaching a large number of SMEs are sought after by DSPs, this might be due to the fact that the number of SMEs

contacted is an empirical piece of data, thus easily quantifiable. Nevertheless, two DSP associates questioned whether a mass-targeted approach could meet SMEs' needs. DSP respondents, R12 and R13, stated that they prefer working with a small number of SMEs through multiple interventions rather than with a large number of SMEs:

"We have got some funding from X [funding body]. We get a high profile speaker and we could then say we could reach two hundred SMEs, you know they will come along and listen to Y [a high profile speaker] [...]. With one-to-many workshops you tick the box quickly [...]. I would personally be willing to work with dozen of businesses over a three year period with multiple interventions and measure that rather than work with the thousand." R12, DSP associate

The number of SMEs attending a DSP workshop can still be considered as important information. For instance, in a one-to-many workshop conducted by a DSP, 4 out of 19 participants were SMEs, the rest of the participants were academics or designers. Similarly, the design seminars attended show that there was a relatively small number of SMEs amongst a large audience. This may demonstrate a lack of interest in these events from SMEs.

Other outputs of DSPs include creation of design briefs, design audit reports, and new actionable ideas for products and services. Some respondents identified that DSP workshops should produce tangible outputs at the end of the sessions.

"It is quite important for companies to know that they are going to do a lot of activities, some of which sound a bit crazy but that actually there is a purpose there. There should be specific outputs whatever they might be. So it would not be a day of creative activities with no tangible outputs." R13, DSP associate

Two DSPs mentioned that they developed detailed design briefs as a result of one-to-one workshops (R15, R17). One DSP developed actionable ideas and offered prizes to participants, who could turn these into a business plan successfully (R18). Another DSP provided audit reports as tangible outputs (R12, R13).

A bespoke design brief, which is a product of a one-to-one workshop, aims to ensure that the design output (a logo, a website, or a new product/service) fulfils the company's needs and contribute to the wider company strategy. A design audit report, often a product of a one-to-one workshop, intends to highlight problems affecting SMEs and can be used when seeking further expertise. Design audit reports reflect the design

associate’s area of expertise, and can provide general advice addressing particular problems that become apparent as a result of the DSP workshops and meetings.

In DSP workshops, interventions usually generate actionable ideas ‘based on quantity, not quality’. For instance, after a one-to-one or one-to-many workshop, a company may have had over thirty ideas. An SME during a workshop indicated that generating ideas is not the most challenging part of the realisation of innovation, in his words, “*ideas come from everywhere*”. Interviewees indicated that selecting the right idea amongst many ideas, developing and bringing that idea to the market and commercialising it is more difficult (R4, R2). A DSP associate mentioned that SMEs need support in developing ideas rather than generating ideas for innovation (R18). Similarly, a design consultant and a DSP respondent indicated that the hardest part is realising that idea, by making it technically feasible, smart and desirable (R21). Table 4.19 evidences the aforementioned opinions on idea generations.

Table 4.19 The relevance of idea generation as a DSP output for SMEs’ needs

Example quotation	Summary statement	Theme
“Stepping up from a proof of concept to a product in the field is pretty challenging.” R4, SME owner manager	Difficulty of realising ideas	The need for realising rather than generating ideas
“We are not short of ideas but the biggest challenge we have is picking the right ones”. R2, SME non owner manager	Difficulty of selecting ideas	
“Everybody has lots of ideas all the time. But we don’t do anything with them and I think it's in doing something with the idea that the value is in because otherwise it just remains an idea unless you put it into practice. And putting it into practice is the very difficult bit and I think that it is what companies need help with.” R18, DSP associate	Difficulty of putting ideas into practice	
“It becomes a product, rather than just an idea. And that’s the hardest thing. It’s easy to come up with ideas that are innovative, I think [...]. not saying it’s easy to come up with ideas, it’s getting them to be innovative and actually taking them through to market which is very difficult. And lots of companies have got lots of ideas. It’s literally shaping them so that they actually become good ideas.” R21, Design consultant	Developing the ideas and quality of ideas	
“When it comes to implementation, it is absolutely not the glamorous end of design interventions. It can be quite dull [...] But design can help by being quite rigorous, by making sure that the initial big ground idea actually gets implemented, nicely and elegantly. But these stages in the literature are sort of completely written off because they are not exciting, that’s	Implementation is often avoided, because it is hard and not glamorous	

hard. The attention is on the myth of making, sort of first initial ideas, on glamorous exciting face.” R13, DSP associate		
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#### 4.5.2 Outcomes

Analysis of interviews and observations led to six themes to assess the impact of DSPs, namely satisfaction, awareness of design, learning-empowerment, increased capacity of using design, financial outcomes and organisational change (see Table 4.20). A great enthusiasm, which was observed amongst participants during DSP workshops, shows their satisfaction as a result of DSP events. The concept of raising awareness of design is often referred to as a desirable outcome within design reports and also mentioned by interviewees. It was found that SMEs were better able to recognise the design activities in their day-to-day business, following a design event (R6). Interviews indicated that another outcome of DSP events is the introduction of a new and different perspective (R14, R18). Behavioural changes amongst SMEs such as being more confident in the market and receptive to the changes were also mentioned (R14, R15). Financial outcomes included increased employment and longer lifespan in the market (R13, R17).

Table 4.20 The outcomes of DSP interventions

Example quotation	Summary statement	Theme
“The feedback we had from them [participant SMEs] was overwhelmingly positive and a lot of them would recommend friends to go along to an event. We do the happy sheets to know what they are getting out of it and I’ve got some quotes saying that it was relevant, enjoyable, challenging, intense [...]. The feedback that we got from them was that they found it really useful and very relevant.” R18, DSP associate	Positive feedback	Satisfaction
“I guess when I first heard innovation and design, I thought ‘do we use design—No we don’t’; the more I thought, ‘yes we do’. But I think that that perception is quite common. If you ask the individuals here [in the SME], that would be the first thing they would say, ‘no, we don’t use design’. But when I actually sit down and think about it we use designers for everything. I am a designer myself when [he is describing a decision making process in the company] I am designing a service for customers. The initial perception is that ‘no we don’t use design, do we need it?- no’. But the simple answer is ‘yes we do’.” R6, SME non-owner manager	An improved understanding of design	Awareness
“So, for example, one of the organisations we worked with described themselves as naïve. They’re much more confident to go out to the world now. They had a very top-down management structure, they have much more distributed leadership and much more focused process. There’s bit of a communication across	Increased confidence	Behavioural change

different organisational silos. Certainly the company behaviour has changed". R14, DSP director		
"...also they are more in tune with what is going on in the world if they follow the advice that have been given or they follow the process they worked with." R17, DSP project leader	Receptive to the changes	
"What we tend to find is that the company is more robust in what it is trying to achieve. [...] Probably the company will last longer in the market place." R17, DSP project leader	Last longer in market place	Business change and financial outcomes
"We have observed that they [an SME] have taken new employees and become smart about how they restructured their market position. That came out from the evaluation at the end". R13, DSP associate	New employees	
"They [SMEs] think in a different way. So they're able to look at problems, issues or opportunities in a different way. They're able to understand their colleagues in a different way". R14, DSP director	Looking at problems differently	A new perspective
"At the end of it, they 're like 'we've got a lot of different perspective now that we didn't have before.'" R18, DSP associate		

## Opportunities

Networking was considered as an important part of the support being offered (R10, R18). For SMEs, the benefits mentioned include meeting with like-minded people, hearing how other SMEs dealt with a problem or seized an opportunity and removing the barriers of communication. Interventions that enable and trigger open discussion and encourage questions and answers on mutual topics were considered a good approach by SMEs. Their viewpoints highlight the value of the interaction and exchange amongst participants. These opinions are shown in Table 4.21.

Table 4.21 The importance of interaction, exchange and networking

Example quotation	Summary statement	Theme
"We did a workshop with DSP X, it was successful in bringing everybody from different parts of the company together and trying to come up with new ideas. Maybe we are not so good at that, people tend to be so busy that they focus on their own job. So that's maybe one small weakness of the company". R2, SME non-owner manager	Collaborative and increased communication within the company.	The importance of interaction, exchange and networking
"I joined some innovation courses and really, my main purpose was to meet and speak to other like minded people to develop my network." R5, SME owner manager	Meeting with like minded people	
"Even if it is not directly related to what we are doing just hearing how other people deal with things is good." R6, SME non-owner manager	Hearing how other deals with things.	
"What we found was that the workshops are really effective for having much needed networking opportunities, helping contacts, developing a peer group or just for understanding what are the sort of challenges you're facing when you're	Peer learning and networking	

starting up a business.” R11, Government support agency representative		
“You could read a book but at workshops you engage with others. That’s the main advantage of the workshop we ran here. That’s another form of networking. That’s a support as well”. R10, Government support agency representative		

Interview findings and observations at design-led workshops showed that DSP workshops encourage collaboration and networking through their hands-on and group activities. A design perspective that is participatory and non-hierarchical encourages lower-level employees to share their ideas within the company (R2). For example, a DSP associate, R18, indicated that rotating participants into different teams during the activities and assigning a facilitator to each group could encourage the conversation. R18 also commented on the fact that ice-breaking activities and the construction of a workshop with several group activities remove the barriers between participants. Nevertheless, networking may still be dependent on the social abilities of participants during refreshment breaks. It was observed during the seminars and master classes that networking and exchanging ideas is not straightforward. It was found that networking is not always strategically structured. An interviewee from a government support agency mentioned, “Networking is an opportunity never formalised” (R11). For instance, a business coach, who also collaborated with a networking company, emphasised the importance of an initiator role in networking (R25). His perspective indicates the importance of additional roles to support networking.

“I’m one of the so-called connectors, so if you come to the networking event for the first time, I’ll be assigned to your company to find out who you want to meet and introduce you to other people. You don’t have to go and start conversations on your own or just look lonely in a corner.” R25, Business coach

### **Difficulties**

One SME commented on the difficulty of reflecting on the event because of their busy schedule (R6). Alternatively, a DSP respondent criticised the approach of raising design awareness and associated raising awareness with design promotion, not design support. One DSP associate pointed out that in the design discourse there is no acronym like SWOT analysis (strengths,

weaknesses, opportunities and threats) or 4P of marketing (price, product, promotion and place) so that SMEs cannot recall the learning easily or cannot refer to later on. It was found that empowering individuals is not a complete outcome, and that the impact needs to reach the company as a whole. Employees that benefited from DSP workshops were expected to share the learning with the rest of the company, so that individual learning would be transferred to the organisation. For instance, the employees who attended one-to-many workshops were expected to disseminate this learning to the rest of the team and to persuade them to proceed to the next step (R12). A difficulty for DSPs might be that SMEs are more interested in solutions that they can commercialise than questions regarding their problems (R4). In addition, SMEs may not have time to realise the project that is initiated at workshops. Three SMEs (R1, R2 and R5) that participated in DSP workshops and one SME (R6) that participated in a DSP seminar refuted that a significant cultural change occurred as a result of working with DSPs. Perhaps, it might be because SMEs participating in DSPs are already design-aware as identified in Table 4.4, or because creating a significant change requires a longer period of support (R13). An SME (R3), who has been working with a university for five years and receiving design support in different ways (KTP, consultancy and placement but never participated in a DSP), recognised the cultural change.

“...more awareness of the issues and more openness in terms of how we analyse the potential solutions”. R3, SME owner manager

Table 4.22 presents the opinions of DSPs and SME respondents regarding difficulties to obtain outcomes.

Table 4.22 Difficulties experienced by DSPs and SMEs to obtain outcomes

<b>DSPs' perspectives</b>	<b>SMEs' perspectives</b>
<p><b>Knowledge sharing issues</b>            “Perhaps just learning for their [SMEs] own benefits or at least we were relying on them to then go back as a third party explaining what the workshop was about.” R12, DSP associate</p> <p><b>Not reaching the decision maker</b>            “In many instances were not talking directly to the decision maker, very often we were</p>	<p><b>Difficulty of reflecting on events due to the busy schedule</b>            “You just go straight back into work. You are not discussing what went on during the day, other people’s challenges and other people’s thoughts and solutions to your challenges. It is the same with a lot of other seminar events you go to. You go to the event, brilliant, you are really inspired on the day and next you are straight back into your day-to-day routine. If you don’t have a</p>

<p>talking to a influencer not the ultimate decision maker". R12, DSP associate</p>	<p>chance to reflect on it, it is almost nothing." R6, SME non-owner manager</p>
<p><b>Achieving innovation can be difficult</b>          "Innovation is a very bumpy road. It's full of risks and investment, and I think we're not even at the stage [...] I think they [SMEs] are beginning to actually understand why they might want to have it". R14, DSP director</p> <p>"It's strange because people seem to understand what innovation is, but it's more difficult for them to understand what design is about. But then it is easier to do design. Design is kind of a practical thing you can actually do, whereas innovation is quite difficult." R16, DSP director</p>	<p><b>Questions rather than solutions</b>          "There was a design centre. They have some expertise that was interesting. And I did a bit of communication, and did some work, which was great actually, really good. [...] There is always the nature of the university approach to things. There are always questions that need to be asked but you don't get an answer to take into the commercial realm. They have just more questions to ask. So you don't get complete solutions in my experience." R4, SME owner manager</p>
<p><b>"Impact now"</b>          "You cannot do it in two or three workshops. It is something that takes years and years. It takes a complete change of mindset and is something you really need to work at. [...] You try to get volume, to show impact the widest number of companies as possible. But you can't achieve those big big results in a small period of time." R13, DSP associate</p> <p>"Not in a million years, what was delivered in workshops in the window we had could be translated into patents." R12, DSP associate</p> <p>"Obviously it takes time getting your brief delivered and getting your consultant commissioned to actually deliver product or service and see the impact." R15, DSP associate</p> <p>"Traditional SMEs are interested in 'impact now'". R11, Government support agency representative</p>	<p><b>Time consuming</b>          "One issue is that working in an academic project is quite time consuming. You may not have that time to do that, especially as a small business." R3, SME owner manager</p>

### 4.5.3 Methods and measures used to assess DSP results

An important topic in relation to outcomes is the process of evaluation. The majority of the DSPs mentioned that they collect feedback as a way to evaluate the value of their interventions. Table 4.23 shows that DSPs tend to measure results of their workshops by qualitative measures, for example by observing the immediate reactions of SMEs during (R13) and after the workshops (R17) or by "gathering their stories of change" (R14). On the other hand, it was mentioned by the majority of respondents that the

programmes' key performance indicators were predominantly defined by funding bodies and were quantitative indicators.

Table 4.23 Methods and measures used to assess DSP results

Example quotation	Summary statement	Theme
"But for me, what was more valuable, as the only person going out delivering the stuff to the companies, was watching how people interact with them [tools and methods] and how they interpret them." R13, DSP associate	Observing SMEs during the process	Qualitative measures
"We don't have any agreement or funding to track in terms of what happens but Government agency X is doing an evaluation. [...] We often ask people to give us feedback. We do have just a really short questionnaire, only 5 questions. We ask them, there are no tick boxes. We ask them to write. So we do that at the end of each workshop." R15, DSP director	Government agency evaluates the results of the DSP  Feedback sheets for their performance	
"We don't use hard measuring ourselves. We ask the organisation if they would like to do but we don't. We use a much more qualitative approach, we gather stories of change." R14, DSP director	Collecting the stories of changes	
"That depends on the project we do because some of them [funding bodies] want us to evaluate against the set known criteria upfront the XYZ projects that I am working on. I have got a 55-page evaluation scheme to follow through. Sometimes it is a requirement that I have to do it their way. But generally speaking If I want to do a quick evaluation, I will go back to the original objectives that I have with the company and check if we have met them, if it has taken them where they wanted to be, if so, we take it as a successful project. So that's very much on a one-to-one basis". R17, DSP project leader	Looking at the objectives and outcomes matches	Qualitative & quantitative measures
"It's all to do with how much funding is awarded, how many companies are given funding, how the companies' turnover go on to increase, very standard in all these sort of projects. I think they [measures] are very necessary. Obviously for the funders because they have to see how the money is awarded and where it goes, they're really quantitative measures to help the funders understand the outcome of the money, so they are really necessary and very useful". R18, DSP associate	Funding framework requires quantitative measures	Quantitative measures
"One of the frustrating ones [measures] was the number of patents that we were expected to file. Not in a million years, what is delivered in workshops in the window we had could be translated into patents." R12, DSP associate	Funding framework requires quantitative measures	

A difficulty regarding the evaluation process mentioned by a respondent was to separate the design interventions made by DSPs from the ongoing

business activities of SMEs. SMEs may have been working with a number of other agencies such as universities and business advisors, making it hard to isolate the impact of a single design intervention.

“It is very difficult to subscribe specific value to me, to us or to the methods because some companies are very canny about the support they receive. Actually they are doing little stuff with us, little bit stuff with somebody else from universities, and they may get support from other business advisors, and other funded projects around. It is more a combination of discrete factors coming together.” R13, DSP associate

It was found that the difficulty of measuring design outcomes was also related to the fact that SMEs, especially small businesses, do not measure design support they receive systematically. The indicators used to measure outcomes vary from company to company. Although most of the SMEs interviewed evaluated the impact of design interventions by making use of financial indicators, other companies used more subjective indicators that were based on feelings such as being confident and happy (R7). R6 reported that they evaluate the design outcomes by comparing the results to their initial expectations from the design intervention. Measuring outcomes design requires time, energy and systematic evaluation methods. Even if SMEs consider measuring the outcomes, they do not do the evaluation of outcomes on a continuous and systematic basis (R7) or sometimes avoid it (R5) (in Appendix E, Table E.3 evidences interviews on SMEs’ evaluation). During the interview process, a DSP representative, R17, mentioned that they were working towards developing a ROI tool to deal with these challenges. *“We have developed a tool, but it’s only in the beta testing at the moment, but it’s called the return on design investment. It’s an online tool, it’s not ready to give to companies yet.”*

#### **4.5.4 Clarifying the outcomes of events and managing expectations**

Another theme identified during the interviews is that there might be a potential misalignment between what DSPs can deliver and what SMEs expect from them (see Table 4.25). Two DSPs mentioned that SMEs are naïve and want to observe the differences as a result of support immediately after the intervention. R17 observed that SMEs have very demanding expectations in general. First-time design users may be much less knowledgeable about the design process and therefore more

demanding (R17). A DSP respondent observed that there was a limit to the benefits of the design-led approach in terms of making a difference in a business (R12). R17 identified a potential problem arising from creating expectations beyond what can be delivered by the DSPs. This was also found in the one-to-one advisory support report by Design Wales (2007). The importance of developing a portfolio with testimonials based on previous works with SMEs was recognised by some DSP respondents. This seems reasonable because all the SMEs that were interviewed look at referrals, testimonials, portfolio and case studies to evaluate the design expertise prior to working with a design consultancy (as illustrated in Appendix E, Table E.2). Although there were some examples of testimonials and case studies, these were relatively unclear and did not help SMEs understand the value of outcomes.

Table 4.24 Clarifying the outcomes of events and managing expectations

Example Quotation	Summary statement	Theme
"There is a big difference there [between first time design users and experienced design users], because those that never used them [designers], have expected too much upfront from a designer". R17, DSP associate	Great expectations of SMEs	Managing expectations
"It is probably very naïve to think a design methodology can turn around the businesses that are struggling." R12, DSP associate	There is a limit to what design can do.	
"If you promise the earth and do very little, I think you do more harm than good." R17, DSP project manager	Being transparent about outcomes	
"As with any service that offers such intense and individual support for clients, there must always be a balance between promotion and the ability to provide an effective service. Too much promotion can raise expectation beyond the capacity of the available resources" (Design Wales, 2006).	Avoid raising expectations beyond the delivery capacity	
"It would have been nice to get a bit of portfolio behind us, some testimonials saying that this is really worthwhile, that these are the kind of impacts and outcomes you are going to pay for". R12, DSP associate	A portfolio evidencing outcomes	

**4.6 Summary of chapter 4**

Chapter 4 has presented the findings that are relevant to the evaluation of the effectiveness of DSPs. These key results were derived from interviews, participant observations, programme reports and websites. The findings were presented using the framework of Rossi et al. on programme evaluation (Rossi et al., 1998), namely the need for the programme, the

evaluation of the programme theory, the process evaluation and the result evaluation. The DSP workshops appear to be the predominant activity of DSPs studied. These workshops are delivered as either one-to-one or one-to-many format. Table 4.25 summarises the strengths and weaknesses of the DSP workshop format delivered to SMEs.

Table 4.25 Strengths and weaknesses of DSP workshops

<b>DSP Workshops</b>	
<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>• Design “doing”, hands-on suitable for design knowledge.</li> <li>• Peer learning and networking</li> <li>• Inspiring</li> <li>• Enabling-empowering</li> <li>• Engaging and motivating</li> <li>• Increasing the awareness of design-led innovation</li> </ul>	<ul style="list-style-type: none"> <li>• It costs time and energy for deliverers</li> <li>• Energy intensive for participants</li> <li>• A common method, SMEs are indifferent, ‘just another workshop’</li> <li>• It requires efforts from SMEs to apply learned material to their own problems</li> <li>• It initiates but does not finish the process</li> <li>• SMEs might be unfamiliar to the idea of serious play and hands on learning.</li> <li>• Cancellations due to the free workshops</li> </ul>

With respect to the outcomes of events, some of the results derived from interview findings demonstrated that developing new ideas is not always relevant for SMEs' problems. Focusing on quantity in idea generation for example is not always desired as an output. A degree of specialism was considered to be critical to be able to work with some industries.

The conducted interviews indicated a recurring difficulty in persuading SMEs to engage in DSP workshops and to follow up initiated work for business outcomes. It was identified that the DSPs studied in this research promote design and raise awareness of its importance by adopting a process-oriented systematic approach and delivering a new perspective and fresh insights to companies. DSPs that were approached advocate the strategic use of design that addresses business issues by reviewing the needs of companies holistically and by utilising a human-centred innovation approach. A key aim appears to be the transformation of the existing

culture within SMEs to an innovation culture that exploits design strategically.

In contrast, it was observed that the SMEs interviewed were often goal and solution oriented, with the value of outcomes tending to be evaluated against financial indicators. It was found that the SMEs focused on achieved results and tangible outputs rather than processes. They conveyed a desire for immediate solutions to their problems and incremental changes. The following Table 4.27 summarises the differing expectations between DSPs and SMEs.

Table 4.26 Differing expectations and objectives between DSPs and SMEs

<b>DSPs</b>	<b>SMEs</b>
<ul style="list-style-type: none"> <li>• A process oriented approach</li> <li>• Integration of design to the company' strategy</li> <li>• A human-centred perspective to enrich the innovation processes</li> <li>• Promote design and raise awareness about its importance</li> <li>• Aim for a holistic approach based on generic support</li> <li>• Cultural change in the company</li> </ul>	<ul style="list-style-type: none"> <li>• An outcome-oriented approach</li> <li>• Tangible and practical solutions</li> <li>• Financial benefits</li> <li>• Based on a desire for immediate solutions to their specific problem</li> <li>• Risk averse, smaller steps, incremental innovation</li> </ul>

The following chapter of the thesis will discuss some of the key findings that have been presented in relation to existing studies, key concepts and theoretical frameworks.

# 5 Discussion of findings concerning the effectiveness of DSPs

## 5.1 Introduction

Chapter 4 presented the findings of the interviews conducted by the researcher (described in Sections 3.4.1, 3.4.2 and 3.4.3), participant observations (described in Section 3.4.4), publicly available DSP reports and case studies (described in Section 3.4.5). The respondents commented on different aspects of the DSPs that they were involved in while reflecting on the effectiveness of the programmes. Their reflections illustrated the complexity of the issues surrounding DSPs, which requires additional discussion.

Chapter 5 discusses the key findings of this research. Effectiveness is about achieving outcomes that are planned, intended or desired; therefore, the following discussion identifies the relationships from an aim-objective-outcome perspective. Additionally, the perspectives of different stakeholders are also considered in the discussion because the notion of 'desired' outcomes might differ for each stakeholder.

The theoretical lenses used to frame and validate the findings are reflective learning (Kolb, 1984) and tacit knowledge exchange (Nonaka, 1991; Polanyi, 1962), which were introduced in Sections 2.2.3 and 2.3.4 respectively. While discussing the findings, the design support literature and the interdisciplinary literature on business support programmes are also referred to, along with existing studies on design support.

The chapter begins by discussing the various aims of DSPs, including design awareness, innovation, knowledge exchange and cultural change. Then, it proceeds to consider the modes of DSPs. Before focusing on the issues relating to the impact of DSPs, it discusses the factors that contribute to the involvement and commitment of SMEs in DSPs. Subsequently, the funding framework and the terminology of design are discussed. The chapter concludes by proposing a seven-step evaluation framework that can be used for planning and evaluating the outcomes of DSPs. This new framework is a re-conceptualisation of Kirkpatrick's four-level model, which was developed to evaluate training programmes in general (Kirkpatrick, 1996).

## **5.2 Goals of DSPs**

The section goes into following sub-sections that discuss the common goals of DSPs. These goals are raising awareness, innovation, knowledge transfer and cultural change. The section also discusses the importance of the role of DSPs in relation to these goals.

### **5.2.1 The value of raising design awareness**

Raising design awareness appears to be a desirable outcome from a designer's perspective. The reports of DSPs that were examined for this research displayed an emphasis on raising awareness. The announcement of European Design Innovation Platform (EDIP) by the Design Council further exemplifies this attitude:

"The EDIP will be delivered over 3 years and aims to accelerate design-driven innovation in order to boost innovation, growth and job creation across the EU. It will do this by raising awareness of how design-driven innovation already increases efficiency in public services and drives business growth across Europe". <http://www.designer.com/news/27130>

The emphasis on design awareness and its profile within businesses can be traced back to the Cox Review of Creativity in Business (Cox, 2005), a foundational policy document, which led to the establishment of several DSPs (see Section 2.4.6.). The review recommended that the issue of raising the profile of design within SMEs be addressed. The underlying premise of 'raising awareness objective' is that if the value of design for

innovation and business growth is clarified, SMEs' problems will be resolved when using design. This line of thought seems reasonable because existing research (e.g. Bruce & Morris, 1994) suggests that SMEs need to have a knowledge base and an awareness of design even before working with designers. However, this PhD research offers a critical stance and questions the value of raising awareness as an aim for the effectiveness of DSPs in three points, namely the suitability of the aim for effective design support, the appeal of the aim for DSP funders and the connotations of the aim. Firstly, one of the interviewees in this research objected the suitability of raising awareness for DSPs and claimed that raising design awareness was a promotional aim and not relevant for effective design support (see in Section 4.4.3- The types of support provided by DSPs). Borja de Mozota (2005), Raulik-Murphy (2010) and Cawood et al. (2004) suggest separating design support for SMEs from design promotion, as these two activities have different objectives and impacts. Their view puts an emphasis on methods and delivery. Design promotion raises awareness through workshops, exhibitions and publications, while design support provides hands-on experience and advice through the design process (Raulik-Murphy & Cawood, 2009). Building on this argument, design support requires more specified actions. If this is the case, the question remains why an SME would be willing to allocate their precious time to listen to design promotion. Design support is not the same as design promotion. The methods, activities and rhetoric used by DSPs should enhance this difference, not weaken it.

Secondly, as discussed in Chapter 1, governments have been increasingly unwilling to provide funding for design promotion schemes (BIS, 2010b; Ramlau & Melander, 2004). Whicher et al. (2011) state that design awareness, as an aim, is not quantifiable and objective, and it is difficult to measure. It seems to be hard to translate into business impacts that would appeal to government funders. Awareness does not necessarily translate into action; a company owner may become familiar with the value of design and still fail to apply it to his business.

The final point focuses on the semantic exploration of 'raising awareness' as a term. It can be said that there is a lack of action implied by this phrase.

Foster (2013) discusses what 'raising awareness' means and describes it as a passive statement. He comments,

"I really don't like the term 'raising awareness'. There's no action to the words, no movement. They sound so passive. Besides, I've met very few organizations dedicated to raising awareness that had a quick response when I've asked, "Okay, I'm aware now. You've made me feel sufficiently concerned/terrified/responsible. What do I do next? [...] 'I know X exists' is a very different message to spread than 'Because of X, we will take action Y.' But it's the latter that will make the difference". (Foster, 2013)

Although Foster's observation is a general one concerning the value of raising awareness, it could equally apply to the interventions of DSPs. For example, a DSP associate, Jonathan Ball (2005, p.5) comments, "I think there is a lingering ivory tower mentality in some quarters, a little bit of 'we have got this message you have to listen to', particularly to small businesses". Once DSPs have the attention of SMEs, SMEs may want to know what to do next in a very clear and detailed way without focusing on delivering a 'message'.

'Raising awareness' as a term also implies a lack of understanding by SMEs towards design. This might be a prejudiced statement. As interview results show, many SMEs that were interviewed have an understanding of design (see Table 4.4). It also dismisses possible shortcomings of the designer's knowledge working with SMEs. Mercer (2002) discusses how we think and suggests that the kind of knowledge we can develop depends heavily on the symbolic languages available to us. Thus, designers and programme deliverers may need to reconsider the implications of the 'raising awareness' term for other stakeholders by reflecting on whether it is convincing and whether this approach and aim should be altered to become more attractive to SMEs. Perhaps, an aim triggering action and recognising the knowledge of SMEs would be more helpful for DSPs assisting SMEs.

Consequently, as indicated by the results of this study, the main message of DSP workshops should not be solely design promotion, if these DSPs aim to empower SMEs and assist with innovation. Support that is tailored and specific towards the needs of SMEs seems more appropriate. DSPs that solely rely on raising awareness of design as a means to make SMEs use design effectively and to produce positive financial outcomes are likely to fail. Increased design awareness is not equivalent to being able to use

design strategically and take design actions independently, though it can be a first step of design support.

### **5.2.2 Innovation as an aim for DSPs**

DSPs often aim to achieve innovation as an outcome resulting from their support. Consequently, the term 'innovation' is employed widely to communicate the value of the design support and to attract attention (see Table 4.5). To Seelos and Mair (2012), short-term governance, global economic failures and a frustration with old development recipes have legitimised a collective and urgent quest for a new solution to every problem; this solution is innovation. The value of innovation to business has been widely studied in literature (see Section 2.2.6).

This research argues that there might be a number of issues with the widely adopted innovation focus of DSPs. Firstly; innovation is vague, complex and difficult to apply. Although, the literature focusing on business growth has demonstrated a positive bias towards innovation as discussed in Section 2.2.6, "the most consistent theme found in the organizational innovation literature is that its research results have been inconsistent" (Wolfe, 1994, p.405). Even the innovations bringing success in a specific situation may fail when transferred to other contexts; this characteristic of innovation provides little guidance to practitioners (Seelos & Mair, 2012; Wolfe, 1994).

A further issue is the relevance of innovation to SMEs' needs. Interview findings (as shown in Table 4.3) indicated that especially small businesses are predominantly occupied to establish the basics about their business operations first, which makes it difficult for them to concentrate on innovation. Interviews with SMEs evidenced in Table 4.1 also illustrated that SMEs are sceptical about the uncertainties and risks associated with undertaking innovation. This finding corresponds to Ravasi and Stigliani (2011) who claim that SMEs avoid risks, which leaves little room for innovation. Some DSP associates who were interviewed stated that innovation could be difficult to achieve, whereas design is easier to apply to specific problems of SMEs (see Table 4.22). Existing studies suggest that SMEs also achieve business growth without focusing on innovation (Oke et

al., 2007). Innovation often requires a longer-term investment, which is much harder to achieve (Oke et al., 2007; Seelos & Mair, 2012; Wolfe, 1994). Due to these complexities and difficulties, it may be unlikely to achieve innovation as a result of a couple of DSP events.

Consequently, innovation is neither a development shortcut to solve big problems faster nor a collaboration shortcut to establish the relationship between SMEs and designers. Therefore, based on the interview findings that are supported with a number of studies, this research study suggests that innovation should not be emphasised too much; instead, potential benefits of design for SMEs' need to be clearly communicated and not be obscured by the innovation rhetoric.

### **5.2.3 Knowledge transfer (share and use) and learning**

An increased capacity for using design effectively is also an aim of many DSPs. This aim requires SMEs to learn about design and design approaches. DSP workshops, which also function as learning platforms, are often highly interactive and require the participants to be fully involved in the process to apply the methods themselves, to maximise the benefits and to transfer their learning back into their companies. Therefore, the quality of delivery and the SMEs' involvement play a key role in knowledge exchange, indicated by interview findings shown in Table 4.7. Raulik et al. (2006, p.4), from Design Wales, state, "the transfer of knowledge should be clear in a way that will provide companies with the confidence to undertake future design projects by themselves".

Interview findings show that one-to-one workshops can increase the communication within the company by bringing people together in a non-hierarchical environment (see Table 4.23). The importance of this activity is validated by situated learning theories (see Section 2.2.3), which identify the culture, and the social relationships within a company and facilitate OL (Wang & Ahmed, 2003).

The importance of knowledge sharing and reuse seems clear for the effectiveness of DSPs; however, design knowledge transfer may not always be straightforward and may present challenges. These challenges include

the relationship between individual learning and organisational learning and tacit knowledge sharing and use.

The interviews conducted for this research indicated that the participants attend DSP events on the organisation's behalf. This brings the challenge, which is that attendees do not always transfer the knowledge into their company (Table 4.24). OL literature (e.g. Field, 1997; Ikehara, 1999) also highlights such difficulties in converting individual learning to OL. There is also an issue of will; the success of this process depends on whether the participants will use and share the learning outcomes (Foos et al., 2006). Foos et al. (2006) identified the importance of the willingness and the capacity of individuals to share and use knowledge.

Interview results of this research also indicated a further concern, which was that when an individual, who has been responsible for championing innovation within a company, leaves the company; the company fails to take the design process further. However, in a study by Bruce et al. (1999), it was found that an individual's previous design experience from another company could be transferred into the activities of the next company, so the design knowledge is sustained somewhere else. In addition, individual learning may still be seen as appropriate because SMEs often have a short lifespan.

The content of DSP workshops is based on different forms of tacit knowledge such as best practices, insights, holistic perspectives and intuition and mental models (Meso & Smith, 2000). The effectiveness of DSPs is related to the success of tacit knowledge transfer. However tacit knowledge transfer is a challenging task, as discussed in Section 2.3.4 (e.g. Holste & Fields, 2010). Choo (2000) suggested that tacit knowledge is often learned through observation and imitation and can be shared through analogies, metaphors, and stories. It often resembles the "from master to apprentice" process (Holste & Fields, 2010; Lam, 2000). Contextualising information delivered in one-to-many events can be difficult for some SMEs to apply. Section 2.3.4 presented the studies concerning tacit knowledge transfer and identified the importance of a long-term relationship and trust. Transferring design knowledge to SMEs via a rapid workshops and a number

of innovation tools may be ineffective. Short duration of design support and a lack of continuing interaction between the DSPs and SMEs could restrict the process of knowledge sharing and use.

Transforming the existing culture within SMEs to an innovative one was observed as a key aim for some DSPs. This is possible when the design knowledge is absorbed by SMEs. This aim/outcome is highly challenging and requires a great deal of time, as reflected by respondents. Expecting this change to happen after only a couple of workshops is naïve and undervalues the complexity of design. For example, Bryan Boyer (2013), from Helsinki Design Lab, comments:

“If design is like a magical seed that you can drop into the board room and after a couple of days workshop, suddenly the executive suite is transformed into a design facility that pretty significantly undervalues what designers bring”. Bryan Boyer, Strategic Design Lead at Helsinki Design Lab.

The existing literature on organisational change also suggests that learning to change is a difficult task for SMEs. There is also an organisational inertia against change reported in the literature on organisational change (Petroski, 1992). Gray (2002, p.64) lists the reasons why small firms refuse to accept change: “loss of hard-won status or privilege, fear of the unknown, lack of trust, cultural or age-related conservatism, different perceptions of external dangers or disagreement over the proposed strategy or changes”. These triggers should be addressed by DSPs in order to initiate cultural change in SMEs.

#### **5.2.4 The importance of a clearly defined role for DSPs**

The DSPs examined in this study showed that they could play different roles; these are signposting-promoting, facilitating-empowering or advising for SMEs (see Table 4.11). The existence of different roles is consistent with the results of Tether (2006), who identified several modes of design support for SMEs (as presented in Section 2.4.6). He claims that these differences indicate an ad-hoc approach in DSPs for SMEs. The results of the present study as presented in Section 4.4.3 indicate that the intermediary role of DSPs is barely established in the design industry; it is not clear whether DSPs complement the collaboration between design consultancies and SMEs

or whether there exists a potential competition between DSPs and design consultancies (see Table 4.12). These different roles and the intermediary position of DSPs can be confusing for SMEs. For example, Major and Cordey-Hayes (2000), whose study looks at SMEs engagement with business support programmes, suggest that the structure of the intermediary sector is poorly understood both by the SMEs and the intermediaries themselves.

These diverging roles have different priorities. For example, a design promotion role aims to raise a design message that can be delivered by mass targeted seminars or by one-to-many workshops designed to reach the maximum number of people. Advisory support, on the other hand, is a more strategic and tailored support for businesses (Bennett & Robson, 1999). Interview results show that advisory support should focus on the quality of the support rather than the number of people involved. For example, delivering motivational seminars by proficient designers as an objective might be effective for raising awareness of design and the promotion of design, but ineffective for improving the strategic use of design for business innovation. The first approach leads attendees to become familiar with the role of design in business. Integration of design in business and observation of the business impact are more likely to happen with bespoke and specific business support. To Bennett and Robson (1999), advice should be tailored and easy to use, to access and to implement. Thus, if the focus is advisory support, the outputs of workshops should be practical for SMEs. Empowerment role is concerned with producing new skills and capabilities. If the focus is adult learning and empowerment, DSP activities need to consider the premises and process of learning (e.g. Kolb, 1980) and critical reflection.

An ambiguous role or a combination of various roles may weaken the link between objectives and outcomes, i.e., a lack of focus might lead to unspecific and irrelevant aims and objectives. This obscurity may result in misaligned expectations between SMEs and DSPs. The OECD report, "Framework for the Evaluation of SME and Entrepreneurship Policies and Programmes", also underlines that a programme has to have clearly specified objectives matching outcomes from "which it is possible to

determine whether or not it succeeded" (OECD, 2007, p.11). This study, therefore, recommends DSPs have defined roles and objectives accordingly.

### **5.3 SMEs' involvement and commitment to design support**

The success of design support is dependent on SMEs' involvement and commitment in the process. As identified by the sequence of DSP operations (see Figure 4.1), convincing SMEs is required at two levels. The first level is the reaction; that is to attract SMEs and encourage them to participate in DSP workshops and seminars. This might include SMEs attending more than one DSP event. To illustrate, convincing a company of the value of design at a one-to-many event may lead to further one-to-one activities. The second level aims to convince them to follow-up on the work initiated at the DSP workshops and to contextualise learning outcomes, for example to apply newly learned skills to their own context or to invest in design by commissioning designers. At the second level, progress is highly dependent on an SME's commitment to a DSP. There are several factors that can affect the amount of engagement an SME may put in a DSP. These factors will be discussed in the following sub-sections.

#### **5.3.1 Factors affecting the SMEs' involvement in DSPs**

Interviews conducted with the DSP associates identify that bringing a large number of SMEs to workshops is rather difficult (see Table 4.8). The lack of participation observed in events also confirms that it might be an issue. A number reasons found as part this research. SMEs' perception might also restrict their attendance to DSP events. The interviews conducted in this study show that priorities are different between the academic and commercial realms; SMEs find universities slow and not being solution focused (see Table 4.22). Previous research also indicates that organisations such as the Design Council, universities or colleges are seen by SMEs as being unapproachable, expensive and difficult to communicate with (Jeffrey & Hunt, 1985). Similarly, the literature relevant to learning activities for SMEs in the human resources field suggests that owners and managers of small businesses are typically more hesitant to participate in

formal trainings and skill development activities, in comparison to managers of larger businesses (Billet, 2001).

Some of the factors that enhance SMEs' involvement indicated by this research concern public relations (PR), convenience of time and venue and credibility and expertise of DSP deliverers, as illustrated in Figure 5.1.

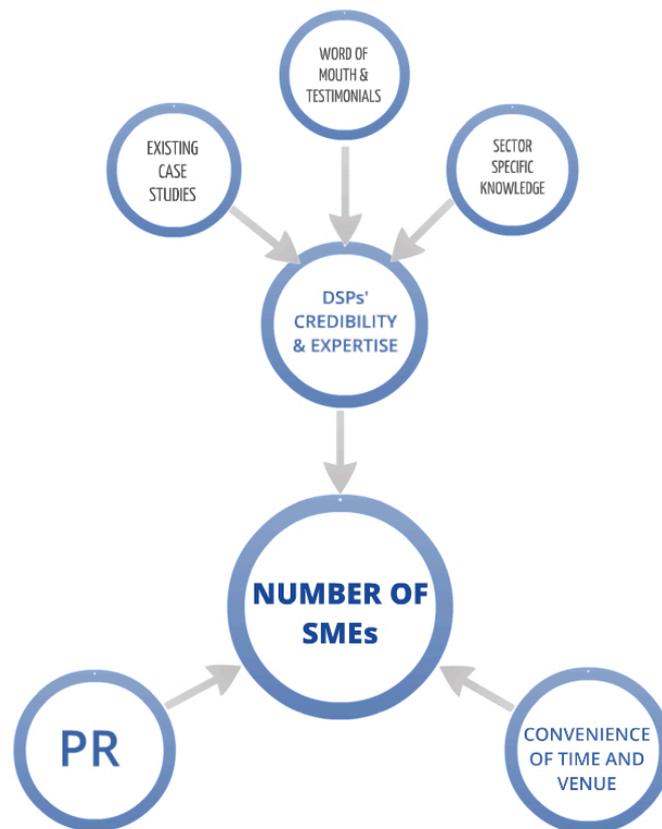


Figure 5.1 Factors affecting SMEs' attendance to design support events

The results of the interviews conducted as part of this research show that SMEs are somewhat inward-looking and often unaware of the PR activities of DSPs. It also identifies room for improvement in the ways in which DSPs promote their activities (see Table 4.8), matching conclusions from Choi et al. (2012). Choi et al. (2012) recommend varying the types of media to promote DSP activities. The present research highlights that not only the

number of PR activities should be increased to inform more SMEs, but also that the content of these activities should be improved to convince SMEs of the value of the support and to overcome apathy i.e. the 'just another workshop' attitude. Knowles et al. (2005) suggest that adults have three key 'need to know' factors that need to be established prior to learning. These are how the learning will be conducted, what will be learned, and why it will be valuable. Interviewees also identified the importance of informing participants concerning the value of interventions. Therefore, this research recommends that PR activities of DSPs communicate the explicit description of their outputs and outcomes, the relevance of these outputs and outcomes to SMEs' needs and the delivery format.

A further point concerning PR activities is to avoid overvaluing design support. Interviews suggest the importance of being transparent with respect to the outcomes of DSP events (see Table 4.24). Similarly to the findings reported by Acklin et al. (2013), the interview results of this research show that it is important to identify the limits of design support while conveying its value to the SMEs in order to avoid misleading expectations. Their research conducted with Swiss SMEs that have little or no design expertise states, "when design was presented as the panacea to all ailments of the company by facilitators or design agencies, this caused distrust or resistance on the side of the SME" (Acklin et al., 2013, p.8).

Another potential barrier to SMEs' attendance mentioned by interviews is the length of the activities themselves. Interviews findings illustrate that a full day or an even longer time period away from their primary business activities may not be reasonable for a busy and active SMEs (Tables 4.7, 4.8 and E.2). When the timing is inconvenient, SMEs being represented by administrative or marketing staff in these activities, rather than by senior personnel, an interviewee commented. This finding is consistent with the conclusion proposed by Walker et al. (2007, p.303), who suggest that location, time of day, and length of session directly influence the reaction to the training events: "Business owner-managers are unwilling to participate in training if it removes them from their business during the busy periods in their day".

Interviews conducted in this research show that the decision by SMEs to work with design consultancies is mainly based on referrals, word of mouth or case studies that have appeared on their websites (see Table E.3). However, the typical three-year period of a DSP may not be long enough to establish credible testimonials and case studies to communicate their skills and evidence their achievements (see Table 4.17).

Sector specific knowledge and experience could also bring more SMEs on board. For example, it applies to the oil and gas sector, which require specific knowledge and expertise being demonstrated by the DSP in order for them to establish their credibility within this sector (Table 4.10). The recent BEDA document published in May 2014 on the current issues informing the design profession also noted DSPs in Europe have been focusing on specific sectors, for example, Swedish DSPs on service design in health care and Danish Design Centre on new materials and technologies (de Jong & Stefanowski, 2014). The report states,

“There seems to be a general trend in Europe away from investing in the promotion of the idea of design as a lever for competitiveness and innovation – at large – towards a much closer collaboration with specific industries or sectors, towards working with organisations which have already embraced design and towards partnerships based on co-funding by the recipient partner. Even though it has not been possible to substantiate this by reliable source statistics, one might suspect that the number of design exhibitions targeting a wider audience, design award schemes and design competitions is decreasing year by year” (de Jong & Stefanowski, 2014, p.6).

### **5.3.2 Factors affecting SMEs’ commitment to design support**

SMEs' attendance to DSP activities is not enough to observe positive results. SMEs need to develop, internalise and apply the information delivered through DSP events. There are several factors affecting an SME's commitment to take forward and apply this information. These factors are discussed in the present section.

#### **Difference in design and innovation needs and capabilities across SMEs**

SMEs existing capabilities and needs, their design knowledge and expectations affect their commitment to DSPs. Findings of this study illustrate that needs and capabilities between medium-sized and small-sized SMEs differ (see Tables 4.2 and E.4). Similarly, The Wales Management

Council, in a report on advisory support for SMEs, states that “‘SME’ is far too broad a term – the needs of a small lifestyle business are radically different from those of a 250-employee organisation” (Ward et al., 2008). As described in Section 2.2.2, SMEs are not only different in size, sector, technology, level of R&D, age, lifecycle and geographical location, but also in their individual dynamics, and informal knowledge (Nauwelaers & Wintjes, 2002; Tödting–Schönhofer et al., 2011). Other studies also suggest that SMEs’ design expectations and design awareness also vary. For instance, Bruce et al. (1999, p.315) state, “some companies may need extensive coaching while others may only need to be put in touch with a designer that fits the company’s needs”. A related finding was found in the study undertaken by Tether (2007) with the firms that were about to participate in a DSP. Tether highlights that the use of design within the SMEs differs across participants. Although half of them did not use design systematically, i.e. were design novices, a third of them approached design as a “natural management tool for the company” indicating different levels of design knowledge and expectations (Tether, 2007). Likewise, Raulik et al. (2006, p.11) state, “what works for one business might not necessarily work for another”, illustrating the fact that SMEs participating in a DSP have differing needs. Choi et al. (2012) also note the operational difficulties that are encountered as a result of the differing support needs of SMEs while discussing the activities of the Designing Demand programme.

The information that is received from a DSP workshop should be relevant to the SMEs' needs. The literature that focuses on formal training for SMEs indicates that SMEs are concerned with the relevance of training to their needs (Knowles et al., 2005). Coopers and Lybrand (1994 cited in Billet, 2001) suggest that small business employers prefer courses based on practical experience, with greater flexibility in their content and outcomes associated with immediate job requirements. Therefore, the ‘one-size fits all’ type of workshops, or talks based on anecdotal best practices may not be easily transferable to an SME’s individual problems and needs. DSP interventions that fail to address the individual problems of SMEs are perceived as irrelevant, regardless of the value and usefulness of the

outputs. This is consistent with Knowles et al.'s criticism concerning the relevance of business support (2005).

A dilemma here is to decide between quantity and quality. On the one hand, because DSPs are publicly funded, they should hold one-to-many workshops and seminars to increase the number of participants and thus satisfy funding criteria. To illustrate, Raulik et al. (2006) suggest that DSPs are non-profit and public funded; and therefore, "must aim to assist as many companies as possible". On the other hand, while aiming to reach many SMEs, the quality of delivery and the relevance of activities fail to satisfy SMEs' expectations and needs. Interview findings show that trying to reach as many SMEs as possible might not be strategic in the sense that more output is not equal to more or desired outcomes, as presented in Section 4.5.1.

Another challenge mentioned by both SMEs and designers lies in the fact that SMEs are result-oriented and thus usually look for practical solutions and quick results (Tables 4.3 and 4.4). However, adopting formulaic approaches (easy and tempting recipes for quick solutions) does not address the real issues of SMEs and does not provide successful outcomes due to the complexity of both cultural change and innovation, as discussed in Sections 5.2.3 and 5.2.2.

A further dilemma is that SMEs are very busy and hence often avoid attending full-day or longer workshops. Yet, the time required achieving desired outcomes such as realising tacit knowledge transfer or building networking amongst participants is considerably long.

### **Selecting SMEs that are responsive and financially ready**

The interview respondents claimed that SMEs that are interested in growth and participated in DSP workshops are more likely to commit themselves to applying changes to achieve innovation (Table 4.16). The respondents also identified curiosity, desire to accept change and financial readiness as important factors of SMEs' commitment to DSPs. SMEs that are liable to be responsive to business support are also more likely to achieve expected results. This complements Gray's (2002) findings. By examining a database

covering 4000 UK-based SMEs, Gray found that the intention to grow would be linked to actual growth and to openness towards implementing changes. The findings of Bruce et al. (1995) concerning the effectiveness of FCS/SFD highlight that the success of the programme is depending on the motivation of the company to take forward and invest its own resources in the skills of the design consultants. The existing research also supports the conclusion that responsive SMEs that are curious, interested in organisational change, financially ready and willing to take risks are likely to apply what they have learned in order to achieve desired outcomes. Therefore, the present research suggests that DSPs should consider selecting responsive SMEs.

However, Major and Cordey-Hayes (2000) state that business programmes should not select high growth companies that are likely to generate positive financial outcomes without the contribution of the programmes.

Nevertheless, there is a difference between selecting responsive SMEs and high growth companies. Responsive SMEs refers to companies that demonstrate that they have the potential and desire to grow and to change. To some interviewees, responsiveness is related to the size of the company (Tables 4.16 and E.5); however, an SME's willingness to grow may be independent from the company size and is more bounded to the managerial attitude (Gray, 2002).

While selecting SMEs, a further issue is to consider their knowledge and expertise in using design for business growth. The results of this PhD research suggest that SMEs have different capabilities, which might affect the use of design knowledge and innovation (Tables 4.4 and E.5). Cumming (2007) also identifies that working with small businesses is significantly different from working with medium or large businesses while managing graphic design projects due to their capabilities and expertise. Most of the SMEs investigated in this research do not see design as a stylistic tool (see Table 4.4) and some of those (medium-sized) have developed methods for exploiting design and innovation (see Table 4.2). As noted widely in the literature (see Section 2.2.2), all SMEs are not the same. Conveying the same message to SMEs regardless of their differences in size while expecting the message to fulfil its objectives may be naive. Although it has not been mentioned explicitly during the interviews, an indicator of

selection may address the aforementioned issues. Such indicator may focus on the SMEs' design knowledge, expertise in using design and exploiting innovation and eventually improve the effectiveness of workshops provided by DSPs.

Due to the reasons mentioned above, having selection criteria to decide which SMEs to work with seems reasonable for the success of DSPs. The research conducted by Choi et al. (2012), however, points out that beyond a certain level, rigid business selection criteria leads to difficulty in finding eligible businesses for participating DSPs.

### **The importance of owner-manager**

Working with SMEs requires DSPs to pay special attention to owner-managers. For effectiveness, it was found that SME-owners and senior employees should attend DSP workshops. If decision makers do not attend the workshops, the support provided by the DSP is rather ignored (see Table 4.22). Gibb and Dyson (1984) and Lybaert (1998), who looked at the use of information in SMEs, indicate that the higher the value that is placed on the activity by the owner-manager, the greater the perceived value will be to other personnel in the company. Attendance to events by non-decision making personnel in the company is not liable to lead to decision involving design support. This issue is related to the challenges of knowledge sharing and use, as discussed in Section 2.3.4.

### **The quality of content and delivery**

The results from the interviews also reinforced the importance of achieving adequate facilitation during the DSP workshops, which produces satisfaction during the workshops. The use of design and innovation tools (e.g. personas, 5-why and customer journey map) was found to be helpful in supporting the delivery of design knowledge and innovation support. Many DSPs use a variety of tools and techniques to convey design knowledge and support innovation. Interviews findings of this research show that these tools also assist SMEs in articulating their personal knowledge about their company values, their vision and plan for growth. The use of tools and

methods makes knowledge exchange more tangible and explicit, matching findings with Acklin et al. (2013) and Bang (2009).

When it comes to the use of design tools, whether they should be developed elsewhere or by the programme itself, interview results highlight different views regarding the topic. On the one hand, developing tools within the programme might better fit the objectives of the programme. On the other hand, the time available for design interventions is generally short, so the time spent on developing new design tools and methods may not be time effective. The literature on innovation, facilitation methods and tools indicates that there are already an abundance of tools (Service design tools, n.d.; see Appendix F for taxonomy of design tools and methods), and developing new tools may not help to empower designers in the facilitation process. The main challenge is to understand the needs and expertise of the audience and to select the appropriate tools ensuring it is fit for the purpose. The interviews indicated the importance of the facilitator role when using these methods to guide and inspire people and to overcome the difficulties (see Table 4.15). It was found that the SME participants are also unfamiliar with the techniques of serious play (see Table 4.8). The expertise of the facilitator in using the selected tools also plays an important role. For example, studies on TRIZ and Six Sigma (Hoerl, 1998) identified them as advanced problem solving methods requiring a high level of expertise and experience before being able to apply them successfully (Hoerl, 2001). Selection of design tools is context dependent including factors such as the size of the workshop, the subject of the workshop or the background of the audience. Being participative, interactive and tactile with clear instructions are found to be important by design respondents while using the tools during DSP workshops (see Table 4.7).

### **Reflection and follow-up**

A further issue of importance is the follow-up and continuity of support offered by the organisation providing the assistance. Interview findings show that although attendees of DSP activities are inspired, they may have difficulty applying their learning within the business context because of the immediate demands of the business and their busy schedule (see Table

4.22). If DSPs fail to provide the necessary follow-up actions to support a positive reflective cycle, SMEs might fail to contextualise what they have learned at DSP workshops. Reflection is highly critical in experiential learning. It not only differentiates an activity from learning but also transforms experience into knowledge. Dewey (1916) distinguishes mere activities from experience. Knowledge results from the combination of grasping experience and transforming it.

“When we experience something we act upon it, we do something; then we suffer or undergo the consequences. We do something to the thing and then it does something to us in return: such is the peculiar combination. The connection of these two phases of experience measures the fruitfulness of experience. Mere activity does not constitute experience” (Dewey, 1916, p.104).

It was recommended by a respondent that DSPs hold several support workshops distributed over a longer period rather than a two-day one-off event. This may encourage reflection and help reinforce learning (see Table 4.7). This finding is consistent with those of the Wales Management Council that reported that SMEs also benefit from a long-term partnership when receiving support (Ward et al., 2008). The present research suggests a model that incorporates several short DSP workshops that last for example two or three hours to encourage information sharing and networking amongst participants. In addition, the model should help to participant to think about the design support, reflect on their experience and gather relevant material to apply their contexts. It will help establish a stronger and longer-term relationship between SMEs and DSP deliverers and encourage reflection, which is essential for experiential learning (see Table 4.22).

The factors affecting an SME’s commitment to design support are summarised in Figure 5.2.

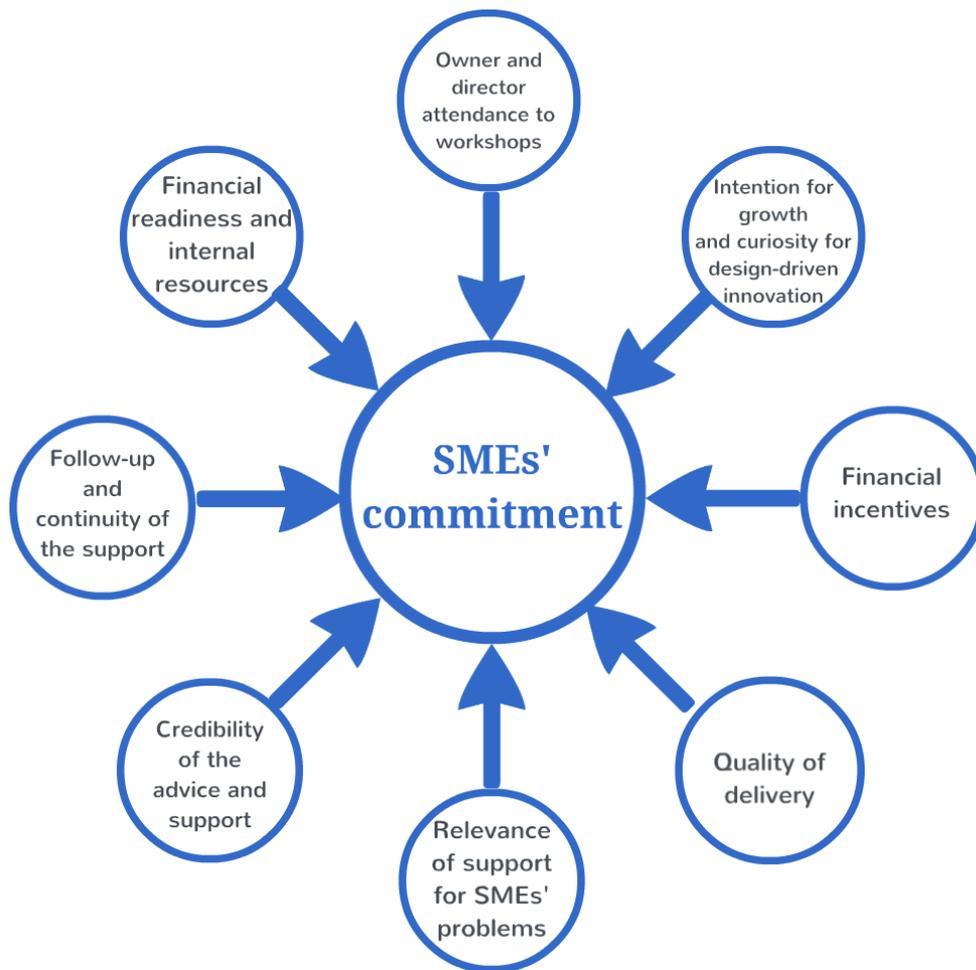


Figure 5.2 Factors affecting the commitment of SMEs to DSPs

#### 5.4 Outcomes and outputs of DSPs

Governments are under increasing pressure to shift their focus from outputs to outcomes (Perrin, 2007). Outputs refer to what has been done, the services delivered, the number of workshops conducted, the number of ideas generated and the number of participants involved in support programmes. Outcomes, on the other hand, refer to the differences that result from the outputs.

Amongst tangible and intangible outputs of DSPs that benefit SMEs, a design brief specifying a new product or service was found to be a useful and tangible output because it satisfies the relevance and exclusiveness of criteria, as discussed in Section 5.3.2. Existing research also highlights the importance of the design brief when outsourcing design expertise. An

inadequate design brief is identified as a problem (Walsh et al., 1992) and a general reason for project failure when outsourcing design in British SMEs (Bruce et al., 1995; Roy & Potter, 1993). A well-constructed design brief contains information regarding company background, the design problem and specifications, target market, and the availability of resources required for product and service development (Cooper & Press, 1995). It helps a design consultancy to develop strategic and effective design solutions for SMEs. Another output of design support is new actionable ideas. The interview findings indicate that a large number of new actionable ideas are less appreciated (divergence); instead the findings stress the significance of the implementation of ideas to achieve innovation (see Table 4.19). DSP workshops should concentrate on the development and selection of ideas (convergence) to address SMEs' needs and requirements.

In terms of soft outcomes, SMEs favour interventions leading to increased collaboration and empowering employees in the company. Networking is also appreciated by SMEs and found to be an important outcome of design-led events (see Table 4.21). This is in agreement with some studies which focus on organisational behaviour; for example, Arad et al. (1997) state that several businesses have sought flatter, more team-based organisational structures, aiming to empower their employees to be more innovative. On the other hand, the existing literature also suggests that many SMEs tend to have a flat and non-hierarchical management structures as a result of their small teams and claim that better communication may not be a key need (see Section 2.2.2).

The importance of interaction, exchange and networking as an outcome can be explained by the social capital theory. The theory is defined as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit (Nahapiet & Ghoshal, 1998, p.243). Nahapiet and Ghoshal (1998) suggest that social capital assists the development of new intellectual capital, which creates an economic advantage for businesses. Although the structure of the DSP workshops increases interaction and exchange amongst participants, there are opportunities for more strategic and better-facilitated networking, findings revealed (see Section 4.5.2).

Reports that focus on the output statements are characterised by the way they present what has been achieved, for example by providing the numbers of activities and the number of people attending events. Being focused on output is sometimes observed in DSP reports. This coincides with the findings of the study by Whicher et al. (2011), in which they analysed DSPs in Europe by using self-evaluation forms. They were critical of the fact that most of DSPs in their evaluation focused on aspects related to delivery rather than outcome. Implementing an outcome-based approach is recognised as being difficult to achieve in the public sector (Perrin, 2007). This difficulty may also apply to DSP interventions for SMEs.

## **5.5 Difficulties when articulating the impact of design interventions**

A difficulty is identified regarding articulation of outcomes with quantifiable figures. The contribution of design to business performance is strong, as discussed in Sections 2.4.1 and 2.4.2. The findings of the present research indicate that measuring DSPs outcomes by isolating their impact amongst other factors is a challenge, matching the common conclusion found in design literature and presented in Section 2.4.6. For instance, Hertenstein et al. (2005) quantify the value of design outcomes on business performance and recognise the difficulty of evidencing the correlation between design and business success, although a causal relationship exists between good design and good business.

Funders often focus on financial and quantitative measures, yet DSPs tend to evaluate their results with qualitative indicators, as shown in Table 4.23. DSPs sometimes articulate outcomes in quantitative terms, which may not reflect the complexity of the design contribution and design process. For example, some of the results that are communicated by the Design Council with regards to their Designing Demand programme raise several concerns. The Design Council claims that every pound that is spent on design results in “£4.12 net operating profit, £20+ net turnover and £5.27 net exports” (Design Council, n.d.). This statement aims to prove the link between design and financial outcomes by using the rhetoric of business. However, these generalised statements are not contextualised and fail to include essential data such as economic conditions or industry sectors. Amongst

few studies quantifying the value of design on business performance, Gemser and Leenders (2001) suggest that the changing nature of the competition in an industry should be considered while looking at the impact of design on business performance. Their empirical study states that the impact of industrial design investments on company performance is dependent on industry sectors. For example, their study claims that the effect of design investment on business performance is less visible for industries that are mature in using design (e.g. the furniture sector). But, in the context of industries where the use of design is emerging (e.g. precision instruments), creating a difference by means of industrial design is easier to achieve. This raises the concerns regarding the validity of the models on which these estimations are based.

A further challenge is trying to articulate the impact related to DSPs and the way in which they estimate the outputs and outcomes prior to the start of a design intervention. Interview results show the economic conditions, the nature and the focus of the support might change based on the feedback received after the initial targets set. For example, Follett and Marra (2012) describe the activities and expected outcomes of their DSP. The study shows that for both the estimated number of SMEs assisted and SMEs undertaking further action, there is an increase by steps of ten each year starting from the first year. In addition, the increase in turnover is estimated to be £100K a year. Achieving financial results from the very beginning of the support may be difficult for programmes. The findings of this PhD research suggest that the first year of a DSP tends to be less productive in terms of the stated deliverables. Measuring the financial impact of the intervention may take considerably longer and sometimes go beyond the duration of the programme (see Tables 4.7 and 4.22). Similarly, the concept of the product life cycle suggests that bringing a product or a service to market takes a period of time before it starts to produce an increase in turnover (Utterback & Abernathy, 1975). In addition, the study conducted by Bruce et al. (1995) suggests that the average payback period of their quantitative sample is 14.5 months for implemented graphic design, engineering/industrial design and product design projects as part of the

FCS/SFD programme, although graphic design projects tend to have a slightly faster rate of return.

In addition, the findings of this study indicate another challenge, which lies in the fact that SMEs do not measure things systematically because they often fail to dedicate time and resources for it. It was observed during the interviews that an SME's evaluation is mostly based on spontaneous satisfaction, confidence with the outcome and amount of attention received (Table E.4). This observation is consistent with Ravasi and Stigliani (2011) and with the Design Council's survey conducted with firms, which indicates that only 13% of the UK businesses measure return on design investment. The survey results also suggest that the size of the business makes little difference regarding the measurement of design investment (Design Council, 2007).

Due to the difficulties mentioned above and to the many interdependent aspects influencing the results (Hertenstein et al., 2005), the estimation of design outcomes is highly complex. It is essential to acknowledge the importance of economic sustainability, avoid poorly contextualised and unrealistic generalisations while articulating the impact of design. In addition, there may be little value and relevance in forcing numerical outcome estimates prior to funding programmes. Such a strategy may result in DSPs to provide figures that are beyond their capacity to deliver (see Table 22). All these arguments underline a very fundamental problem in design research, which is that the ROI of design should be investigated in a detailed manner in future research.

## **5.6 The relationship between funding frameworks and the effectiveness of DSPs**

The interviews conducted for this research suggest that programme deliverers consider that funders have a lack of understanding of design and design-led business support. This matter echoed the findings from interviews with two government support respondents, which presented a lack of appreciation of the value of design innovation (Table 4.6 and Section 4.3). This research indicates that the impact funders expect to see and

those that DSP associates can deliver during the design support do not always match (Table 4.22). A further issue is related to the funding frameworks that tend to use standard business performance indicators such as turnover to measure the success of projects. These indicators alone do not reflect the complexity of design interventions, as discussed in Section 5.4. In addition, DSPs are dependent on obtaining external funding and therefore can be considered as not being fully independent. The limited flexibility of funding frameworks may hinder programme deliverers from supporting SMEs sufficiently.

As a result of the criteria within funding frameworks, DSPs are often active for relatively short durations, which prevents them from developing longer-term relationships with SMEs and restricts their effectiveness. Major and Cordey-Hayes (2000) look at knowledge transfer within technology-based SMEs and suggest that SMEs do not prefer to work with time-limited intermediary organisations.

All these issues reveal a lack of shared understanding between DSP deliverers and funders. This result is consistent with findings from an earlier survey conducted by the European Commission in 2009 that aimed to identify barriers preventing the use of "design as a driver of user-centred innovation". The study indicates that the most significant barrier considered by 78% of respondents was the "lack of awareness and understanding of the potential of design among policy-makers" (European Commission, 2009, p.8).

All the DSPs that were studied in the present research provided support free of charge to SMEs. Interviewees commented that because the programme is publicly funded, it should be free, but they also noted that this characteristic of the support scheme leads to more SMEs cancelling their participation at short notice. A further issue relates to the value of advice and the cost of advice. Gino (2008) states that paid advice is significantly more applied than advice given without charge. This "sunk costs fallacy" is investigated by Harvey & Fischer (1997) and Gino (2008). In addition, Roy and Potter (1990) recommend moving away from a grant culture in design advice services. A business report from the Wales Management Council

claims that 70% of government clients would be willing to pay for services offered if they were confident in the quality and relevance of the support being provided (Ward et al., 2008). From the literature and interviews conducted in this research, it appears that requesting service fees would increase the value of design support, but could also bring fewer SMEs on-board.

## **5.7 The effect of design terminology issues on DSPs**

The lack of agreed definitions in the design field represents one of the challenges faced while evaluating DSPs (Whicher et al., 2011). Tether (2005a) also indicates that the lack of a standard definition of the term 'design' and the missing evaluation of its impacts can lead to difficulties in building a case for design in the political economy of innovation. Although this terminology problem is not related to the actions of DSPs, the terminology issues related to the field of design in general influence their effectiveness.

The design field has been expanding and applied widely at a potential cost of losing its distinctiveness. The philosopher Latour, in his keynote talk given to designers, discusses the definitions of design and notes,

"It has eaten up more and more elements of what a thing is. Today everyone with an iPhone knows that it would be absurd to distinguish what has been designed from what has been planned, calculated, arrayed, arranged, packed, packaged, defined, projected, tinkered, written down in code, disposed of and so on. From now on, 'to design' could mean equally any or all of those verbs". (Latour, 2008, p.2)

Defining the terminology is a boundary problem. Definitions result from the need for definite knowledge. To Aristo, a definition should be "Genus proximum differentia specifica" which means it includes or excludes characteristics of terms to define an area of acting and solving the blur to make meaningful predictions. The exclusion is necessary to reach a meaningful definition. Design often includes new elements and actions to its meaning, as Latour's quote illustrates. The lack of agreed definitions and content of the term 'design' hamper its development as experienced by the design management discipline (Gorb, 1986; von Stamm, 2004). For example, Peter Gorb, in 1986, claimed that giving a multiple set of meaning to 'design management' is a problem. "I have been attempting over the last

few years to observe, classify, and generally sort out the multiple meanings of the words 'design management'". Gorb (1986) says that the pioneers stitched two words together and gave them a multiple set of meanings. This problem can be observed almost three decades later not only in design management but also in design thinking or design strategy. Although both design academicians and practitioners have written much on design thinking and its problematic definition and scope, it appears that the term 'design strategy' or 'strategic design' raises the same concerns. The concepts of 'using design strategically' and 'using design as a business strategy' are different but interchangeably used in practice with the term 'design strategy'. For example, Alan Topalian, in a recent keynote talk at the Cambridge management conference, states that designers "who seek to pitch their contributions at the highest level in business increasingly describe the service they offer as 'strategic design', a term prone to misinterpretation and overuse" (Topalian, 2013, p.6).

The design field has created several terms that lack clarity and theoretical underpinning. This does not empower the discipline but instead may lead to credibility issues. As mentioned in the interview findings (see Table 4.6), design thinking suffers from credibility problems that halt the progress of its development. 'Design strategy', like 'design thinking', is prone to being misappropriated.

Ericsson and Smith (1991) identify the process in which a new popular approach becomes indistinguishable in a discipline. Their observation appears valid for the design field in particular when the concepts such as 'design management', 'design thinking', 'design strategy' and even 'service design' are concerned.

"Many people will adopt it [a new popular approach], and even larger numbers of investigators, however, will adopt only the terminology, and will attempt to modify other research approaches to encompass the new concepts. That, in turn, leads to diffusion, of new characteristics of the new approach, making straightforward attempts to integrate published research findings difficult. Because of this process of diffusion, often the new approach will no longer be readily distinguishable from previous alternative research approaches" (Ericsson & Smith, 1991, p.1).

The lack of a clear consensus on the definition and scope of design and design-related terms, such as 'design thinking', 'design strategy', 'design-led innovation' and 'design management', offers little guidance to

practitioners. A lack of explanatory frameworks in design research (Dorst, 2008) and the dominance of oversimplified recipe style approaches in the form of “three steps to better innovation” within popular innovation and design thinking books also have an influence on the effectiveness of DSPs. DSPs need to rely on their interpretation of design terms to define their scope and focus. As a result, some DSPs stress practical applications, while others tend to emphasise organisational change and empowerment instead.

## **5.8 Proposing a seven-step evaluation framework for DSPs**

The complexity of DSP evaluation requires a robust evaluation framework. The importance of explanatory frameworks in design research is emphasised by Dorst (2008) and the lack of frameworks on effectiveness of DSPs in the design field is identified in Section 2.4.7. Yet, there are a number of frameworks that can be adapted for evaluation. Some of these frameworks that were analysed include Kirkpatrick’s four levels of evaluation for training programmes, Funnell and Roger’s (2011) logic model on social programme evaluation and planning, NESTA’s logic model of creative credit programme (Bakhshi et al., 2011) and Bennett and Robson’s (2005) conceptual model on the advisory support for business impact and satisfaction. In order to identify an appropriate framework, the findings of this study and the literature on DSP were consulted. NESTA’s logic model is interesting but was found inappropriate for this study because it works as a descriptive model about application of creative credit programme. Both the interviews and programme reports echoed a knowledge transfer-exchange approach. Since Kirkpatrick’s model is better developed as an evaluation model and addresses the learning aspect of design support, it was considered more relevant amongst other evaluation frameworks, hence selected.

Kirkpatrick, in 1954, provided a four-level model for evaluating training programmes, which became a widely used framework. His four levels of evaluation include reaction (participant satisfaction), learning (learning success), behaviour (learning transfer) and results (business success) (Kirkpatrick, 1996). His evaluation focuses on quantitative measurement and starts with level one and moves sequentially through levels two, three

and four. The first level in his model measures the feelings of participants; he stresses the importance of not measuring the learning at this stage. Kirkpatrick states that because participant satisfaction is very easy to measure, deliverers in general undertake this step. It is critical to distinguish positive participant satisfaction from the conclusion that “programme assures learning” (Kirkpatrick, 1996). The second level, learning, refers to the principles and techniques that were absorbed by the audience. The third step refers to the changes resulting from the effective training programme. The fourth step is the results of training programmes, which may include financial improvements such as reduction of costs, increased quality of production and some general improvements such as increased morale in employees. Kirkpatrick (1996) states that the measurements of the last two levels are complex and require further expertise.

Although his model is useful and widely used by training programmes in general, it has not been adapted for DSPs yet. Kirkpatrick, in his model, explains each step and how these steps can be measured by quantitative methods. However, he does not explain how each step can be achieved. This thesis proposes a seven-step framework that can be used for both planning and evaluating the interventions of DSPs, as illustrated in Figure 5.3. This framework re-conceptualises Kirkpatrick’s four-level model for DSPs by considering the premise of Kolb’s experiential learning together with the findings of this PhD research. In addition, it explains how each step can be achieved and the importance of each step for determining the success of DSPs.

The first step refers to attendance and reactions to the DSP workshops. Unlike Kirkpatrick’s model, this model considers workshop attendance as an important element for the evaluation of DSPs. DSPs’ credibility that is presented through existing case studies, knowledge, formal power, testimonials, and existence of PR activities contributes to achieving the first step as discussed in Section 5.3.1.

The second step is participant satisfaction. This step is similar to Kirkpatrick’s model. Participant satisfaction is an immediate and often

temporary reaction and does not assure learning or application of any advice provided. The quality of delivery via good facilitation, a comprehensible content and clear language contributes to achieving a positive outcome.

The third step is design awareness, motivation, inspiration and new perspectives. Like the first step, this step does not exist in Kirkpatrick's model. Good examples and relevant information about design help SMEs to become familiar with design and design methods and their role in the innovation process. Seminars and talks that provide motivation and inspiration can further improve awareness of design. This awareness is a secondary outcome for SMEs, and does not indicate that the techniques and methods that are delivered are internalised by the SMEs and hence, are not liable to have a sustained impact.

The fourth step is learning. This step is also part of Kirkpatrick's model. However, the seven-step framework proposed in this section, builds on the principles of experiential learning (Kolb, 1980). SMEs start to reflect on the new perspectives and learning inspired by the intervention. By means of reflection, they contemplate the design-led innovation approach applying it to their own context rather than leaving it as a stand-alone experience and dismissing it. Considering an SME's day-to-day business schedule, reflection requires follow up from DSPs. SMEs and DSP associates may discuss the methods of applying a design-led innovation approach and potential challenges along the way. Although Kirkpatrick (1996) suggests that evaluation of the learning should be conducted using quantitative and objective measurements which can be built into in the programme such as presentation and before and after testing with control group, the suitability of these learning measurement methods is beyond the scope of this research and should be investigated in future research.

The fifth step is application. SMEs may make some changes based on the new perspective and methodology. For example, they can develop new ideas in-house, recruit a designer or commission a design consultancy. Kirkpatrick (1996) states that there may be a significant difference between knowing the principles and applying them in practice. This step may

demonstrate that the learning is achieved; however, learning may also exist without application.

Business impact and ROI represent the focus of the sixth step of the proposed model. In this step, SMEs observe changes in the business performance as a result of the collaboration between designers and SMEs. However this outcome is neither immediately experienced nor easily measurable. It requires time and commitment.

The final step refers to cultural change in the company. It occurs when SMEs are convinced about the value of design and strategically integrate it into their long-term business plans. This change can be observed in repeatedly performed tasks i.e. in the routines of the company. Cultural change occurs as a result of sustainable knowledge that remains with the SMEs and helps them to grow. It builds on the establishment of a continuous relationships and trust between SMEs and designers. For a company to adopt design as a strategic tool, it often requires SMEs to observe business impacts explicitly.

The seven-step framework illustrates how the actions of programmes can achieve their intended outcomes sequentially by building from one another. Although the ladder metaphor is helpful, not all the steps are equal. There appears to be a threshold between steps 3 and 4. Once DSPs attract the attention of SMEs, it becomes easier to satisfy SMEs with events and make them aware of the value of design, however it is then more difficult for SMEs to apply this learning and to work with designers. As a result, most of the support provided by DSPs fail to go beyond step 3.



Figure 5.3 The seven-step evaluation framework of the outcomes of DSPs. This proposed model reconceptualised Kirkpatrick’s model (1996) by using the findings of this PhD research. Step 2 (satisfaction), Step 4 (learning) and Step 6 (business outcomes) originate from Kirkpatrick’ model, the additional four steps are proposed as a result of this study.

This seven-step explanatory framework contributes to developing a shared understanding amongst deliverers of DSPs and funders. This model suggests that the success of design support for SMEs cannot be assessed solely by the activities of DSPs. The last three steps are dependent on the expertise of a design consultant and an SME’s commitment to the process.

## 5.9 Conclusion of effectiveness of DSPs

The previous chapter presented interview results relevant to DSPs using a thematic analysis approach (Braun & Clarke 2006) while this chapter has discussed some of these results in relation to the existing literature and with the aid of theoretical lenses such as experiential learning (Kolb, 1984) and tacit knowledge exchange (Nonaka, 1991; Polanyi, 1962).

Evaluation of DSPs is a challenging task because the effectiveness of design support is a complex system composed of many interdependent factors. These include great diversity amongst SMEs, uncertainties of achieving innovations and the difficulty of measuring direct and unique causality by isolating the design input and the different expectations amongst stakeholders of design support.

Several factors identified in relation to the effectiveness of DSPs were presented. The present research has questioned the possible assumptions regarding innovation and design awareness. It has discussed the intermediary position of DSPs and their differing roles in relation to their aims and objectives and identified the factors affecting the exchange of tacit knowledge concerning the effectiveness of DSPs.

This research has highlighted a number of factors that increase SMEs' involvement in DSPs, namely public relations (PR), convenience of time and venue and credibility and expertise of DSP deliverers. The chapter has emphasised the importance of 'relevance' in supporting SMEs. The research has concluded that one-to-many workshops are helpful but may be considered as too generic in nature. Although networking is found as an important outcome of one-to-many workshops and desired by SMEs, it is very difficult for one-to-many support activities to achieve the flexibility and relevance that SMEs may require as a result of their differing needs and capabilities.

The outputs (advice, ideas, plans) provided to SMEs and resulting from interventions should be desirable and achievable by SMEs, considering their needs and the resources available to them. For example, although actionable ideas developed during the DSPs can be inspirational and novel, generating a large number of ideas is not favourable by SMEs. The focus should be on idea development and selection.

This research has identified several issues related to the impact of DSP interventions. SMEs, and to some extent policy makers, are focused on immediate and quantifiable results which are not compatible with the outcomes of many design interventions. The duration of the support has

been found short to achieve desired outcomes. A typical three-year period of a DSP may not be long enough to establish credible testimonials and case studies in order to communicate their skills adequately and to develop a long-term relationship with the SMEs.

Establishing a roadmap that is valid for each and every situation is extremely difficult and, in fact, should be avoided. However, the factors that are contributing to effective design support can be illustrated schematically as a map. An example of this type of map is given in Figure 5.4 and can be thought of as of a summary of the findings regarding the effectiveness of DSPs, but also as a practical tool to be used by DSP deliverers and funders. Extended versions of this map are included in Appendix G. The present research concludes that it would be highly beneficial for DSPs to adopt models which trigger action and reflection, recognise the different requirements and capabilities of SMEs, avoid driving unrealistic expectations and avoid conveying design promotion messages.

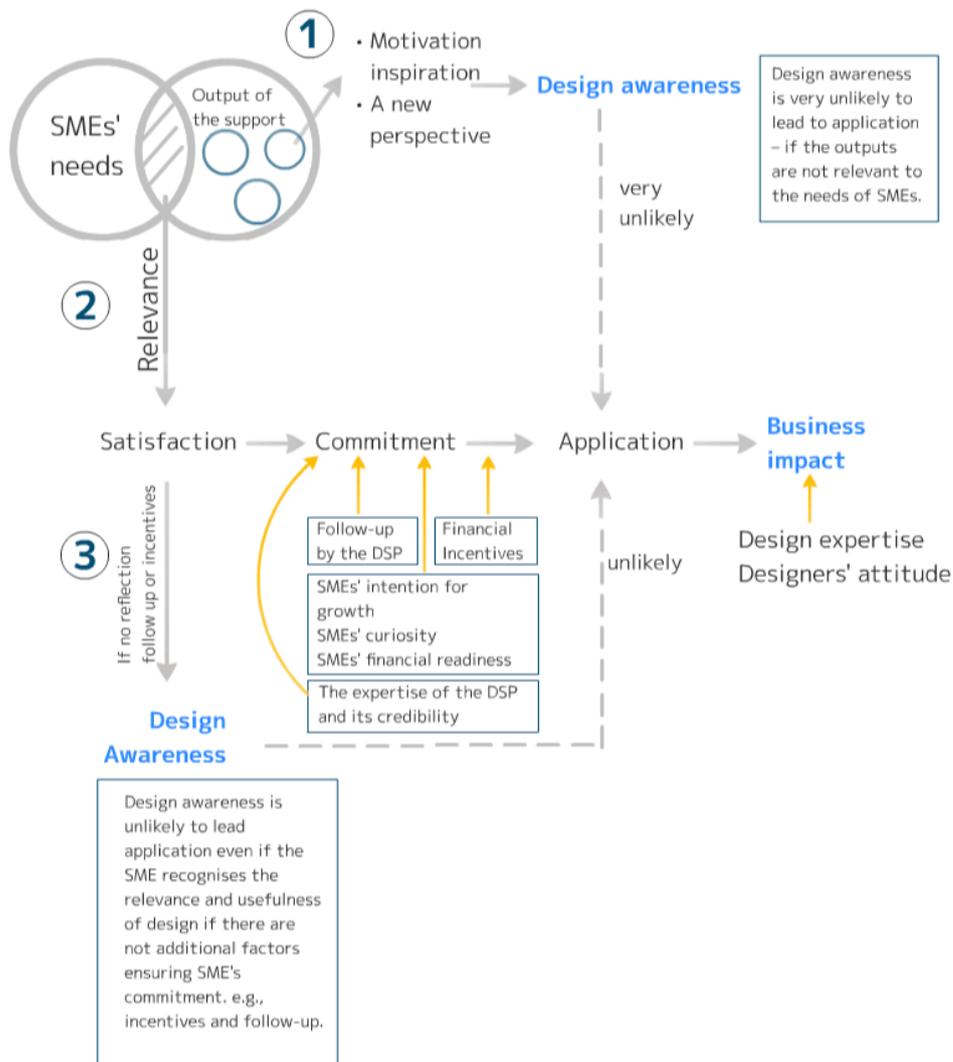


Figure 5.4 A road map for DSPs' effectiveness in assisting SMEs

The chapter has concluded by presenting a seven-step model for evaluation of DSPs. The new framework proposed has extended Kirkpatrick's four-level model that was developed to evaluate training outcomes (Kirkpatrick, 1996). The framework draws from different experiences and from opinions of respondents, observations, government reports and peer-reviewed papers and aims to inform DSPs and to help improve the efficiency and effectiveness of their provision.

The seven-step evaluation framework also establishes that the effectiveness of DSPs depends on SMEs commissioning designers and the expertise of design consultancies. The next chapter focuses on the role of design

expertise in the collaboration between SMEs and design consultancies. The analysis conducted in the next chapter will inform the trust and credibility issues in the design field in relation to domain specific knowledge of designers.

# 6 The effectiveness of design consultancies in relation to design expertise

## 6.1 Introduction

Chapter 4 and 5 showed that DSPs have an intermediary role in supporting SMEs, and sometimes act as bridges between SMEs and design consultancies. The economic impact of DSPs is dependent on SMEs commissioning designers (or SMEs employing an in-house designer, which is an option that falls outside the scope of this research). Through this collaboration with designers, SMEs realise the design brief and actualise ideas that have been generated as part of a DSP.

Section 2.4.5 presented the studies that considered the effectiveness of design consultancy support. However, as stated previously, these studies rarely discuss the role of design knowledge, experience and attitude provided by design consultancies. Although the qualities of design expertise have been investigated, there are only a few non-peer reviewed papers and online discussions dealing with the 'generalist-specialist dilemma' of design expertise (see Section 2.3.5). One of the main research questions which the present research has attempted to address relates to the required expertise and knowledge that an external designer needs to have to work with SMEs effectively (see Section 1.3). Designers' capabilities, knowledge and attitude play an important role in design support for SMEs. For this reason, the chapter provides an examination of design expertise.

It examines the significance of depth and breadth of design knowledge in design support and studies the issues encountered during their collaboration by referring to findings from interviews that were conducted with SMEs, DSP associates and design consultancies (see Section 3.4).

Using a thematic analysis (see Section 3.5.1), the research arrives at some findings that reveal some tensions and contradictions between SMEs' and designers' perspectives. The analysis contrasts SMEs' views with those of designers, drawing out compatibilities and incompatibilities. The conclusion of the analysis proposes a re-framing of the generalist-specialist dilemma. This explanatory framework informs the field of design support, which includes not only design consultancies but also DSPs.

## **6.2 Findings**

Some of the expertise related findings that inform DSPs were initially presented in Chapter 4 and discussed in Chapter 5. This section presents additional findings related to design expertise that are a result of interviews conducted with design consultancies (n=6). As presented in Section 3.5, this chapter also makes use of the same interviews that were conducted with representatives of SMEs (n=8). SMEs were not asked about their reflection about the expertise of DSP deliverers in particular, they were asked about their opinions about design expertise in general. Some of the reasons are, not all the SMEs worked with DSPs and asking very direct question might lead to biases, as discussed in Section 3.4.

The interviews illustrate some of the issues encountered during the collaborations between designers and SMEs. These issues are divided into three categories of themes. First theme is an examination of issues related to knowledge and skills. Then it moves on to the findings around creativity, and finally it presents the findings about the nature of the collaboration between SMEs and designers. The findings related to each theme have been divided so as to present the opinions of SMEs initially before focusing on the opinions of designers.

### **6.2.1 Knowledge and skills of designers**

Section 2.5.3 presented the ongoing discussion on the 'specialist-generalist dilemma' and views on the specific knowledge as fundamental to perceived credibility (Kolko, 2011; Krippendorff, 2009). These opinions establish the importance of this topic; however, these views are not based on empirical

data and scientific analysis or not specifically considering the perspectives SMEs. Therefore, interviews conducted for this research study have sought to explore this topic to inform DSPs and design consultancies.

### **The SME's perspective**

All the SMEs interviewed claimed that the lack of sector specific knowledge, skills and experience was an issue.

"I think there is a barrier to designers not knowing the capabilities of the technology." R7, SME non-owner manager (working in software sector)

An SME that operates in the extreme sport industry indicated that they avoid working with design companies that have not designed within a similar sector in which they operate. Even though consultants have a supporting portfolio that demonstrates their skills and knowledge in other sectors, the SME perceive that a potential collaboration would present risky.

"a good portfolio is not enough to take the risk and work with a design consultancy that has not designed a climbing wall or a skateboarding path before." R6, SME non-owner manager

Another SME representative working in an aquaculture-marine business clearly stated that he does not want to work with a "generic product design engineer". He instead preferred to work with a designer who has experience in the marine design field.

"I just would not use any designers. Here, we need marine designers, or someone who spent a lot time on boats, something like that. We had some work with designers who did not have that kind of background, what he did was completely wrong and we just had to walk away from each other. So he worked for us a couple of times, but still it was wrong. So the thing is to get designers who have relevant background". R4, SME owner-manager

Another company working in the subsea market indicated that they are critical of the products offered by design consultancies because they think that designers do not fully understand the strict requirements of the specialist market. The interviewee from the company commented that they needed to work together several times for designers to comprehend the dynamics and constraints of the subsea market. It was observed that sectoral knowledge was also sought after even if the sector is not particularly known to be specialist.

"If there is somebody else who has been doing sport specific work and advertising marketing work for the last ten years I go with them." R6, SMEs non-owner manager

In addition, the interviews indicated that SMEs themselves prefer to focus on one sector. They experience advantages due to the fact that they get to know the field thoroughly. These advantages include a better understanding of the terms in the field and an increased speed in business operations. They don't believe adopting this focus restricts them. The comments below are from a bespoke software developer talking about the advantages, which can also inform the way design consultants work.

"All our customers are in the oil and gas industry which is because we are in City X. It is really a specific field. We have done a range of applications. What is useful to us when we have got knowledge of things, like how recruitment works in City X, how people track their inventory, and how they rent stuff out. We understand oil and gas, how the industry works, different kinds of roles and logistics. That just gives us a lot of knowledge. When somebody explains to us something, we don't need everything to be defined. We do have a lot of oil and gas specific knowledge but it does not restrict us to working on particular types of software. We can understand what they want to do a lot quicker". R7, SME owner manager

### **The designer's perspective**

From an alternative point of view, designer respondents offered various opinions that seemed to go back and forth between the generalist and specialist dilemma. The designer's perspective highlighted several themes that they associated with design knowledge and skill including credibility, lucrative deals with clients and ease of working, career path and opportunities and division of labour when handling design tasks when working within a design consultancy. All these factors are seen to be affected by geography, the nature of the market and the size of the consultancy.

Parallel to the views of SMEs, designers also recognised that particular markets require specialist knowledge.

"Specialist markets that we are active in are medical devices and subsea equipment. Both those markets are quite specialised. You can't really just get up one day and decide that you're going to go and develop a medical device without learning certain things first". R19, Design consultant

To enter and compete in the market without a specialist portfolio is also a challenge.

“Certainly, if you’ve never worked on a medical device, ever, and you’re trying to compete with other companies who have, then you’re going to struggle”. R19, Design consultant

The head of a design consultancy highlighted that specialisation may bring more credibility and may lead to contracts that are more lucrative.

Design consultancies experience the benefits of having an in-depth knowledge in a particular sector. They develop an understanding of the potential success of a product or service in the market they focus on.

“We have been working with house builders for years. We kind of historically know how certain people react to certain things but also the determination to do things certain ways”. R23, Design consultant

Proponents of a different view arose when exploring issues of industry density, geography and the scale of the design consultancy. One interviewee (R22), a creative director working in North East Scotland, indicated that it is better to remain a generalist than a specialist in small cities because there is not enough room to specialise in one area of expertise. He commented,

“...one ends up doing a bit of everything.” R22, Design consultant

Similarly, another consultancy pointed out that the value of specialisation depends on the size of the company. Its respondent indicated that, as a small design consultancy (6 people), when they recruit a designer they prefer to employ a generalist rather than a specialist.

“We are a small company and so we’re looking for generalists-[...] We would be looking for the generalists rather than someone who is just good at drawing or really good at styling but no good at mechanics [...] whereas a bigger company who might have enough staff is able to say “right, you do that bit, you do that bit, you do that bit”. R19, Design consultant

Another interviewee from a design consultancy based in the same region mentioned difficulties in finding product design graduates with a specialised understanding of the oil and gas industry, the dominant local industry in the North East of Scotland.

One interviewee interprets specialisation as a personal decision that is about either being ‘deeply curious’ or ‘broadly curious’.

I’ve always found it interesting taking on different types of work and then having to do a bit of learning at the start to understand a particular market or a new area. I

think it's maybe just a personal thing, I never really wanted just to deep-dive into some sort of particular area. There's no point in doing it if it's not going to be interesting. R19, Design consultant

Another approach to levels of expertise is that design professionals can display different levels of specialisation from generalist to specialist. One design manager expressed the view "design consultancies tend to be generalist and in-house designers are more specialists". Likewise, another respondent stated,

"A design advisor tends to be a generalist for me, but a designer who produces something in the end won't, such as the packaging specialist, then they would definitely be specialists. You can do branding, and have an understanding of what design can do for the majority of people but you don't necessarily know, perhaps the structural side of packaging. So I would definitely say that designers are specialists in some design categories." R17, DSP project leader

Another design respondent indicated that as a design consultancy, they became more open about the limits of their own expertise. Their clients are positive about the fact that they collaborate with other specialists to improve their service.

"We never used to tell them (clients) that we're dealing with an external web agency. We just said we're doing it all, we never said we do in-house but the implication was that we did everything ourselves. And now I think we're a lot more open with that. [...] "look, we're good at branding and marketing stuff, but we're going to use these guys because they're experts" I think the clients actually appreciate that". R22, Design consultant

## **6.2.2 The relationship between creativity and depth of knowledge**

### **The SME's perspective**

Concerns about creativity, experience and knowledge and the relationship between them were also observed during the interviews. An SME director sees long-term experience in one area without new challenges as a potential barrier to creativity. His comment below illustrates this:

"It [design expertise] falls into two schools. You have somebody who is here for 20 years, then he may be in that certain product line for so long that his creativity falls away. Then you have the newer less experienced colleague who may have fantastic creative skills but does not have the experience in the environment that we are working in, I guess the technical challenge balances out there. To say that, there is a perfect medium, I probably say for some to become a good designer takes 8 to 10 years of experience. After 10 years they need a fresh challenge or new company." R2, SME non-owner manager

Creativity is perceived as its own, independent from being an accomplished practitioner within a specific domain. Creativity is separated from functionality.

“He may be very good but his imagination is very low. And you may have somebody who is very creative in another area, but again he may not have I guess the database to draw on. So it is kind of putting those right people together. It is that balance between creativity and functionality, from my experience which is the sort of characteristics or sort of parameters that tend to work best”. R2, SME non-owner manager

Although SMEs want to work with the same design company for extended periods, they may notice after a while that their consultancy produces repetitive work. In order to bring a fresh perspective and ideas, SMEs sometimes try to change the companies they work with but recognise that this change may present risks.

“They [the design company] just produced similar work, not very exciting. So we thought that we are going to go to someone else who can give us a totally different angle on things, new and refreshing. No matter what we did with the previous company, it was always fairly similar. From time-to-time we just take that risk”. R6, SME non-owner manager

### **The designer's perspective**

Specialisation is considered as a potential cause for losing freshness and creativity. For a design consultant, being good in the design field equates with being creative. Specialisation is found to be repetitive and regarded as uncreative:

“I think it's bad to be too specialist. I think you become stale. You know, if you do the same thing every day then you become bad at it”. R21, Design consultant

The head of a design consultancy stated that they preferred to operate as generalists working in a variety of sectors because they believe that it helps the cross-fertilisation of ideas. They found this experience more rewarding and enriching than working in one field.

“If you're constantly trying to apply your design skills to a construction tool, a hand-held thing, a tray, a medical device, a piece of equipment to go on a submarine, you're thinking of how to address all these areas. Then, I think your brain is a bit more switched-on to how to take what you've learned from that and from this and from a medical device and pull all that together and generally have a broader sort of skill set and a broader awareness of the world and different types of users and different circumstances and generally just more, awareness of what's going on to be able to produce a better design than the people who only do a certain type of thing”. R19, Design consultant

Each different project involves a significant amount of learning, which nourishes the whole design process. The cross-fertilisation of ideas and re-use of knowledge may not always require working in different fields. For example, another design-engineering consultancy that works solely in the oil and gas sector applies solutions from a variety of different fields (R24). These include the medical sector, chemistry and electronics, solving design problems in the oil and gas sector in a creative manner.

### **6.2.3 Mutual understanding between designers and SMEs**

#### **The SME's perspective**

The interviews indicated that recognising each other's point of view and expectations is vital to achieving a successful collaboration between SMEs and designers. However, it remains a challenging part of the collaboration.

“Getting them to understand our needs I would say was the biggest challenge, and how to articulate that.” R6, SME non-owner manager

Interviews showed that SMEs become satisfied if they observe that the design consultant understands the requirements of the company along with the company's values and challenges.

“They [referring to the design company they worked with] were fantastic, they really wanted to understand the company. It was not difficult for them. We are quite a different company to work with because we don't actually have a product on the shelf in a shop.” R8, SME non-owner manager

It was stated by respondents that misunderstandings during the process were liable to lead to disappointments. These misunderstandings might arise as a result of a lack of face-to-face communication.

“Well, I did have an initial difficulty when I was working with a designer. We had a conversation and I agreed that the approach he suggested was a good idea but when we looked at the drawing, it was just wrong in terms of our needs. And so that was a difficulty because he spent quite a bit of time doing this and that was really because we had not sat together face-to-face. We talked on the phone and he described the concept to me, when I saw it on paper it was wrong for us.” R4, SME owner manager

Another company from the food sector explained that they experienced similar problems when they used open briefs to work with design consultancies and were provided with solutions that were not applicable to their market.

"Being quite clear on what the intersections out with the project are and the constraints will lead you to more practical or faster implemented solutions. But with an open brief you get more ideas, less immediate, less practical applications." R1, SME non-owner manager

Design consultants ask several questions to make sure that both sides understand each other clearly.

"They (design company) asked loads of questions just to make sure they understood what it was that we wanted." R8, SME non-owner manager

SMEs also are pleased about seeing the end product that reflect their own their ideas.

"They (design company) had developed the brand based on our ideas of brand". R8, SME non-owner manager

Their knowledge is seen as having an equal collaborative value

"We know that the university has that knowledge and experience. The expertise we bring is how to make things, what works, what does not work, what is acceptable to the market that we are trying to address". R3, SME owner manager

SMEs indicated that they preferred face-to-face communication during their collaboration.

"We did have some email communication back and forth as well but we liked to do things face to face. It is a lot easier. We went up there and they came here sometimes as well". R3, SME marketing manager

### **The designer's perspective**

From a designer's perspective, a reoccurring theme is that clients do not understand the support provided by consultancies. Designers often notice a conflict between the requirements of clients and their desired delivery. Despite this conflict, SMEs may be reluctant to change their initial requirements.

"I also think that a lot of people don't really understand what we do and to a large degree, a lot of people go in [thinking that] what they have in their head is what they want us to do and they won't change from that. [...] They want this, they want XYZ, if we say "no you should be doing ABC" they will still think that "this is what I want" and that's what they demand from us." R22, Design consultant

Interviewees also noted that SMEs might have unrealistic expectations or can be over demanding because of a lack knowledge concerning the design process and outcomes. The majority of the consultants interviewed reported problems with the design briefs provided by SMEs. A considerable effort is

made to understand each side's expectations outlined in the briefs. Interviews indicated that the involvement of SMEs' in the design process is positive to a certain degree, which makes the process easier and produces beneficial outcomes.

Designers also suggested that developing a relationship that removes the client-consultant barrier is important for an effective collaboration.

"You know who Bob is, who is working there. You know them, you can talk to a human and therefore it is not just another person in the email chain. And once you break down a little bit of that kind of client-consultant barrier, it is more about your team". R21, Design consultant

Interviewees R22 and R3 also commented that their contribution is more strategic within SMEs when a long-term relationship has been established between the design consultancy and the SME, and when designers get involved in the process; they collect data that feeds other projects.

"We have to get involved we need to understand actually what is the issue". R23, Design consultant

Interviewee R23 indicated that a long-term relationship is a sign of trust. As a result of a trust-based relationship, the SME is confident that the consultancy understands the company, its needs and its resources.

"If a client trusts you, then they get on with the job. Your approach and what you are doing are correct. They know that you understand the company. It comes back to -what I said to you at the beginning- you have to understand what the company is doing and what they are trying to achieve". R23, Design consultant

### **6.3 Discussion of the interview results**

This section discusses the interview results. It first discusses the findings related to the 'specialist-generalist' dichotomy in relation to the literature and by using creativity theories and a phenomenological approach before moving on to discuss the results pertaining to the effectiveness of collaboration between SMEs and designers. Finally, it proposes a framework to elucidate the 'specialist-generalist' dichotomy.

#### **6.3.1 The sector-specific knowledge gap**

The findings above highlighted that the majority of SME interviewees revealed that SMEs do not want to risk working with designers who do not

have previous experience in the specific field in which the SME operates. This problem has also been highlighted by interviews conducted by Selek (2008). Although it is not explicitly stated in her research findings, her interviews suggest that SMEs find it difficult to work with designers who do not know SME's field well. Similarly, in another study, which reported the result of a collaboration with an external designer and a plastic pen manufacturer, highlighted that the biggest problem encountered was that the designer was not competent in plastic pen manufacturing techniques, which, he believed, affected the learning pace, slowed down the product development process and harmed the effectiveness of working together (Er & Evcimen, 2012). This finding corresponds to the general attitude of SMEs as stated by Bennett and Robson (1999), who claim that obtaining specialist knowledge and receiving intensive yet temporary help to address their specific problems and gaps were the main drivers behind SMEs' use of external advisors. Still, it is questionable whether the external designer should really need knowledge of plastic pen manufacturing techniques.

On the other hand, David Kelley from IDEO, a famous established design consultancy, indicated on an ABC nightline programme that IDEO do not specialise in any specific area of design but they are experts in the design process. This approach leads them to develop innovations.

"The point is that we are not experts at any given area. We are kind of experts in the process of how you design stuff. So we don't care if you give us a tooth brush, a tooth paste tube, a tractor, a space shuttle... It's all the same to us. We want to figure out how to innovate by using our process and applying it".  
<https://www.youtube.com/watch?v=M66ZU2PCicM>.

Buchanan (1992) and other scholars as presented in Section 2.3.7 also agrees with the above-mentioned approach by suggesting "design has not subject matter on it own". In the design field a lack of knowledge sometimes appears to be acceptable and seen as a source of novelty.

Norman (2012b), in his talk to design students about a designer's knowledge, claimed,

"One of the interesting things about design is that you really do not know very much about the world; you do not know much about science; you may not know much about literature and history, and the fact you do not know very much is your most important strength; that's why you are great designers. Because if you don't know

anything well; you are not stuck in the past; you are not stuck with the ideas of the field" (Norman, 2012b).

Norman (2012b) highlights that designers' lack of knowledge is their "brilliance", which enables them to ask various questions including some that could be qualified as 'stupid' that serve to reveal underlying assumptions. He emphasises the importance of naïve mind. Initiating and nurturing a process of 'unlearning' is important for the discipline to encourage designers to solve problems from a different perspective. However, taking a fresh eye or keeping a Zen mind is significantly different from ignoring the importance of specialist knowledge. The difference here is similar to the one that exists between being naïve and a naïve approach, where the latter is a strategy applied when taking a phenomenological approach. Speigelberg (1965) states, "The phenomenological method is a subjective and intuitive effort to suspend the customary attribution of meaning to a phenomenon, and instead approach it *naively* [emphasis added] so as to apprehend its 'essences' ". What Norman (2012b) claims as brilliance may be problematic because of allowing designers to overlook the specialist knowledge required for a project. Perhaps this ignorance towards the value of knowledge has started with the overload of design knowledge, a designer's excuse. Yet too often, it appears that designers are reluctant to admit that they might need more than a certain level of familiarity with the topic they work on, and they believe that generalist knowledge is sufficient for their practice as long as they ask the right questions. Asking the right questions is about identifying the problem. Solving the problem may still require the use of tools, capabilities and knowledge.

It might also be problematic to assume that design is a heuristic method that is not context bound and can contribute substantially to any topic. A historical literature review dealing with the question about whether cognitive skills such as problem solving, decision making in domains like chess and mathematics are context bound provides a strong specialist position and provides a generalist position at the same time (Perkins & Salomon, 1989) revealing that it may be a difficult position to take/a paradox.

Adopting a wider perspective, it may be argued that a generalist attitude has evolved amongst designers and this is due to the eclectic nature of design. The design discourse is influenced by various other disciplines, such as architecture, management and computing, in relation to the economic and social circumstances of the period, especially from the 1950s to the present day. Design has flourished and migrated into diverse areas and many professionals from other disciplines migrated into the design field (Bayazit, 2004; Buchanan, 1992; Cross, 2001). As a result, communicating the specific knowledge of design with other stakeholders is even more difficult.

This migration has also led to borrowing methods and to being influenced by neighbouring disciplines. The act of 'adapting and adopting' is widespread in the discipline. Cognitive techniques such as 'Think-aloud', 'Protocol analysis' and 'Morphological analysis' are utilised by designers (Bayazit, 2004). Likewise, other methods that are widely adopted, such as 'Personas', 'Customer journey mapping', or simply brainstorming, did not originate in the design field nor were they developed by individuals who called themselves 'designers'. One of the implications of this borrowing can be articulated as a 'quick and dirty' approach. For example, designers as part of a human-centred approach adopt design ethnography i.e. quick and dirty (or rapid) ethnography (The Design Exchange, 2013). This mindset has both advantages and disadvantages. Instead of waiting for anthropologists and others to complete time-consuming and in-depth studies, designers focus on practicality, speed and efficiency in gathering such data. A quick and dirty approach is time efficient but does not guarantee the best outcome. Although this method is not as thorough as a long-term study, it may be an effective method in this particular context where limited depth of understanding may be required. To some extent, this approach can enrich the discipline, but it may form the belief that a quickly performed task is sufficient, and thus the proper application of a method may be unnecessary. A further consequence of this approach may be a lack of theoretical underpinning and a lack of scientific evaluation in the discipline.

The interviews revealed that both SMEs and design respondents perceive high levels of expertise as a factor limiting creativity. The understanding is that being good at one subject does not necessarily mean being creative. The SME's view is that designers reach their expertise in ten years, and thereafter suffer a decline in creative ability if there no new challenge arises. This observation of expertise was also echoed by some scholars (e.g. Cross, 2004; Dorst & Reymen, 2004; Ericsson, 2002). Ericsson (2002) states that each field requires a considerable amount of time to reach a peak of performance, but there seems to be an agreement that it requires a minimum period of practice for at least ten years starting from the first involvement. In contrast, Lawson (2004) suggests that unlike other fields, such as music and support, design excellence comes with maturity.

Although SMEs are very risk averse and resistant changing things, they can turn to novelty if a design company re-uses the same solutions. This observation is in line with other studies as seen in Eckert et al. (1999) and Stacey et al. (2002) that analyse the relationship between expertise and innovation. These authors argue that developing expertise may increase the efficiency of textile designers but also hinders their creativity in terms of finding new patterns. All the observations and studies cited above show that designers consider specialisation and development of experience as pure repetition, which may hinder creativity. On the other hand, the findings of Reilly (2008) and Leigh et al. (2012) suggest that there seems to be a correlation between increased levels of domain experience and increased creative output. Howard Gruber (1991) introduced a phenomenological perspective, the evolving systems approach, in order to explain creativity. Prior to Gruber, creativity was considered a spontaneous irregularity and an innate force of genius. Gruber discusses constructive repetition as a source of creativity. Constructive repetition, which refers to the deliberate repetition leading to idea variations and revisions of a concept in order to establish the best creative product, is a reflective process that leads to mastery (Brower, 2003). Based on the premise of constructive repetition, specialisation is not a barrier to creativity.

Working in a variety of projects may nourish a designer's repertoire and could feed into the design process. Interviews indicated many designers,

therefore, hesitate to specialise in a single sector because specialisation will prevent them cross-fertilising solutions across different projects. Cross (2011) presents the design process of Gordon Murray, who is a racing car designer and can be considered as a domain specialist designer. Careful reading of his design process shows that while he was developing a hydro-pneumatic suspension system, he consulted existing solutions normally found within micro filters in the medical industry. Not working in the medical industry did not prevent him applying an existing solution found in the medical industry to the automotive industry. This line of thought was also observed in an interview (R24), but generally opposed by other interviewees in this research (e.g. R21, R20, R19, R17). A further concern of designers about specialisation is that they believe that there may not be enough jobs to sustain themselves or that working for one particular industry is less interesting and less fruitful. However, designers acknowledge that entering a new market and competing with specialist rival consultancies without products supporting their experience is highly challenging. Specialisation provides credibility and more lucrative deals with clients.

The interviews conducted for this study indicated that external designers are typically thought of as generalists while in-house designers are seen as specialists. Based on this assumption, a way to improve collaboration is to provide strategic mechanisms that enable external and internal designers to work together at the same time. While an external design consultancy works with an SME to bring a novel and fresh perspective, an in-house designer works as a bridge to overcome the possible knowledge and communication gap that may exist during the partnership. This solution is widely adopted by large enterprises and can be mostly applied by medium-sized SMEs rather than small business because they often do not employ in-house designers. Taking this association for granted may not be very helpful for the development of knowledge in the design profession and may not improve the collaboration between designers and SMEs.

A positive implication of specialisation found in the literature is that professionals help each other. Rusten and Bryson (2007) claim that Norwegian designers "try to help each other by providing referrals and

recommendations to their friends in the design industry. This is possible in this sector especially with designers specialising in different types of product and expertise". This positive outcome has not been observed in Scotland based interviews undertaken in this PhD research.

### **6.3.2 Effective collaboration between SMEs and designers**

The interviews illustrated that there was a lack of empathy and understanding between SMEs and designers during collaborations. Designers argued that SMEs do not understand designers. This statement corresponds to the literature as discussed in Chapter 2. Yet the present study shows that designers also fail to fully understand SMEs requirements and needs which can lead to unsatisfactory results. Perhaps, one of the reasons is that designers underestimate the needs of SMEs' and assume that what SMEs want is not suitable for their company. As a result, they provide a solution that mismatches the SMEs' requirements. This misunderstanding happens when there is a lack of discussion and negotiation and when SMEs are not fully involved in the process. This point is reflected in Schein's (1988, 1999) findings, which claim that only clients themselves can know the value of a proposed solution and course of action for their company. The outsider can never fully understand the company with its nuances. He suggests that clients must always be involved in the process and should 'own' all the 'next steps' that are taken.

The majority of the interviewees emphasised the importance of a face-to-face meeting at the beginning of the project to negotiate objectives, requirements and limits and to reach an agreement on these terms to maintain a healthy relationship. Both designers and SMEs observed a positive difference in the performance of design consultants in cases where the clients express their motivations and objectives more clearly and when both sides discuss the brief thoroughly.

Designers should also openly discuss their capabilities and limitations at the beginning of the process. A previous study looking at collaboration between designers and scientists identified a conflicting behaviour inherent to designers. At times, designers may engage in tasks that require

qualifications that they do not have when they do not clearly communicate the limits of their capabilities (Driver et al., 2011).

“The designers did not make their capabilities and limitations clear at the beginning of the project, leading to them accepting a task they did not have the skills to fulfil” (Driver et al., 2011, p.25).

Collaboration can be improved by following a long-term partnership that enables trust and open dialogue between designers and clients.

### **6.3.3 A framework for understanding the generalist-specialist dilemma**

The findings from the interviews indicated that when designers talk about the specialist-generalist dilemma, they are either referring to sector specialisation or task specialisation without noticing that they use these lenses almost interchangeably. This research, therefore, suggests an explanatory framework that may contribute to the improvement of understanding about specialisation issues. The expertise of designers may be illustrated by means of a two-axes graph, which can be seen in Figures 6.1, 6.2 and 6.3. The vertical axis represents different tasks included in the design process (e.g. concept development, design management and visualisation), whereas the horizontal axis illustrates various sectors in the market. These sectors may include retail, health and social care, automotive and food sectors in which a design consultancy may work. Focusing on one or many points on a single axis does not create an ambiguity about the credibility of the designer expertise. However, it is challenging when the designer or a small consultancy attempts to cover several points from both axes, which means being generalist in both design tasks and application sectors. This attempt may result in confusion and unmanageable situations arising (Figure 6.3). This study also suggests that developing expertise happens gradually in parallel to acquiring knowledge and experience. It proposes that focusing on one sector and one task at the beginning, as a design graduate or as a new consultancy and widening the expertise in one of the axes with time seems feasible.

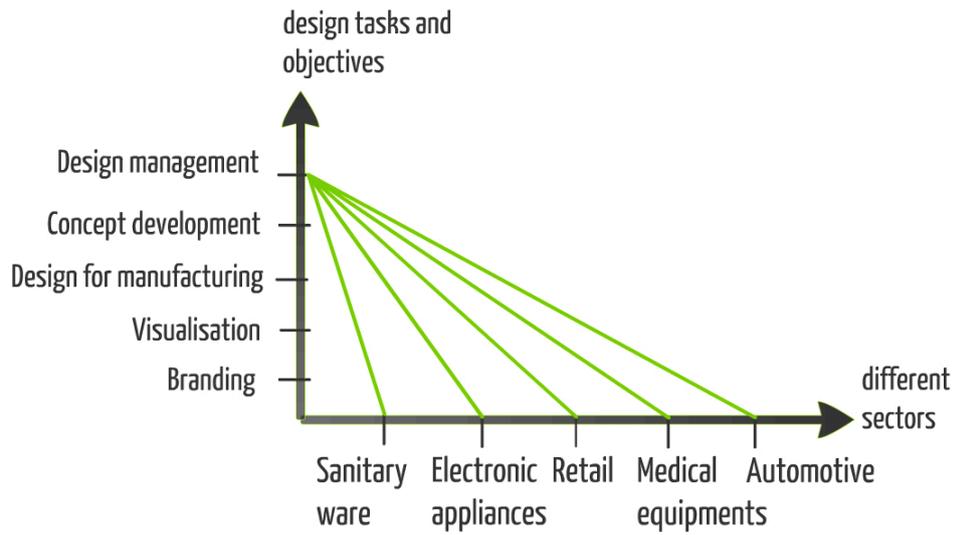


Figure 6.1 Specialist in design tasks working in several sectors

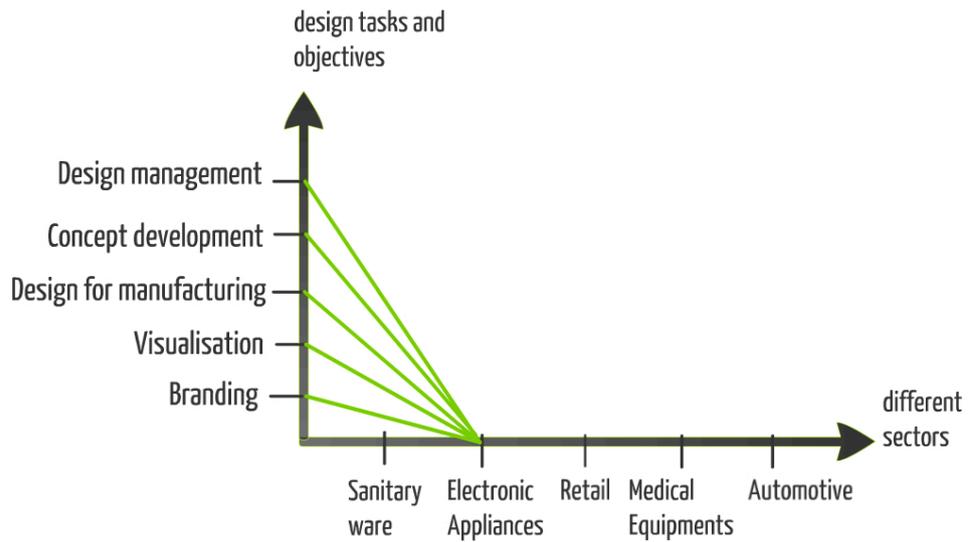


Figure 6.2 Generalist in design tasks working in one particular sector

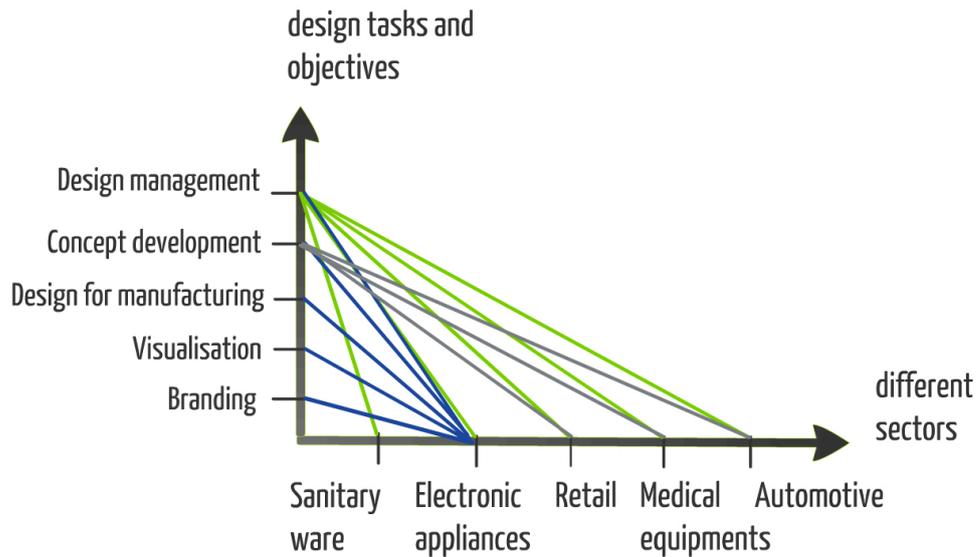


Figure 6.3 Generalist in designing, working in several sectors

Although this framework mainly informs design consultancies working with SMEs, it can be used by DSPs because it is consistent with the interview findings derived from DSP associates. As described in Section 4.4.3, it was found that defining the focus of DSPs in a narrow way brings improved results and can help the programme communicates its support with SMEs more effectively. Additionally, difficulties were experienced when accessing some industries due to a lack of domain specialists working in DSPs. As a result, by specialising in a sector or design task, DSPs may increase the involvement and commitment to SMEs and improve their effectiveness.

#### 6.4 Conclusion of depth and breadth of design expertise

Communicating the value of design expertise clearly with SMEs is a continuous challenge. This study has illustrated the difficulties reported by the interviewees from both the perspectives of designers and SMEs, paying particular attention to the value of specialisation. From an SME's perspective, the knowledge gap emerging from a lack of specialisation was found to be problematic and risky. As a result, it was often avoided by SMEs. From an external designers' perspective, the interviews suggest that that specialisation yields more credibility in support of collaboration. This may be due to a lack of domain specific knowledge, and this is viewed as being less credible and negatively affecting the perceived value of design expertise in a problem-solving context. Designers who worked within areas

which necessitated a high level of technical knowledge either need to work with technical experts whose inputs are visible in the project or develop the specialist knowledge as required by the field. This research concludes that undertaking projects without the necessary steps by solely relying on design skills might do more harm than good to the practice of practice.

Designers need to communicate their sectoral knowledge and skills to fulfil a project-related task in order to avoid misunderstandings and mismatched expectations. Defining a required speciality without using domain jargon might help foster a mutual understanding of perceptions and expectations, and ultimately help build a trustworthy and working relationship between SMEs and designers.

Most of the time designers do not want to specialise because of the limitations inherent to specialisation. Specialisation is sometimes perceived as a barrier to creativity because sector specialisation may result in the designer lacking the experience gained through undertaking a diverse range of projects. Moreover, task specialisation often results in repetition in terms of the design methods which are liable to be applied and may lead to a lack of original thinking. Studies that have been cited indicate that it is not always the case (e.g. Gruber, 1991).

Providing a broader or deeper expertise may be also dependent on the size of the consultancy, the majority of consultants in this study are part of small consultancies (less than ten), the largest company employing sixteen people. The larger consultancies may have a variety of specialists and can offer a broad range of services. However, this issue is beyond the scope of this research. Additionally, the Design Council's survey suggests that fewer than ten people are employed over 82% of design consultancies in the UK (Design Council, 2005b).

The specialist-generalist dichotomy is not a fixed categorical rubric but a way of framing the issue. Being a specialist or a generalist has trade-offs and since the design discipline is multifaceted, it is vital to understand the designer's role within each organisation and each situation individually and to act accordingly.

# 7 An analysis of the metaphors used in design

## 7.1 Introduction

The meaning of the term 'design', as well as 'design expertise', is the subject of academic debate (e.g. Buchanan, 1992; Cross, 1990, 2011; Lawson & Dorst, 2009). This may be a result of the multifaceted nature of design and existing underlying assumptions, theoretical anomalies and the fragmented knowledge in the field. As discussed in Section 3.5.2, Lakoff and Johnson (1980), through the development of the conceptual metaphor theory, suggest that metaphors can be used to structure perceptions and understanding and affect the way experiences and ideas are categorised and organised. Based on this argument, this research applies a systematic metaphor analysis to examine the visual and cognitive metaphors related to design and in particular design expertise, to discuss the design discourse. It examines how design expertise is represented through the use of metaphors and explores the use of metaphors as a tool to recognise, share and acquire expertise.

Lakoff and Johnson (1980) suggest that language is evidence of our conceptual system. Likewise, the language of design evidences design expertise. The analysis of these metaphors reveals characteristics, strengths and limits of how we understand and describe design. It also makes a contribution to how design expertise is communicated, knowledge exchanged, ideas and skills developed, and experiences shared within the design and business communities, who may not often share the same specialist language and mindset.

A systematic metaphor analysis approach has been adopted for the purpose of reaching wider and transferrable conclusions as discussed in Section 3.5.2. Metaphors represent a distillation of information. They also help assess how design perceptions and measures evolve over time. This evolving aspect of design expertise and attitude lends itself to be studied more effectively through the use of metaphors than through interviews. In addition, metaphorical analysis is selected to overcome the missing self-criticality in the research domain (Michlewski, 2006; Raulik-Murphy, 2010), since interviews are influenced by the assumptions existing in the design field, especially those of designers. Due to the fact that metaphors represent collective thinking rather than a single designer's opinions, the result of metaphorical analysis is transferable.

## **7.2 Findings of metaphor analysis**

The following section presents a selection of metaphors before moving on to the analysis. The metaphors have been gathered from the interviews undertaken for this research, and from the literature review, and by doing so, this study offers a way to further clarify the implications and assumptions which lie behind how designers and SMEs think about design expertise. The methodology behind the assembly of the metaphors was described in more detail in Section 3.5.2. Table 7.1 lists the metaphors identified under the core aspects of design expertise: design skills (as a composite of knowledge and abilities), design processes, design outcomes, and design roles.

Table 7.1 A selection of metaphors for design and design expertise

Design Skills-knowledge	Design Process	Design Outcomes	Design Roles
Metaphors found in the interviews conducted for this study			
Magic (R21) Gut instinct (R22) Database (R2)	Fluffy (R7) Spark Myth (R22)	Ta-da (R7, R21) Blue sky (R7)	Vehicle (R17, R15) Bridge (R13)
Metaphors are found in literature <sup>12</sup> and other interviews			
Thinking out of the box Magic (Kolko, 2011) Capturing, collecting, recalling building knowledge Design as tight rope walking (Schön, 1983) Repertoire (Schön, 1983) Pencil as Spokesman (Richard MacCormac, practitioner architect in Lawson, 1994) Fresh Eye Connecting Cross-pollination (Kelley & Littmann, 2005) Repertoire of tricks (Richard MacCormac, practitioner architect, in Lawson, 1994)	Black box (Jones, 1992) Mystical Journey (Cross, 2011; Lawson & Dorst, 2009) Re-inventing the wheel Incubation illumination (Wallas, 1926) Framing the problem (Schön, 1983) Problem structuring-formulating Problem setting (Schön, 1983) Reflective conversation (Schön, 1983) Drawing as a dialogue (Santiago Calatrava engineer-architect, in Lawson, 1994) Reflective conversation (Schön, 1983) Dialogue (Calatrava, cited in Lawson, 1994)	Concrete solutions (Cross, 2011) Creative Flash, A mental block lifted. (Cross, 2011) The Eureka The aha! Moment (Kelley & Littmann 2005) Signpost (Juninger, in Bühlmann & Wiedmer, 2008) Wild ideas Design as a marker of culture (Jacob Hashimoto, artist designer, 2012) Design as political windows dressing (Sarasin, in Bühlmann & Wiedmer, 2008) A messy divorce (Christopher Boots, design practitioner 2011) Unique twist (Andrej Matic, design practitioner, 2011)	Magician Path-finder, way-finder (Juninger, in Bühlmann & Wiedmer, 2008) Competitive weapon (Fujimoto, 1991) Catalyst (Dunne, in Bühlmann & Wiedmer, 2008) Explorer (Jones, 1992) Bridge (Lake-Hammond & Waite, 2010) Connector (Leung, design practitioner 2012) Integrator (Fujimoto, 1991) Midwife (Ingels, architect, 2012) Hero (Badke-Schaub et al., 2010) White knight, (Badke-Schaub et al., 2010) Illusionist (Jones, 1992) Gambit (Lawson 2004)
<b>Visual metaphors</b>			
Post it note Light bulb			

<sup>12</sup> These metaphors can be found in other texts, these references are just examples for the reader to source the data and context.

### 7.3 The analysis framework

Schön's (1979) generative metaphor framework has been adopted for the analysis of the metaphors identified in this study. By using two concrete examples of urban planning, Schön explains the generative metaphor framework through the application of two metaphors. These are '*seeing slums as congenital disease*' and '*seeing slums as natural communities*' (p.145). In his first example, he referred to the opinion of the experts of the 1950s. This led to the conclusion that the community would be healthy when there would not be any blight or slum area in a city. This statement resulted in '*the slum being seen as a congenital disease*'. The existing buildings in the slum were regarded as unsanitary. The area, therefore, was planned so as to eliminate the conditions of the slum. As a result, the process of redesigning the problem area focused on building new housing, parks, streets and shopping centres. The disease was cured by the removal of the slums or treatment of the symptoms. In his second example, Schön refers to the Herbert Gans' Urban Villagers Project in 1962 through the metaphor '*seeing slums as natural communities*'. Gans recognised the informal networks of the slum with its homelike stability. Consequently, instead of dislocating people from their local areas and *natural communities*, ways of preserving and improving community cohesion were sought. Schön identifies our strong affinity with the *natural* (due to its romantic origins) and our distrust in the artificial, which influenced our understanding of urban renewal. Seeing the slums as health/disease in the first example and nature/artifice in the second had different implications as to how the reality was constructed, the problem was re-framed, and solutions were found.

Perhaps another example will help illustrate how the use of metaphors can influence decision-making. Borders (2011) looks at the metaphors used to understand an economy. He identifies the metaphor "*the economy as a machine*" as one of the most pervasive and problematic metaphors in economic theory. Several examples gathered by Borders from the publications in the field of economics include: "How to Fix the Economy"; "how not to run an economy"; "the Economy [is] overheating". He claims

that this is problematic because it does not represent the way the economy works. The economy is interdependent; one can neither fix the rainforest by pushing a button nor the economy. He then suggests that understanding 'the economy as an ecosystem' would be more helpful. He acknowledges the fact that it is easier to think of economics by borrowing from Newton (physics) than from Darwin (biology) when discussing what needs to be done about a crisis, for example. However, daily doses of this sort of language add up over time and affect our understanding of the way economies actually work. Similar concerns are perhaps valid for the design discourse. The following section identifies some of the problematic and pervasive metaphors that are used to represent design and design expertise and discusses the implications of these metaphors by using a generative metaphor framework.

#### **7.4 Analysis of design metaphors**

For the analysis, a small selection of these metaphors have been analysed and are discussed below. Schön's generative metaphor framework has also provided the criteria for selection. Schön, in his analysis, views generative metaphors as oppositional values. Therefore, metaphors that can be discussed in a comparative manner are selected for the analysis. First, design knowledge is discussed by means of 'repertoire' and 'repository' metaphors. Then, metaphors that describe the design process, such as 'journey', 'black box' and 'magic' are examined. This is followed by an examination of design roles, through the use of metaphors including 'heroes' and 'catalysts'. Two visual metaphors of the design process, 'light bulb' and 'post it notes' are also considered. A comparative discussion concludes the analysis.

##### **7.4.1 Design knowledge: 'repertoire' vs. 'repository'**

Schön (1983) describes designers' knowledge as a design repertoire rather than a set of abstract figures and scientific rules. Similarly, Jesse Catron (2012), a game designer, states:

“Of course familiarity breeds proficiency but I think it is important for a designer to have a versatile *repertoire* of mechanics to use according to the goals he is trying to accomplish or the problems he is trying to solve”.

*Repertoire*, a theatrical and performance-related term, is a re-occurring metaphor and has a significant impact on the design discourse (Bang, 2009; Lawson, 1994; Stolterman, 2008). It often indicates that a design practitioner, whether consciously or subconsciously, draws from his/her own previous experiences. Designers acquire knowledge intuitively, without the use of a reason or without inference. Thus, this knowledge is often implicit, tacit and experiential (Bang, 2009). Similarly, *repository* as a metaphor reflects the understanding of the reuse of design experience. The underlying theory for both metaphors is case-based reasoning<sup>13</sup>. Although repertoire is a frequently used metaphor, repository is rarely used. The repertoire refers to internal and digested knowledge, which is regularly performed i.e. reused. The repository, on the other hand, refers to using an external knowledge source. Designers perhaps regard the knowledge retained in repository as institutional, formal and impersonal. However, an SME in this research perceive ‘knowledge as a database’, which appears to carry the same implications as repository.

“And you may have somebody who is very creative in another area, but again he may not have I guess the database to draw on”. R2, SME non-owner manager

Ye and Fischer (2002) point out that a cognitive barrier to external reuse might stem from a user’s unfamiliarity with the contents of the repository. Brown and Duguid (2000, p.119) advance the idea that “knowledge is something we *digest* rather than merely *hold*”. They suggest that it is more reasonable to say, “I’ve got the information but I don’t understand it,” rather than, “I know but I don’t understand”. It could be argued that the repository keeps the design information while the repertoire keeps the design knowledge.

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<sup>13</sup> Cased based reasoning refers to using existing experiences and cases to analyse and solve new problems (Kolodner, 1992)

Another way to approach the repository metaphor is that repository refers to the knowledge that is codified, structured, open and easy to share in comparison to repertoire in which the knowledge is personal, informal and less organised. Repertoire implies while developing knowledge and expertise, that attention is required when internalising the design knowledge, learning to *perform*, and not learning to *store in a unit*. Other important aspects of the reusability of knowledge are the ability and attention to 'capture' and 'recall'. That means to organise and retrieve the previous experiences and use them regularly. Each retrieval and re-use of knowledge is a way of rehearsing and making the knowledge tangible by practising. Table 7.2 provides a comparison between the knowledge within repertoire and repository regarding their associations.

Table 7.2 A comparison of associations of two metaphors on reuse of knowledge

<b>Repertoire</b>	<b>Repository</b>
Implicit	Explicit
Personal knowledge	Impersonal-institutional
Digested knowledge	Difficult to contextualise
Less structured	Structured
Ownership	Open knowledge
Difficult to share	Easy to share
Dynamic	Static

#### 7.4.2 The design process as 'journey'

The metaphor of 'journey' is widely used in various contexts, such as research and project-based studies. MacCormac (cited in Lawson & Dorst, 2009, p.11) uses the *journey* metaphor to illustrate his design process:

"I mean the analogy of a journey is a very interesting one. The design process is a journey, an episodic journey towards a destination which you don't know about, which is what life is and what writing and all arts are like; a journey".

Cross (2011) also uses this metaphor to describe the design process; he contextualises design projects in particular. He treats the design brief as the starting point of the journey. Hence, it is a known part of the journey in that sense. He explains the need to "stand back and adopt a fresh point of departure" to bring a new perspective to evaluate it. Similarly, Jones (1992) likens designers to explorers looking for hidden treasure. To him, a new

problem is like an unknown land, of unknown extent, in which the explorer searches by making a network of journeys. He sees design methods as navigational tools and maps. Design methods assist in plotting the course of the journey and maintaining some control over where design goes. Lawson and Dorst (2009, p.21) also use the journey metaphor to describe the overall process of developing expertise, "we see the creation of design expertise as a journey". For them, acquiring expertise is a long journey that starts with graduation. The journey metaphor suggests that expertise is acquired. If expertise is the final destination, people can get lost and not reach their final destination. If expertise is seen as being on the journey, the emphasis is placed on movement. It is a dynamic process.

The word 'journey' is derived from old French 'journée', meaning "a defined course of travelling; one's path in life". Even though the definition refers to "a *defined* course of travel" (Online Etymology Dictionary, 2013), the unknown is an important aspect of experiencing a journey, likewise designing. The associations with travelling place an emphasis on relying on maps and tools, good equipment and experience rather than on exceptional skills. This approach implies an open model that encourages designers to be curious and flexible. Since designers cannot predict all the obstacles and opportunities lying in their path towards the goal, all they can do is deal with the obstacles, seize the opportunities and embrace the unknown whilst tackling them on the way.

#### **7.4.3 The design process as 'black box' and 'magic'**

The metaphors that convey mystery and which obscure the design process include *magic, black box, magician, myth, trick and twist*.

Designers sometimes use magic in a positive sense and associate it with creativity. Thoreau (2013), for instance, describes himself,

"I am a graphic designer who loves creativity and magic, and my aim in life is to share these with you. I believe that we find our truest vision and purpose in the magical world of creativity".

Richard MacCormac (in Lawson, 2004) described his practice as "having a *repertoire of tricks*" to exemplify his original and surprising ideas. Lawson

(2004) likens designing to the activity of a gambit, a chess player who needs to create a new and unexpected move in a chess game in order to win. Kolko (2011) also suggests that clients may desire magic because a satisfying magic-show means that the money is well spent on the magician.

Many misunderstandings about design expertise arise perhaps as a result of the mystification of the design process. To Jones (1992, p.46), "the most valuable part of the design process is that which goes on inside the designer's head and partly out of reach of his conscious control as it were in the 'black box'." With the black box metaphor, the emphasis is on input and output, which leaves the process unobservable. Kolko (2011) recognises that much of the mystery is related to the synthesis stage of the design process, which leaves this stage unresolved, personal and rarely formalised. He notes that it leads to ignorance within the companies with professionals not allocating enough time and budget to undertake the synthesis stage of the design process. A consequence of a black box approach is that most of the outputs of design, design thinking and writings are produced without an explanation about the processes behind them (Jones, 1992). Another implication was observed during interviews conducted with respondents, who indicated that they avoid using design term during their support. One DSP respondent (R13) commented, "the design profession has long since sold itself on a myth and as a result, people do not understand it."

Magic is commonly practiced in isolation and secrecy, and a magician never discloses how the illusion is created. Magicians enjoy a black box approach, because mystery has a professional value for them. Likewise, it is observed that designers may believe that de-mystification of the design process may devalue design outcomes. Two interviews conducted within this research with design practitioners suggested that mystification serves to protect the intellectual property (IP) and maintain the value of design.

"De-mystification of design and entry level to it is now relatively cheap. Everybody has a laptop now. They can download free software. You can do what ever you want. This has a negative effect. Suddenly the value of design is seen as less. My daughter can do it or you know anybody with computer can do it. For people who don't value design anyway, it is devaluing design". R23, Design consultant

Making the design process inaccessible by putting it into a black box seems to help preserve the IP. Whether it is a reaction to silent design or "all men

are designers" (Papanek, 1980) and "everybody designs" (Simon, 1969), or to prevent the downgrading of design skills, it is not clear. However, 'seeing design as magic or mystery' hardly aids trust, dependability, collaboration, design democratisation and participatory design.

#### **7.4.4 Designers as 'heroes'**

Metaphors in this group may emphasise the value of creativity for design expertise and convey the message that expertise belongs to the personality of the designer, or expertise is a result of an outstanding performance or talent. In some situations, the self-image of designers appears as arrogance. Forty (1986, p.242) says that seeing design as a distinctive skill of designers may result in 'the myth of their own omnipotence'. He states, "design has come to be regarded as belonging entirely within the realm of the designer". An idea of 'uniqueness' of design is also observed in the design rhetoric; for example, Brian Gillespie, a design consultant, advertises design support as "The companies benefit from a form of thinking that is *unique* to designers" (Gillespie, 2007, p.2). Badke-Schaub et al. (2010) criticise these special skills and functions ascribed to the designer such as high impact innovative solutions to be applied to the market. They use the metaphors 'white knight' and 'hero' to point out how the value of design expertise is overestimated by designers. Designers do not call themselves heroes, but the rhetoric implying that design will save the world or the company is widely used (see Figure 7.1). Our association with hero is not only about saving the world. We also recognise a 'hero' as a single individual, often born as hero, helping but not collaborating.

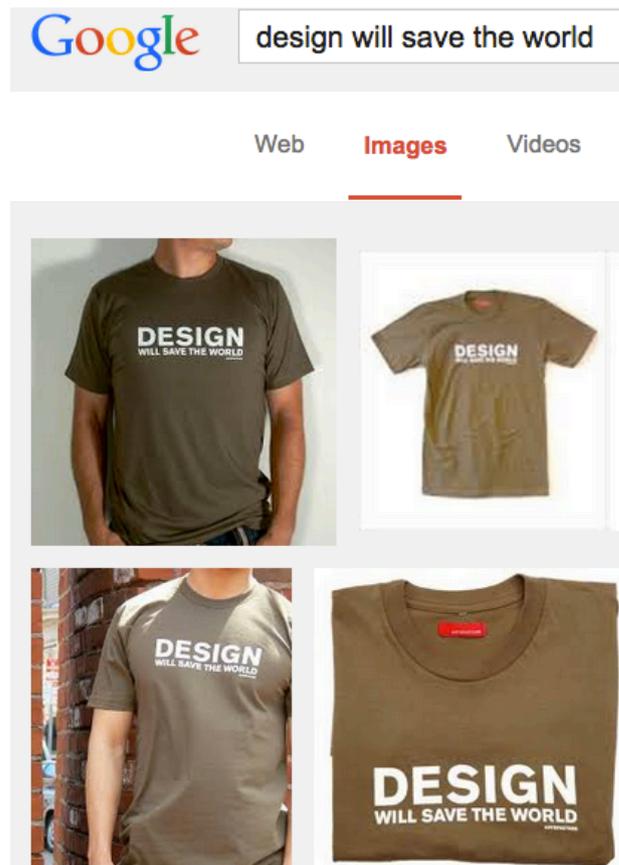


Figure 7.1 An example of 'designers as heroes' rhetoric.

The example of *Juicy Salif* the lemon squeezer, designed by Philippe Starck, can be mentioned as a narrative, a root metaphor,<sup>14</sup> (Sarbin, 1986) to illustrate the distinctive design skill. This root metaphor serves, perhaps strategically, to evoke emotions, to strengthen the value of design and to increase sales. "Starck is known to suggest that design ideas come to him quite *magically as if out of nowhere*" (Cross, 2011, p.6). Starck's design story starts in a restaurant after receiving a design brief from Alessi (Carmel-Arthur, 1999). Starck explains "this vision of a squid like lemon came upon me, so I started sketching it..." (Figure 7.2). "If I'm quick", Starck thinks, "I can design this before the *primi piatti*" (Carmel-Arthur, 1999). According to the story, the very next day, he called Alessi and said, "I've got a lemon squeezer for you". The story implies that the way he arrives at the design solution and his ability to communicating his expertise

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<sup>14</sup> According to Sarbin (1986) narrative is a root metaphor (Pepper, 1942). Narratives, like metaphors, construct the reality through shaping an individual's perception of the world. It builds on the idea that meaning is created and communicated through stories and experiences rather than logical arguments and lawful formulations.

are a product of his individual skills. The story is presented in a way that the outcome is not a result of practice or design methodology. Starck's story reduces the complexity of the design process. This story and similar ones embracing design genius seem to embody the design expertise at first glance. However, it does not help the design profession because it attaches the value of design to the individual, not to the profession.



Figure 7.2 Sketches on service napkin, Juicy Salif, the lemon squeezer (Carmel-Arthur, 1999)

#### 7.4.5 Designers as 'catalysts'

Perhaps as a result of the increased importance of collaboration, co-design, and critical design, new metaphors such as catalyst<sup>15</sup>, bridge, connector, link and midwife widely appear in recent publications and are also found in the interviews conducted by the researcher. For example, in an interview by Bühlmann (cited in Bühlmann & Wiedmer, 2008, p.241), Anthony Dunne commented,

<sup>15</sup> In chemistry, when a catalyst participates in a chemical reaction, it often lowers the activation energy to start the reaction or increase the rate of reaction.

"They [designers] are catalysts, I think it is becoming well known. Certainly here in London-that one possible role for designers in the future is a catalytic role, and a facilitating role".

Dunne suggests that this new role is an engaging role, and the responsibility of the designer is to connect different audiences such as the public and professionals. In the same interview, Fiona Raby (cited in Bühlmann & Wiedmer, 2008, p.241) contributed to this concept by claiming that the expertise of designers is to generate questions and to reformulate the problems, rather than to solve them. The expertise of the designer lies in aiding collaboration between stakeholders, in assisting the design process and in increasing its efficiency. Similarly, Bjarke Ingels (2012), a Danish architect, suggests a facilitating role through his metaphor of the midwife,

"In a sense we are facilitators or - I like this idea that the architect is a midwife that we help society continually to give birth to itself -".

Another designer talking about this new role claims that 'ta-da' i.e. the magician attitude has become out-dated due to the risks involved in it. He indicated,

"I think that the old way of doing design still happens, but going away and coming back and going 'ta-da' has a risk to it, right?" R21, Design consultant

Some metaphors emphasise the integrating role of design, such as 'bridge' (Lake-Hammond & Waite, 2010), 'connector' (Leung, 2012), 'integrator' (Fujimoto, 1991). DSP associates use metaphors such as 'vehicle' and 'bridge' to define their expertise as being parallel to their intermediary position and the facilitator role they adopted (see Section 4.4.3).

"The design process is about taking a company from where it is to where it wants to be, using design as the vehicle..." R17, DSP associate

"It's [design] a really useful approach to help organisations be innovative so it's a kind of bridge between the end user and technology". R16, DSP associate

For instance, a bridge connects two points, so does a link, it connects a to b, making a linear connection, whereas an integrator can connect more than two points, it might be a more versatile role, perhaps integrating different stakeholders.

These metaphors place an emphasis on the value of the process of design, collaboration and the democratisation of design and consider design as an

initiator of change. Designers take part in finding the solution, but do not own the solution. Design outcomes also depend on the expertise of collaborators, and the picture of this process is significantly different from Starck's representation of the repertoire of knowledge. However, the shift from being a designer to a facilitating agent raises several concerns. When designers facilitate a project, they may empower clients but this may lead to a perception that SMEs undervalue a designer's contribution because the project may result in no tangible outputs being achieved. Another barrier to this shift is that unlike facilitation, designing is a highly personalised activity as Lawson and Dorst (2009, p.270) describe:

"The quotes of the most experienced designers in this book suggest they are their practices. Most designers seem to feel easier describing themselves through the projects that, taken together, make up their practice. Designing is not just something you do, or that you take lightly when you practice it, but rather it helps form your identity. Design becomes a part of one's being because it involves so much that is personal, like your creativity, way of approaching the world's problems, your own history, learning style and view of the world' preferred and idealised skills".

#### **7.4.6 Visual metaphors**

Along with the textual metaphors which have been discussed, there are two visual metaphors identified that are important for the design-led innovation and business support discourse. One is 'the use of post-it notes on the wall' and the other metaphor is the 'light bulb'.

A visual metaphor to communicate this facilitating role is the designer making use of post-it notes, as illustrated in Figure 7.3. The multicolour squares of paper cover walls and windows to convey the quantity of outputs resulting from creative collaboration, nonetheless the overusing of this type of images without the necessary comprehension might reduce the value of facilitation. An image showing the quantity of post-it notes produced in a workshop is not sufficient to reflect the quality of the outputs. Additionally, sticky notes are just elements of facilitating a brainstorming session. Although the workshop may be perceived by attendees as being successfully facilitated just by judging the quantity of notes, these should not be regarded as the output. The notes have become the workshop itself and the expertise, which lies behind the facilitation, becomes invisible.



Figure 7.3 A facilitation image from a workshop

The light bulb, as a visual metaphor, often represents “I have an idea!”. Despite the fact that the incandescent light bulb has become obsolete, it still represents a novel or innovative idea. One might associate it with the breakthrough of the light bulb in the early twentieth century or in relation to Thomas Edison, as a recognised innovator. Perhaps its real value as a metaphor is due to its connection with sudden illumination. As Wallas (1926) suggests “the art of thought” has four stages: preparation, incubation, illumination<sup>16</sup> and verification. Illumination, an observable property and effect of light, ends the darkness. It represents the moment of ‘Eureka’, ‘aha!’ or a ‘creative flash’, which happens often after incubation, a long period of preoccupation with a problem or a process of hard thinking. Similarly, the phrases such as ‘a bright idea’ and ‘it is brilliant’ are also based on the implications of it. The light bulb can therefore be assumed to be still valid and relevant. For example, Gordon Murray, an automotive designer (in Cross, 2011, p.33), describes his design process, “in the midst of the pressure, there appears a sudden illumination”. The light bulb is widely used to visualise innovation (see Figure 7.4).

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<sup>16</sup> Both illumination and incubation are also metaphors representing the thinking process.

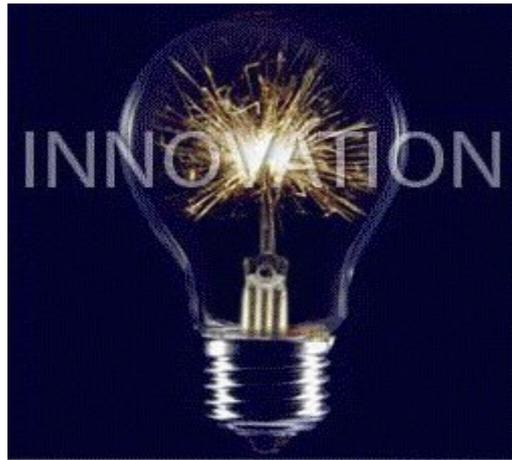


Figure 7.4 An image representing the association between light bulb and idea (Creative Commons image).

Innovation is, on the other hand, more than just an idea. It is applied, matured and marketed. Therein lies the issue of assuming the idea as innovation. This observation can be applied to DSP workshops in which ideas that are generated do not necessarily mean that innovation is achieved. "To be regarded as an innovation, an idea must be implemented" (Jalonen, 2012).

### **7.5 A comparative discussion of metaphor analysis**

Based on the analysis of each metaphor, it is possible to discuss some general points and compare the implications of different metaphors. Mystification and personal knowledge/ownerships are amongst the main findings that arose from the metaphor analysis. The analysis showed that seeing 'designers as magicians' has different implications than seeing 'designers as catalysts' or 'midwives' regarding ownership of the process and how the outputs developed. Similarly, describing the design process as a black box or journey is not the same. Although both are associated with the unknown, the implications of the unknown are different when the unknown is communicated by the use of the black box or journey metaphor. The idea of 'journey' is associated with maps and travel; it encourages the experience to deal with the unknown and relates it to making discoveries. The 'black box' metaphor, on the other hand, is related to the mysterious and unknown. The black box approach inhibits observation, leaves 'the

unknowns' unapproachable and irresolvable, which makes the process of designing difficult to share with others.

Obscure metaphors can lead to an unresolved and informal design process, which provides solutions that often rely on the personal skills of the designer or simply on serendipity. Thus, companies do not try to improve the process or allocate enough time and budget to the use of design. The metaphor of the black box or repertoire implies that the failures of the design process are hidden from view. As a result, these experiences are often not recorded even at the company level and are mostly forgotten, which can also hamper the improvement of the design practice.

Some metaphors such as 'hero' convey a message about fame and fortune. This is an individual status rather than professional status. Hence, the profession itself does not benefit from the same status and prestige in the society as the designer himself. This may also lead to the perception that the value of design is associated with individuals. For example, an SME would think, "we experienced good results because the designer was very good" rather than "we experienced good results because design is a valuable asset for the company".

The reoccurring appearance of metaphors such as facilitator, connector and midwife also shows that a role that encourages communication and bonding within communities seems to be adopted by numerous designers. This is in line with the development of participatory approaches as an 'alternative development' method which challenges the 'power asymmetries' and the effectiveness of expert-driven methods. Participation has become a widely preferred approach to be employed as a vehicle for the "democratisation of development" (Friedmann, 1992).

Many designers adopting a facilitator role use a workshop format for delivering design interventions. This seems to convey the message that 'design as magic' has been overcome by adopting a transparent and open process; however, it can be observed that expectation of a cultural change within SMEs following a number of DSP workshops is also an implication of seeing 'design as magic' and 'designers as magicians' (see Section 5.2.3).

Facilitation through workshops can initiate change, but it is not a magical transformation. Bryan Boyer (2013), director at Finnish DSP also support this view:

"If design is like a magical seed that you can drop into the board room and after a couple of days workshop, suddenly the executive suite is transformed into a design facility that pretty significantly undervalues what designers bring" Bryan Boyer, Strategic Design Lead at Helsinki Design Lab.

A facilitating role may lead to the undervaluing of design expertise. A catalyst is not an indispensable component of a chemical reaction<sup>17</sup>. A problem resulting from facilitation is that it can undermine the uniqueness of design expertise. This facilitation role may contribute to the loss of specialism and leadership in the design profession because of the indistinctiveness of this role. Another issue with the facilitation role might be its subsidiary status. Rust (2004) exemplified a number of roles that designers play in a scientific research project. These roles are prototyping, reframing the problem and supporting communication at the early stage of scientific projects. He refers to their contribution as a catalyst that facilitates scientists' access to their tacit knowledge. Rust yet recognised a barrier, which is materialised when designers do not see themselves as part of the creation of knowledge. As a result designers find themselves in a subsidiary role or in no role at all.

## 7.6 Conclusion of the metaphorical analysis

Lakoff and Johnson (1980) already claimed that metaphors construct our reality. The way metaphors shape people's understanding may go unnoticed because generative metaphors are ordinarily tacit (Schön, 1979). The present study contributes to making metaphors in design apparent to designers and inviting designers to use metaphors consciously as an evaluation tool of their practice and attitude. This study, therefore,

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<sup>17</sup> "A common misunderstanding is that catalysis "makes the reaction happen", that the reaction would not otherwise proceed without the presence of the catalyst. However, a catalyst cannot make a thermodynamically unfavorable reaction proceed. Rather, it can only speed up a reaction that is already thermodynamically favorable"  
<http://en.wikibooks.org/wiki/Biochemistry/Catalysis>.

presented a number of metaphors that are relevant and significant for design expertise as different lenses through which to observe the role of designers and various aspects of design activity.

Metaphors affect how we exchange knowledge, ideas, experiences and skills between the design and business communities, which often do not share the same design language and mindset. In the absence of trust and credibility, it is difficult for SMEs to differentiate 'a strategic help transforming an organisation' from 'a professional ego disorienting a working organisation'. This systematic metaphorical analysis has presented a reflection on the attitude of designers revealed by their use of metaphors such as hero, black box and magician. Many of these metaphors affects the way in which designers are trusted by the organisations they seek to work with. Therefore, the rhetoric of design support that initiates change should avoid arrogance and self-indulgence. It can be argued that based on the analysis of metaphors, some of the credibility issues and ambiguities of design can be resolved.

The use of metaphors such as 'black box' may be a deliberate strategy used by some designers to obscure unknown aspects of a design project. Acting like as a magician and being wilfully obscure about the design process may create a sense of curiosity and help protect design knowledge and IP partially, but it may inhibit collaboration. It may also undermine the trust between designers and their clients. In such contexts where collaboration is sought, design professionals should avoid these attitudes.

SMEs outsource essential capabilities that are not available internally. If SMEs consider designers solely as facilitating agents, they may be even more reluctant to recognise the contribution made by design expertise for the project development.

The metaphorical analysis method developed here allows for the tracing of the implications of design expertise on society in general. This method also enables a transferable outcome without conducting a large-scale survey or interviews with multiple stakeholders.



# 8 Conclusion

This chapter presents a summary of this research study based on consideration of the evidence provided through the systematic analysis of interviews and a consideration of the relevant literature. The chapter reflects on the aims and research questions, and sets out the contributions that this research makes to new knowledge in the field of design-led business and innovation support for SMEs. The chapter also identifies the limitations of this study, and it concludes by making suggestions for areas of future research based on the outcomes and the limitations of this research in order to improve the field of design support further.

## 8.1 General conclusions

SMEs represent over 99% of businesses in the UK. The importance of SMEs for a country's business and economic growth and the recognition of the problems they encounter have resulted in business support being provided for SMEs in most industrialised countries. Consequently, considerable resources are spent on 'SME support', which often takes the form of information and advice provided by professionals from various disciplines, and which relies on financial incentives provided to SMEs.

Design has been increasingly presented as a strategic resource, which can improve a company's organisational structure, market position and intangible value. The Cox Review of Creativity in Business published in 2005 recommended the development of regional DSPs in the UK to assist SMEs for innovation. This report provided a well-grounded argument for the design profession to receive funding in order to support SMEs. Historically, SMEs are known to be reluctant to work with designers and be unaware of the value of design; thus they have not always used design strategically. DSPs promote design as a strategic source for SMEs and address SMEs'

limited knowledge of using design by providing information and advice about design and a design-driven innovation perspective. The aim on behalf of DSPs is to bring about increased sales, innovation, employment, company growth, strategic exploitation of design and cultural change amongst SMEs.

This PhD has examined the effectiveness of design support for SMEs in Scotland and analysed the depth and breath of design knowledge, the changing role of design expertise and its credibility for supporting SMEs by analysing both DSPs and design consultancies. The research was based on a number of interviews conducted with representatives of DSPs, SMEs, government support agencies and design consultancies, along with participant observations and desk research. The interview findings were studied by a two-fold analysis approach. To understand the effectiveness of design support and the generalist-specialist dilemma, the interviews were first approached as statements evidencing interpretations and analysed with a thematic analysis method. To explore design expertise and its credibility, the interviews and design literature were approached as raw text and were analysed by adopting a systematic metaphor analysis approach and by using Schön's generative metaphor framework to look beyond what is said and wrote to reveal underlying ideas, patterns and assumptions.

Research questions were stated in Section 1.3 and used to guide the present research. Answers to these questions are provided below and serve as a basis to articulate the general conclusions.

#### **8.1.1 In which contexts are DSPs effective/ ineffective?**

- *DSPs should clarify their role, aims and objectives.*

There are several DSPs being offered in the UK, and these programmes provide different types of support focusing on facilitating-enabling, brokering-signposting and advising. These intermediary roles have distinct priorities and impact on the implementation and outputs of DSPs. A combination of these roles can be confusing for SMEs, and clarification is required to prevent disappointments amongst SMEs resulting from unrealistic expectations. Making this distinction is helpful, as the respective

outcomes of these roles need to be evaluated differently. A lack of clarity around a programme's aims and objectives may contribute to the industry's poor use of design support for SMEs. In addition, clarification also reduces confusions that may also exist between design consultancies and DSPs.

- *DSPs should avoid focusing on design message and dealing with perceptions of design. Design awareness does not ensure desired business outcomes, innovation and transformational change.*

Although informing SMEs about the potential of design is important, the research suggests that DSPs should not solely rely on 'design awareness' messages to generate business impact or to integrate design to business agendas. The process is reasonably complex. Some of the goals targeted by DSPs, such as organisational change, innovation and knowledge transfer and exchange, require long term and comprehensive support. Expecting a cultural change following a number of DSP workshops may be an oversimplification of the complexity of organisational change, the design process and the contribution of design expertise to a project.

- *Selecting SMEs that are responsive to DSP activities, interested in growth, curious and financially ready will improve effectiveness of DSPs.*

Several DSPs do not have selection criteria to decide which SMEs to work with. However, SMEs that are liable to be responsive to business support are more likely to commit themselves to apply changes and learning of DSP workshops in their business and to achieve expected results. Curiosity, desire to accept change and financial readiness are found as important factors for commitment to DSPs.

- *Convenient time and location, the reputation (track records) of the DSP and PR activities that clearly communicate the value of support increase the number of SMEs participating in the events.*

Convincing SMEs to participate in DSP workshops is a difficult task. In order to do so and increase the numbers participating, timing and location should be convenient for them. SMEs, active ones, are unwilling to participate in

events that take them from busy schedule. Short workshops that run over a longer period time can be considered instead of days long workshops. There needs to be more PR activities that clearly communicate the value and the relevance of outcomes for SMEs. The credibility of DSPs and the relevance of their expertise contribute to the number of SMEs participating in DSP workshops. Agencies running DSPs need a comprehensive portfolio and case studies to evidence their claims and demonstrate their expertise. Establishing credibility and track records may also increase the commitment of SMEs to apply the advice they receive. The reputation of institutions that programmes collaborate with may also provide a basis for credibility. Programmes that are designed to run for three-years may not be able to establish sufficient experience and credibility.

- *DSPs should pursue quality over quantity while supporting SMEs.*

The aim of DSPs to reach a large number of SMEs may be attributed to the fact that funders encourage interaction with a large number of companies. It may also be explained by the fact that the number of participant is relatively easy to measure as a deliverable output. The research showed that quality rather than quantity can be pursued by, for example, targeting a smaller number of responsive SMEs that are likely to develop desired outcomes with more tailored support rather than aiming for a large number of SMEs within a limited period of time.

- *DSPs should avoid driving expectations that can hardly be reached.*

For DSPs to be effective, managing expectations is of critical importance from start to finish. The findings from this research have shown that the outcomes of an SME's participation in a DSP should be communicated in a manner that prevents setting expectations that can hardly be reached. Participation does not guarantee expected outcomes to be reached, but increases their likelihood. SMEs need to be committed to process to achieve desired outcomes. Promoting outcomes that are beyond what a DSP can deliver or promoting design as a panacea for all problems of SMEs creates disappointments.

- *DSPs should follow-up SMEs that participated in workshops and encourage reflection and accountability to enhance the application of learning outcomes.*

Well-prepared DSP workshops and seminars are at the core of innovation support for SMEs. DSP workshops are effective at bringing several perspectives together in a non-hierarchical environment. Several DSPs studied have adopted an experiential learning approach. This approach seems appropriate for delivering design knowledge, which is mostly tacit. One of the fundamentals of experiential learning is reflection. Although DSP workshops provide the opportunity to SMEs to reflect on their own businesses by removing them from their day-to-day routines and by using several techniques that encourage reflection, SMEs may fail to apply and reflect on the DSP outputs when they return to their day-to-day businesses due to their very busy schedules, interviews revealed. Consequently, if there is no reflection, follow-up and accountability, SMEs may shelve DSP learning outcomes without applying them in their context and without commissioning designers to realise initiated work. Hence, interventions often fail to lead to further development after the interaction ends. Therefore, the follow-up stage encouraging reflection is necessary in the construction of DSP models.

- *One-size does not fit all; support should be relevant to the individual SME's needs and in line with its capabilities and knowledge for effectiveness.*

DSPs produce tangible and intangible outputs that benefit SMEs. Although SMEs are usually looking for practical solutions and quick results, this tendency does not justify adopting easy and tempting recipes for design-led business and innovation support. For SMEs, the quality and applicability of outputs are important. For example, a well-constructed design brief is found to be a key output of DSP activities, because it is bespoke, addresses an SME's capabilities and makes it easier for a design consultancy to work on this brief for results that are strategic for the SME.

Achievable advice for SMEs are also found to be helpful as long as the advice is not generic and is suitable for the capabilities and resources of SMEs. SMEs have different capabilities and requirements. The assumptions such as SMEs do not know how understand customers or how to use design might be invalid, for example.

- *Instead of generating a number of new actionable ideas, DSPs should focus on developing ideas for innovation to be achieved.*

Generating a number new actionable ideas may not be favourable by SMEs as interview results reviewed, instead of focusing on generating a large number of new ideas, emphasis might be placed on developing ideas and converting ideas to innovations. This could include developing existing ideas of SMEs or helping SMEs to select their ideas to develop and bring into market.

- *Networking is an important outcome of DSP events for SMEs, but it should be better facilitated.*

In terms of intangible outcomes, medium sized businesses favour interventions leading to increased collaboration and communication in the company. Networking is also appreciated by SMEs and found to be an important outcome of design-led events. Nonetheless, there are opportunities for strategic and facilitated networking for contacts to turn into contracts, interviews revealed.

Consequently, programmes should concentrate on developing specific and relevant support for an SME's needs, requirements and capabilities. DSPs need to use procedures and delivery formats that are adapted to an SME's needs and resources. Unsurprisingly, it is difficult to develop relevant outputs for individual SMEs using a one-size-fits-all approach. In addition, the current duration of funding inhibit programmes to establish their methods and tools that are effective and build a portfolio and reputation that ensure SMEs participation and commitment.

### 8.1.2 How can the success of DSPs be evaluated?

- *Both qualitative and quantitative indicators should be considered for evaluation*

Evaluation criteria that are defined by funding bodies often focus on quantitative impacts of interventions. These include the number of patents, increase in turnover and sales. It was shown that quantitative measures alone fail to fully evaluate the objectives of DSPs. In addition, programme deliverers generally prefer qualitative measures to quantitative ones. Consequently, it is vital to develop measures that can meet the objectives set by both SMEs and funding bodies. Until then, it is important for DSP deliverers to work towards realistic objectives that are achievable within the duration of their programmes.

- *A seven-step evaluation framework was proposed to evaluate short term and long term outcomes of DSPs*

The evaluation of outcomes of DSPs is a complex endeavour due to the many independent factors involved. Therefore, a seven-step evaluation framework was proposed. The model shows that there are different levels of outcomes building on each other. Some of the outcomes are temporary and can be achieved in a short period of time. These outcomes are satisfaction, design awareness, motivation and inspiration. Learning and application follow these initial outcomes but require reflection and contextualisation of learning outcomes. The financial and cultural impacts are experienced at a later stage. Building an innovation culture requires a significant amount of time. Unfortunately, the short duration of these support projects fails to create a long-term impact. Deeper interventions through long-term partnerships may contribute to embedding design into a company's strategies and to building an innovation culture. The quality of the outcomes measured in the last three steps highly depends on design expertise and the relationship between SMEs and designers.

### **8.1.3 What are the required expertise, knowledge and skills an external designer needs to have to work with SMEs effectively?**

- *Design professionals should avoid ambiguous language and maintain transparency in the design process.*

Metaphorical analysis has shown that the design profession may appear as mysterious and arrogant. A 'black box' approach may prevent SMEs from understanding designers and design processes. The ambiguous and mysterious professional picture triggers resistance and uncertainty avoidance. This type of language builds up over time and leads to institutional uncertainty that may hinder the trustworthiness of design consultancies. Misrepresentation, self-aggrandisement and a lack of transparency in the process may hinder the credibility of designers and create mistrust between clients and designer consultancies.

- *Design professionals should give importance to contextual knowledge. Sector specific knowledge is critical for SMEs.*

A generalist approach is confusing for SMEs because SMEs cannot understand and evaluate the knowledge boundaries of design consultancies. SMEs consider the sector specific knowledge gap as a risk and therefore often prefer to work with design specialists from their domain. A lack of sector specific knowledge in their own area makes it difficult for SMEs to trust designers.

- *Design professionals should avoid promoting a recipe approach and quick solutions that oversimplify the design and innovation process.*

Some of the popular books and guidelines delivered by design consultancies present an oversimplified design process. Although these easy-to-apply recommendations attract business attention, they may create an unfounded image of design and create unrealistic expectations amongst SMEs. As long as design is perceived as 'magic' and 'a quick recipe' for successful innovations, clients as well as policy makers will fail to learn how to allocate the time and resources required for design projects and design-led support for SMEs and innovation.

Developing trust through knowledge, attitude and relationship is required for disciplines based on tacit knowledge exchange; this applies to design, as it is one of these disciplines. This will enable to develop reciprocal and rewarding relationships between SMEs and designers. Although both sides need to learn how to work with each other, this study highlights that it is primarily the responsibility of designers to make themselves understood in a clear manner. For this reason, designers need to negotiate the project brief and outcomes by using the values that are understood by their clients, rather than the values of designers. Ideally and where applicable, mutual values should be adopted.

- *Design professionals need to find out the uniqueness of the emerging facilitator role and communicate it clearly.*

The research findings demonstrated that being a facilitator has been a widely adopted role by designers in design projects in the recent years. Facilitation allows an open and creative dialogue between SMEs and designers. Design methods and tools may contribute to the extracting and exchanging tacit knowledge during this process. Nevertheless, the facilitation role in itself may not be sufficient to fulfil the expectations of SMEs, especially small sized enterprises that require specific and tangible help whilst outsourcing their activities. SMEs may undermine the value of design expertise because a facilitation role, which might seem potentially a subsidiary role, hampers the distinctiveness of design expertise in a project. The design professionals need to find out the uniqueness of this emerging facilitator role and communicate it clearly.

#### **8.1.4 What are the existing assumptions of DSPs and design consultancies while they are supporting SMEs, and to what extent are they valid?**

This research question informs and constructs the core of this PhD study and the researcher has used this question as a critical lens throughout the research process. Challenging assumptions is not the same as proving a hypothesis; therefore a list of assumptions is not given. However, the assumptions around design awareness, design methods, contextual knowledge and core expertise are discussed above.

## 8.2 Original contribution to knowledge

The following section highlights the key contributions to the field of design and, more specifically, to the area of design support for SMEs presented in this thesis.

A large part of the literature focusing on the evaluation of DSPs covers reports, documents and case studies that are often descriptive in nature, are written by programme deliverers and present a self-promotion of design support activities of the programmes rather than applying academic methods of investigation, providing critical analysis, offering an academic debate and producing new forms of theoretical knowledge. Therefore, following contributions are original and important for this field:

- A comprehensive review of the current literature providing a theoretical overview of DSPs assisting SMEs (Chapter 2).
- A detailed analysis of effective and ineffective aspects in DSPs that are assisting SMEs for business innovation and growth (Chapter 4 and 5).
- The development of a novel seven step explanatory framework based on Kirkpatrick's (1996) four-step model that can be applied to evaluate and plan the outcomes of DSP interventions, as presented by Figure 5.3 in Section 5.8 and also Figure 8.1

This proposed model reconceptualised Kirkpatrick's model (1996) by using the findings of this PhD research. Step 2 (satisfaction), Step 4 (learning) and Step 6 (business outcomes) originate from Kirkpatrick's model, the additional four steps are proposed as a result of this study.

Kirkpatrick's four-step model has provided insights and a theoretical base for the present study, but could not adequately draw attention to the important outcomes of the DSP interventions and explain all research findings. By juxtaposing findings, in the extended literature e.g. Kolb's experiential learning, this seven-step framework was developed to help DSPs plan and self-evaluate their activities. This explanatory framework contributes to the development of clear timeframes, deliverables and appropriate ways (through steps) to achieve DSP targets.

DSPs can monitor their performance regarding each step and can determine how many assisted SMEs reached the different steps. Figure 8.2 shows a possible application of the framework for evaluation. Note that all the numbers are hypothetical and given for illustration purposes. First, a DSP measures the number of SMEs that attended the DSP's activities. For the purpose of this example, we assume that this number is 100. Then, the DSP can evaluate the SMEs who were satisfied with these activities (e.g. 80% of all SMEs). Subsequently, the DSP can monitor whether the SMEs are motivated and inspired by the activities and their understanding of design (70%). Afterwards, it is possible to track if the SMEs reach the next step which is learning if they develop new skills (40%). The DSP can check if the SMEs apply the new learning for their business activities or commission designers to realise them (25%). Then, SMEs that achieve business outcomes can be monitored (20%). Finally, in the long run, cultural change in the companies that were assisted can be observed and evaluated (3%). Note that the ways in which DSPs may measure these outcomes with SMEs was not an objective of the present research. However, these figures may be gathered for example by conducting questionnaires, observations, interviews and feedback forms.

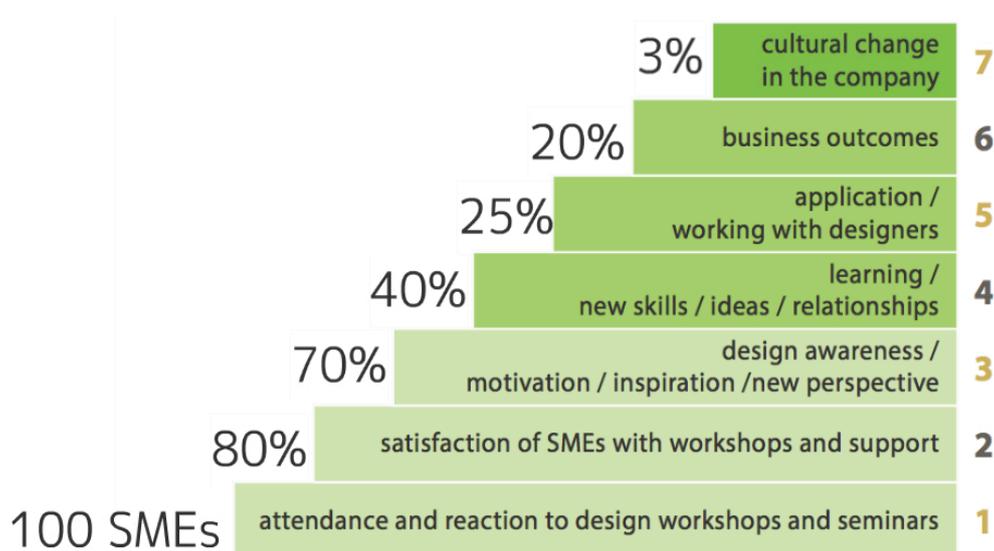


Figure 8.1 An application of the seven seven-step evaluation framework of DSPs' outcomes (hypothetical figures)

The seven-step framework can also be used by programme deliverers to manage expectations of SMEs and to align their objectives by illustrating the requirements, their roles in each step and the relationship between SMEs and themselves. The framework explains the programme objectives, the process by which the DSP operates, its immediate outcomes (satisfaction, motivation, new perspective and awareness), intermediate outcomes (learning and application of skills and business outcomes-ROI) and intended longer-term outcomes (cultural change). These are also indicators of the effectiveness of the DSPs.

The seven-step framework highlights that outcomes that are planned by DSPs are dependent on other factors influencing an SME's innovation and design adoption processes. For example, learning does not ensure business outcomes. SMEs need to work with design consultancies to realise innovations and this means that the success of business outcomes is also dependent on the expertise and attitude of design consultancies.

The implication of this explanatory framework in the design field is that it contributes towards design support research by making it more theory-driven rather than recommendation and tools driven. Other researchers in academia can use the framework to evaluate and understand DSP activities.

- The development of a new conceptual roadmap that can be applied by DSPs, as presented by Figure 5.4 and Appendix G. DSP deliverers and policy makers can also use this conceptual roadmap to reveal milestones in the process to improve their provision.

This explanatory framework contributes to the identification of milestones of success. There are three paths within this map, as illustrated in Figure 8.2.

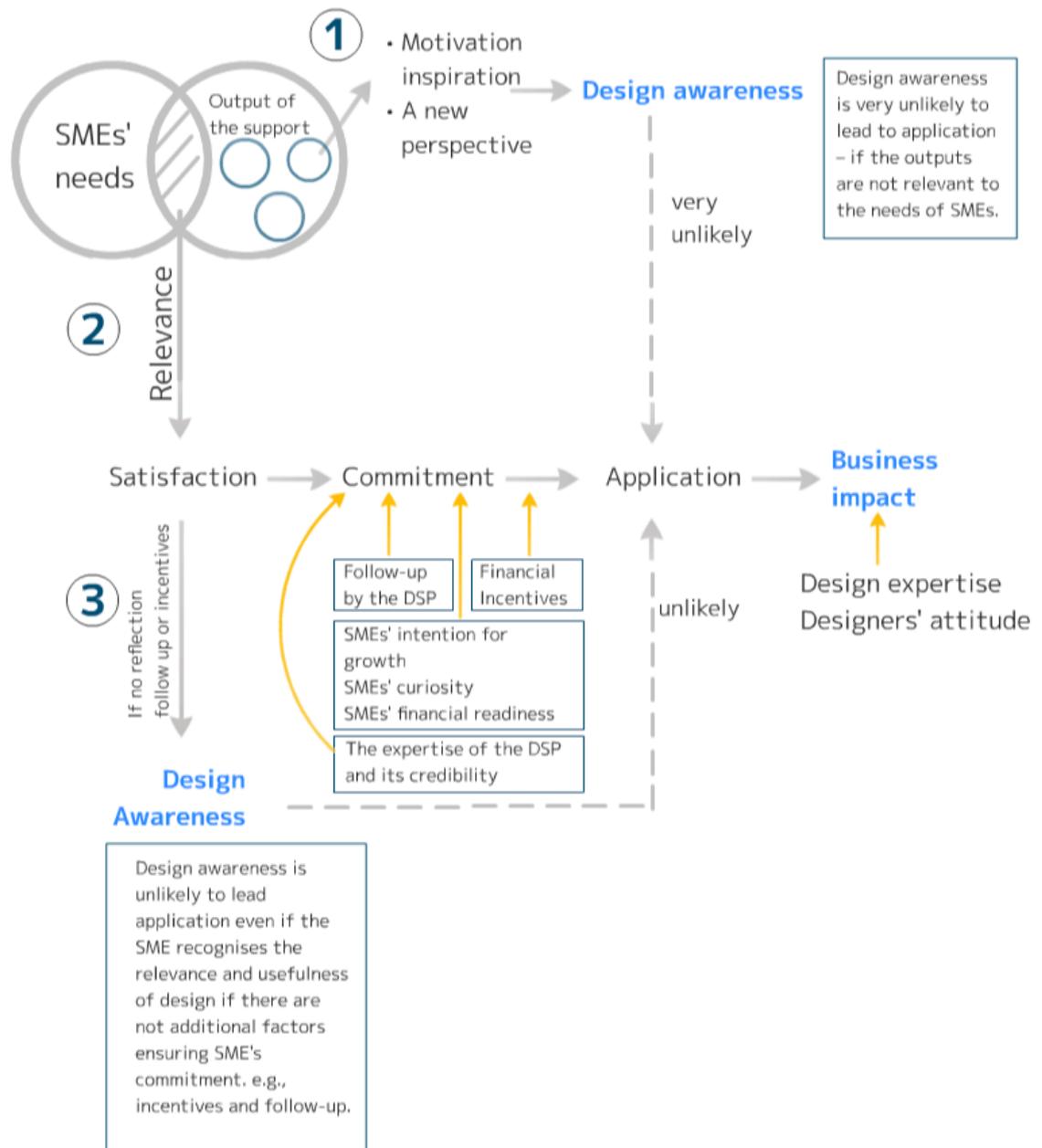


Figure 8.2 A road map for DSPs' effectiveness

The first path is followed when design outputs are not relevant for SMEs. Good and interesting examples about design, design methods and the role of design in the innovation process can motivate and inspire SMEs and increase their design awareness. However, if SMEs find these examples, methods and advice irrelevant to their needs and requirements, the SMEs are unlikely to use these methods and apply advice.

The second path represents situations where design outcomes are relevant for SMEs' needs, which leads to satisfaction. Simply being satisfied with DSP

outputs is not sufficient for SMEs to achieve business outcomes and innovation. SMEs need to be committed to achieve desired outcomes. There are several factors determining SMEs' commitment. These factors include their intention for growth, their curiosity for innovation and their financial readiness. Therefore, selecting SMEs that satisfy these characteristics is critical for achieving desired business outcomes. Follow-up by DSPs is required to ensure SMEs' commitment in the process, considering the SME's busy business schedule. By means of follow-up, DSP associates discuss opportunities and challenges along the way and facilitate reflection, which is necessary for experiential learning. Financial incentives are also found as being important stimulant that help SMEs to realise ideas and apply DSP advice.

The third path explains the situation where SMEs recognise the relevance of design approaches, methods and ideas provided by DSPs for them but there is a lack of complementing conditions enabling SMEs' commitment. Although the SME's perception of design is increased, it may still fail to internalise and apply the techniques and methods that are delivered. This might be a result of several issues, for instance, the SME may not be financially ready to commission a design consultancy, or simply not interested in growth. Another reason the SME do not apply the DSP advice might be that they do not find DSP advice credible.

Researchers can use this framework to understand the design support process and the factors contributing to the effectiveness of support. The framework clarifies that design awareness, although being a sought-after outcome by designers, solely does not ensure that SMEs will achieve business outcomes.

- The development of a framework that reveals the specialist generalist dilemma faced by design consultancies. Recommendations have been provided to overcome potential conflicts whilst working with SMEs, as described in Section 6.3.3 and Figure 8.3.

A lack of empirical data on the generalist-specialist dilemma that designers faced while supporting SMEs have been identified through reviewing the

literature on design expertise. The existence of a prescriptive approach in design research tradition is indicated by Dorst (2008) as a major area of concern. He claims that academic inquiries often produce prescriptive guidelines instead of explanatory frameworks. Therefore, the following framework expands our knowledge of design expertise (Figure 8.3).

The framework impacts the design expertise studies, in particular those on the generalist-specialist dichotomy. It recommends that design consultancies focus on their core expertise while supporting SMEs. It states that when a designer or a small consultancy provides services in different domains and tasks, it is confusing for SMEs. Design practitioners or novice designers can use the framework to improve their competency and the effectiveness of their services. Associates of DSPs who are assisting SMEs for business growth and innovation can also use this framework, which recommends them to focus on particular tasks and domains and to employ design associates who have expertise in these.

Moreover, with the identification of the key role of specialism while working with SMEs, design educators may take into account recommendations of this framework and develop courses that emphasise the importance of contextual knowledge and encourage students to develop their expertise accordingly in order to secure their employment.

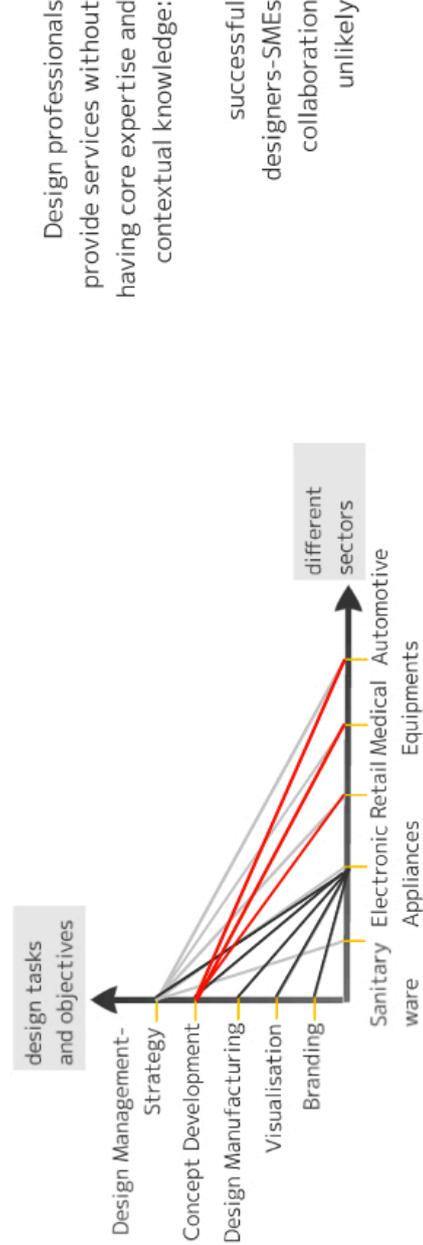
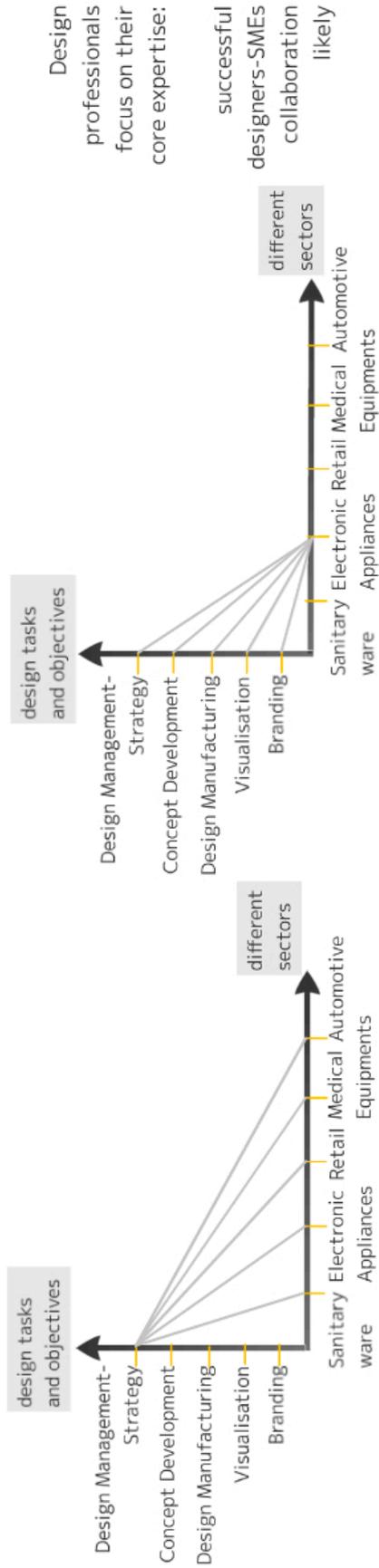


Figure 8.3 A framework for design expertise

- The use of systematic metaphor analysis and generative metaphor framework in the design discipline

The credibility of design expertise as a cause for SMEs' lack of appreciation in design is also infrequently investigated in the design literature. A detailed analysis of designers' self-image and expertise through systematic metaphors analysis helps to extend our knowledge of the underlying factors of SMEs' lack of appreciation. In addition, both systematic metaphor analysis and generative metaphor framework are new methods of analyses for the design discipline. Therefore, their rigorous applications in the present study provide a novel contribution to knowledge in the design discipline and will serve as a basis for future studies using these methods. Although metaphor-based discourse analysis is adopted in humanities in order to trace the implications, metaphors have not been analysed systematically in the design discipline as the main source of data to discuss the implications of certain concepts. Metaphors are often employed in the design discipline to generate new ideas and solutions, and this use employs direct mapping approaches (e.g. desktop metaphor) instead of tracing the implications of metaphors, as applied in the present research.

A systematic metaphor analysis approach in the present study allowed the researcher to use a wider source of data by analysing the interviews conducted by other researchers and the design expertise literature. This helped overcome a number of limitations of the present study. One of them is the small number of interviews while the other is the geographical limitation; that is, most of the interviewees are based in Scotland. In addition, metaphorical analysis helps address the missing self-criticality and biases that might occur during interviews. Metaphors represent collective thinking rather than a single designer's opinions. As a result, the findings of metaphorical analysis are transferable and can have wider implications in the discipline.

### **8.3 The limitations of this research study**

Despite contributing to the design support domain knowledge, it is essential to consider some of the limitations that are related to it and may affect its

analysis and transferability. These limitations and their potential effects are detailed in this section.

The research has investigated the effectiveness of design support in different DSPs and design consultancies by simplifying various aspects that cannot be controlled. For example, the research did not consider the impact of the economic crisis, which has affected SMEs for the last five years, might inhibit the success of their innovation attempts with design consultancies or DSPs or might affect their sustainable growth. The organisational politics within DSPs might possibly affect the respondents' comments and responses to interview questions. Respondents who are actively working for DSPs might have a tendency to protect the public image of DSPs and therefore may avoid commenting about negative aspects of the DSP or being critical of funding providers. In addition, respondents who developed methods and tools may want to protect their intellectual property regarding methods and tools and therefore avoid sharing their own knowledge. In addition, this research did not consider the situations, in which some respondents might misstate some facts because their memories might be inaccurate or because could not recall key points.

The deliverers of DSPs are generally unable to disclose specific information concerning the SMEs that they have worked with as they have an obligation to maintain confidentiality. As a result only information that is available through published case studies can be accessed. Case studies selected and published by the DSPs are subject to bias. This led to companies being included in the study that had no direct contact with the DSPs that were studied.

The thesis has studied DSPs and design consultancies assisting SMEs in the Scotland. However, the generalisability of the research does not necessarily apply in other countries. For example, SMEs and designers in different countries, especially in developing countries where there are cultural and economic differences, may experience other constraints and opportunities. Note that there are differences among SMEs in Scotland and SMEs in London.

The present study has focused on SMEs and collected data from small design companies that predominantly collaborate with their clients to deliver product, service or brand-based solutions in the market and from DSPs assisting SMEs, therefore the recommendations and the frameworks resulting from the research may not necessarily apply to larger enterprises or larger design companies and may not inform design-led interventions in public sectors.

The research study has focused on the analysis of the implementation and management of DSPs. The costs associated with their organisation were not considered as being relevant to this study.

One methodological limitation is that there are no agreed guidelines for the analyses of data for qualitative studies, which makes this process dependent on the researcher's skills, training, insights and analytical intellect and style (Patton, 2002). The researcher has conducted both data collection and analysis, which may introduce possible research bias. That said, data triangulation and methodological triangulation were used to address this issue (see Section 3.5), and the research findings were validated with theory and existing research, where possible. Although a considerable amount of data in the form of transcripts were collected for this PhD research, the number of SMEs, design consultancies, DSP associates and government support agency representatives interviewed were still limited in number.

Nevertheless, the findings of the present study are sufficiently robust to facilitate understanding of other projects that adopt a design-led business support for SMEs and design consultancies supporting SMEs. To Robson (2011), this is an indication of generalisability of findings. Subsequently, the findings may not be transferable across all design contexts but provide a reliable account of DSPs and design consultancies in Scotland.

#### **8.4 Suggestions for future research**

The research reported in this thesis has identified key factors that influence the effectiveness of design support for SMEs and investigated the SMEs'

expectations when working with designers. It presented some of these key factors and proposed explanatory frameworks explaining their relationships. However, the frameworks that were developed in the present study have not been introduced to companies, design consultancies and DSPs for verification. Therefore, further research is required to test these factors across multiple design contexts and perspectives to develop the frameworks into well-founded comprehensive frameworks. To further improve the frameworks developed in this study, they should be investigated in different contexts such as large companies, public sector or applied to companies in different countries.

The findings of the present study are based on data collected from Scotland. A comparative study with other countries could be developed in the future. Choi et al. (2012), in their study, compared the DSPs in the UK and South Korea. However, another comparative study could be undertaken with a developing country, where design support is an emerging field. For example, the design support in Turkey follows a different model due to the non-existence of large grant schemes, cultural differences and the design establishment. Although Er and Er (2003), Er et al. (2013) and Selek (2008) presented some of the examples and theory of design support in Turkey, the design support for SMEs in Turkey might justify further attention.

A comparative study with other business support programmes for SMEs could be developed in the future. This may help to identify whether or not the difficulties that are encountered by DSPs when assisting SMEs for growth and innovation are similar to difficulties experienced by business support programmes led by other professionals such as human resources specialist international business specialists, patent advisors or other engineers<sup>18</sup>. For example, findings may reveal problems are related to support strategy itself or related to the domain of support. This research can contribute to the establishment of a strategic role for DSPs amongst other forms of business support programmes. Findings may encourage the

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<sup>18</sup> A list of business support programmes for SMEs is found in the "Business Support for SMEs" report by Intellectual Property Office <http://www.ipo.gov.uk/business-support.pdf>

cross-fertilisation of knowledge within different support programmes and suggest ways to provide an integrated and comprehensive support for SMEs.

A further suggestion for future research is to map all support programmes for SMEs in the UK. It is difficult for SMEs to comprehend the range of government business support services and how these services may contribute to their business needs (Major & Cordey-Hayes, 2000). The structure of the intermediary sector is poorly understood both by the SMEs and by the intermediaries themselves (Major & Cordey-Hayes, 2000). The future research map would reveal how government departments, DSPs and other government services complement each other's aims and objectives. This may help companies to better understand the government services and to identify which service is relevant to their needs. Findings would identify the gaps in business support for SMEs and give a better idea about the number of programmes and events that should be run and the number of people that should/could participate.

This present research identified the misalignment of expectations between policy makers, DSPs and SMEs. A further area for future action research in the design field could bring key stakeholders together to establish a continuous dialogue in order to develop a more effective DSP model that accommodates the needs of all stakeholders and that supports SMEs with design for economic growth and innovation. This type of action research was applied by the Wales Management Council that conducts workshops with the participation of funders, SMEs and advisors to develop better advisory support programmes for business advisors (Ward et al, 2008). In the case of design-led business support, design consultancies, DSP associates, policy makers and SMEs as critical stakeholders, should participate in workshops to develop an effective model for future DSPs.

This present research illustrated that an important future research can be developed for identifying the best ways to measure the value of design support outcomes. "The lack of knowledge and tools to evaluate the rate of return on design investment" has been identified as a serious barrier to a more effective use of design in Europe, by the European Commission survey

in 2009. Accordingly, there is a growing interest in ROI in design, as reflected by the recent DMI design value project (Westcott et al., 2013). Measurement is a complex issue. The Wales Management Council's report on advisory support adequately summarises the problem by stating, "we tend to measure the wrong things, at the wrong time, and therefore get the wrong results in terms of long-term economic impact" (Ward et al. 2008, p.26). Further research may be required to develop better and alternative methods for measuring the outcomes of design interventions. This may require measuring the effectiveness of support with metrics that go beyond the standard business indicators such as turnover and increased sales. More effective forms of measurements help demonstrate the value of design to all stakeholders and eventually contribute to the better estimation of outcomes.

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# Appendix A The main elements of the contextual review

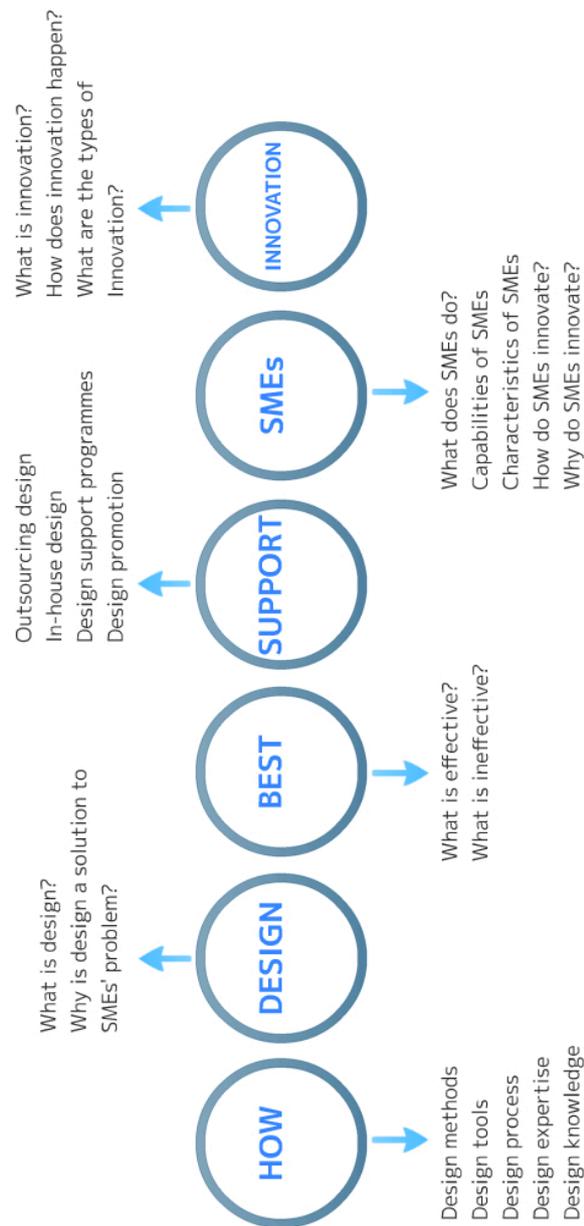


Figure A.1 Unpacking the research question to identify areas to look at in the literature.



# Appendix B Interview questions

## B.1 Questions for SMEs

### Opening

Hello, My name is Melehat Nil Gulari, I am a doctoral research student, at Robert Gordon University, thanks for accepting my invitation for an interview. I am trying to understand how design best supports SMEs for innovation and sustainable growth. I am looking at the effectiveness of design support for SMEs; i.e. what works and what does not. Today I would like to talk about this topic. During this interview there will be some general questions about your company; about working with designers; about how innovation happens in the company.

I believe the outcome of my research will support the future of business design partnership and inform policy makers such as Technology Strategy Board<sup>19</sup> or Scottish Enterprise.

With your permission, I will record our conversation. If you require, I will send you the transcription so that you can review what we have covered. Your information will be kept confidential. For this interview, I am requiring 30 to 40 min, thanks again. If you don't have any queries, shall we start?

### Topic: General questions

- How would you describe your core business?
- How would you describe the company structure, type of business and basic activities?
- What is the company strategy for sustainable growth?
- (Alternative question) Do you have a strategy to help your company compete with the market
- How do you measure the success of the company?

### Topic: Working with designers

- Have you worked with any designers or design-based companies? If so, what sort of experiences have you had?
- Would you tell me about the nature of this experience and what worked, what did not work?
- Which aspects of business have received design support?
- What sort of design interventions happened?

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<sup>19</sup> The name of Technology Strategy Board is changed to Innovate UK

- What criteria did you use to measure the value of design interventions?
- Have these interventions led to significant changes in the company culture?

Topic: Value of design and innovation within the company

- What does innovation mean to you?
- What does design mean to you?
- What does design expertise mean to you?
- What form does innovation take in your company? (e.g. improvement in efficiency, products and models)
- What is the value of innovation for the company success?
- Do you invest in innovation? If so, how?
- Do you use design support for innovation?

Topic: Design innovation process

- Can you describe your process to bring new ideas to the market?
- What methods do you use to develop and implement new commercial ideas?
- How you identify things that could have been done better, i.e. opportunities for improvement and innovation?
- Which stage of the innovation process is most challenging for you?

Topic: Evaluation

- How do you evaluate your ideas?
- How do you evaluate the contribution of design to the company?

Topic: Company culture

- Would you describe how decision-making happens in your company?
- Would you talk about your company culture? Turnover rate, employer satisfaction?

Topic: Collaboration

- Do you work with your customers? And if so how do you work with them?
- Do you use particular methods or a systematic approach to ensure active feedback of your customers?

Closing-

Well it has been very useful to find out about the company and your experience. I appreciate the time you took for this interview, is there anything else you would like to add? I should have the information I need. Would it be possible to contact you again if I have any more questions?

Thank you very much.

## B.2 Questions for DSP associates:

### Opening

Hello, my name is Melehat Nil Gulari. I am a doctoral research student at Robert Gordon University, thanks for accepting my invitation for an interview. I am trying to understand how design best supports SMEs for innovation and sustainable growth. I am looking at the effectiveness of design support for SMEs; i.e. what works and what does not. Today, I would like to talk about this topic for my PhD research. During this interview there will be general questions about how you support SMEs, approaches, methods and tools you used in this process, barriers and opportunities you face while supporting SMEs, and value of the support for the company.

I believe the outcome of my research will support the future of business design partnership and may inform policy makers such as Technology Strategy Board or Scottish Enterprise.

With your permission, I will record our conversation and if you want I will send you the transcription so that you can review what we have covered. Your information will be kept confidential. For this interview I am requiring 45 min, thanks again. If you don't have any queries, shall we start?

### Topic: General questions

- Can you describe your process to support SMEs?
- Could you describe the main activities of the programme?
- What kind of issues are you dealing with companies?
- Why do SMEs seek design support?
- How do you convince SMEs that design is a solution for their problems?

### Topic: Process-implementation

- What are the common approaches/methods you use in the process?
- Do you follow a particular design notion or theory? (if it is not clear give, mentioning design thinking or human-centred design?)
- Have you observed a common approach that works better than the other approaches? Why?
- What can be the special difficulties and problems that occur in the processes?
- Would you describe or give example about your most successful design intervention and the least successful one?
- How do you communicate the way you support SMEs?
- Do you have some regional concerns while working with SMEs?
- Do you collaborate with others stakeholders, partners?

### Topic: Design and innovation

- What does innovation mean to you?
- What are the barriers to innovation?
- Which stage of the innovation process is most challenging, i.e. finding the gap, ideas, solving the problem or bringing the product or service to the market?
- What does design mean to you?
- What does design expertise mean to you?

Topic: Evaluation

- How would you evaluate your contribution to the companies?
- How would you describe the impact of your design contribution to the company?
- Could you describe the short term and long term effects of your design support to SMEs?
- Do you track the transformation which happened within the company resulted from your interventions?
- How do you measure the outcomes of the interventions?

Topic: Value of design and innovation

- What do you think about the value of innovation for the SMEs/company success?
- To your view, what is the contribution of design to a company's vision and sustainable growth?
- To your view, what is the role of design in these processes?

Closing

Well it has been very useful to find out about the programme and your experience with SMEs. I appreciate the time you took for this interview.

Is there anything else you would like add that will be helpful? Is there anything you would like to ask?

I should have the information I need. Would it be alright to contact you again if I have any more questions?

Thanks again.

### **B.3 Questions for design consultancies.**

#### Opening

Hello, My name is Melehat Nil Gulari, I am a doctoral research student, at Robert Gordon University, thanks for accepting my invitation for an interview. I am trying to understand design and innovation process with SMEs, i.e. what works and what does not work. Today I would like to talk about this topic for my PhD research. During this interview there will be general questions about how you work with small and medium sized businesses: approaches, methods and tools, value of design and innovation for small and medium sized companies.

I believe the outcome of my research will support the future of business design partnership.

With your permission, I will record our conversation and if you wish will send you the transcription so that you can review what we have covered. Your information will be kept confidential. For this interview I am requiring half an hour of your time, thanks again. If you don't have any queries, shall we start?

#### Topic: General questions

- Could you please describe the nature of the process that relate to how you work with SMEs? or could you describe the basic activities you have done with companies?
- How do you know the needs of your clients?
- Do you agree or disagree that working with SMEs is different than working with large enterprises? Why do you think so?
- Do you work usually with first time design users? Does it make a difference?

#### Topic: Process

- Do you follow a particular design notion or theory such as design thinking or human-centred design?
- What are the common sources/methods you use in the process?
- Have you observed a common approach that works better than the other approaches while you were working with SMEs?
- Would you describe or give examples about your most successful design intervention and the least successful one?

#### Topic: Value of design in innovation and design expertise

- What does innovation mean to you?
- What is the role of design in innovation process?
- In which stage of the innovation process do you think design is an effective tool? Could you give me some examples?
- Within the innovation process, in which subject do you think SMEs

need most help?

- What kind of issues do you deal with companies?
- Why do SMEs seek your design support?
- How do you convince them that design is a solution for their problems?
- What are the benefits of design, experienced by clients?
- What does design expertise mean to you?
- How do you communicate your expertise with SMEs?
- Do you agree or disagree that if a design agency focuses on a particular sector of business, it will turn out better?

Topic: Evaluation

- How would you evaluate the methods that you use with the companies?
- What are the main difficulties you have experienced in workshops and advisory support?
- Which criteria do you use to measure the success of the outcomes?
- How do SMEs perceive the support?
- How would you describe the impact of your support to the company?
- Could you describe the short term and long term effects of your design support to SMEs?
- Do you track the transformation which happened within the company resulted from your interventions?

Closing

Well it has been very useful to find out about the company and your experience with SMEs. I appreciate the time you took for this interview. Is there anything else you would like to add that will be helpful or you would like to ask about my research?

I should have the information I need. Would it be alright to contact you again if I have any more questions?

Thanks again.

## **B.4 Questions for Government support representatives associates:**

### Opening

Hello, my name is Melehat Nil Gulari. I am a doctoral research student at Robert Gordon University, thanks for accepting my invitation for an interview. I am trying to understand how design best supports SMEs for innovation and sustainable growth. I am looking at the effectiveness of design support for SMEs; i.e. what works and what does not. Today, I would like to talk about this topic for my PhD research. During this interview there will be general questions about how you support SMEs, approaches, methods and tools you used in this process, barriers and opportunities you face during supporting SMEs, and value of the support for the company.

I believe the outcome of my research will support the future of business design partnership and may inform policy makers such as Technology Strategy Board or Scottish Enterprise.

With your permission, I will record our conversation and if you want I will send you the transcription so that you can review what we have covered. Your information will be kept confidential. For this interview I am requiring 45 min, thanks again. If you don't have any queries, shall we start?

### Topic: General questions

- Can you describe your process to support SMEs?
- Could you describe the main activities of the programme?

### Topic: Problem definition and process

- What are the common approaches/methods you use in the process?
- Do you follow a particular theory to address SMEs' problems?
- Have you observed a common approach that works better than the other approaches?
- What can be the special difficulties and problems that occur in the processes?
- Would you describe or give examples about your most successful design intervention and the least successful one?
- How do you communicate the way you support SMEs?
- Do you have some regional concerns while working with SMEs?
- Do you collaborate with other stakeholders, partners?

### Topic: Innovation

- What does innovation mean to you?
- What are the barriers to innovation?
- Which stage of the innovation process is the most challenging, i.e. finding the gap, ideas, solving the problem or bringing the product or service to the market?

#### Topic: Evaluation

- How would you describe the impact of your support for the companies supported?
- Could you describe the short term and long term effects of your design support to SMEs?
- Do you track the transformation which happened within the company resulted from your interventions?
- How do you to evaluate the outcomes of the interventions?

#### Topic: Value of design and innovation

- What does design mean to you?
- What do you think about the value of design for the SMEs/company success?
- To your view, what is the role of design in these processes?
- What kind of issues are you dealing with companies? Why do SMEs seek government support?

#### Closing

Well it has been very useful to find out about the programme and your experience with SMEs. I appreciate the time you took for this interview.

Is there anything else you would like add that will be helpful? Is there anything you would like to ask?

I should have the information I need. Would it be alright to contact you again if I have any more questions?

Thanks again.

# Appendix C Sample selection

Figure C.1 further illustrates the sample selection process. Three interviewees were contacted from the researcher's own professional network. Seven interviewees were contacted through five acquaintances of the researcher and ten interviewees were approached through cold calling. Four of the respondents were met at four networking events. The final three interviewees were reached through snowballing. Respondents R1 to R8 are all SME representatives. Respondents R9 to R11 are government support agency representatives, R12 to R18 DSP representatives and R19 to R24 are design consultancy representatives.



Figure C.1 Sample selection process



# Appendix D Interview invitation letter

An example of invitation for an interview

Dear...

I am a doctoral research student, at Robert Gordon University. I am investigating the best ways to assist SMEs. I am undertaking a research to examine the effectiveness of design support for SMEs' innovation and business growth. In short, I am looking at what works and what does not work in supporting SMEs with design for business growth and innovation. As part of this research I am conducting a series of interviews with SME owners and managers/design associates/design consultancies/government support agency representatives who have supported SMEs within their innovation process.

I would very much appreciate if you would agree to give up half an hour of your time to allow me to ask you a series of questions relating to your experience with companies and how you assist them. Since I am based in Aberdeen, would it possible for you to answer my question on the phone or Skype?

If this is acceptable to you, could we please arrange a convenient time for an interview?

If you require any further details please let me know.

Many thanks for your help with my research.

Kind regards,

Melehat Nil Gulari



# Appendix E Interview analysis

Table E.1 SMEs' understanding of innovation (expanded Table 4.1)

Example quotation	Summary statement	Theme
<p>"We've planned to double our profit in the next 10 years. Large part of that is through innovation, so new products, new product introduction." R1, SME non-owner-manager</p> <p>"So we have to innovate and focus on product quality to compete". R1, SME non-owner-manager</p> <p>"We do what we are good at, that is to be innovative, to keep ahead of the game, we are a well known industry for delivering and promoting new products. In average, we probably bring up 2 to 3 products a year, in some cases as many as 5. That keeps us ahead of the competition." R2, SME non-owner-manager</p> <p>"We have always specialised in wood. We are innovative in design in terms of our continuous design development of our interlocking log buildings. Description of the company is timber engineers rather than kit manufacturers. We also have done fairly large timber buildings, which is quite specialised. We have expertise in that. Our development is now very much driven by assumed escalating energy costs, and requirements of the building regulations and zero carbon economy". R3, SME owner-manager</p> <p>"there is competition, it is the case of providing something better or innovative to provide something new you know to be head of the game and that's it." R4, SME owner-manager</p>	<p>Innovation is important for growth</p> <p>Economic growth, competition, reduced cost</p>	<p>SMEs' approach to innovation</p>
<p>"You've got to be careful that you don't become too innovative." R2, SME non-owner-manager</p>	<p>Cautious, avoiding big changes</p>	
<p>"[Innovation] It's obviously doing things differently. But the construction industry is very conservative, because it is producing a long-term durable product. If something is tried, tested, and proven, we are keen to keep doing that because we know it is safe." R3, SME owner-manager</p>	<p>Importance of tried and tested methods</p>	
<p>"Innovation is to me when you come up with a new way of doing something that has obviously got benefits, so everybody else is doing so. I don't think we do that in how we deliver services. It is more small innovations rather than one big ta-da. It is all about lots of small improvement you can make in how we work." R7, owner-manager</p>	<p>Small changes rather than big steps</p>	

<p>“I think when we think about innovation, perhaps we have very high expectations that everything would be new, whereas it doesn’t need to be, it just maybe taking an idea and doing it in a new context. I personally define innovation very broadly as it does not have to be rocket science to be successful SME.” R1, SME non owner manager</p>		
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Table E.2 The length of workshops

Example quotation	Summary statement	Theme
<p>"We would have day-long workshop, we would have lunch in between with lots of chances and opportunities for networking. Personally I don't think we invite the right people in that way because they have got time to take a day out, off work, whereas the ones who really do things don't have that much time." R12, DSP associate</p>	<p>Difficulty for busy and active SMEs to attend day-long workshops</p>	<p>The length of workshop</p>
<p>"[The length of workshops] it is a barrier for people to come along but then you also have to look at the bigger picture. If they kind of contribute two days now, are they able to change their business in the future? [...] I think the time is obviously an issue here, it's a commitment of people's time, which has no cost to come to the event, but we appreciate that there is an opportunity cost in that there is lost time, out of the office, but I think that if they want to go on and get further funding, obviously there has to be some commitment to the process." R18, DSP associate</p>	<p>It is a barrier to participation</p>	
<p>"Typically a 2-hour one, because we tend to find two days long, long full day thing [workshop] can be difficult [...] Because it's difficult to get companies in this current economic climate to take time out." R17, DSP project leader</p>	<p>SMEs are busy to take time out</p>	
<p>"You find that companies are so busy, it is very difficult for them to commit pretty much a full day to a workshop and trying to get them commit to do more there." R13, DSP associate</p>	<p>Difficulty of concentrating whole day</p>	
<p>"I think now that we've done 4 [workshops], 2 and a half days is a good amount of time, it's difficult for small businesses to commit to that much time and that's an ongoing challenge you know because that's is half a week out of the office. But you have to hope that you're obviously getting people coming along here that are enthusiastic and are keen to learn, keen to try these new design techniques." R18, DSP associate</p>	<p>Difficulty for SMEs to commit long time to DSPs</p>	
<p>"one facilitator can probably not do all the events, it is just a time commitment, it is a big chunk in someone's diary, so we keep working with different facilitators". R18, DSP associate</p>	<p>Preparing and facilitating take a long time</p>	
<p>"So we had to understand our customers, we realised our time is limited, that it is better to do it in their own premises and that we had to work with their time scales. If they wanted something starting at 8 o'clock in the morning, we would do it or if they wanted something in an extended lunch break or at another time, we had to accommodate them". R12, DSP associate</p>	<p>Tailor the duration of the workshop based on the SME's needs</p>	

Table E.3 How SMEs commission designers

Example quotation	Summary statement	Theme
<p>"Contact with people in industry to get their feedback, testimonials, seeing what different companies have made and designed and what it looks like and communicate with those companies to let them know our needs and our kind of budget limit and see what kind of best fits in there. R6, SME non-owner manager</p>	<p>Testimonials</p>	<p>The importance of reputations, recommendations, cost, case studies and existing network</p>
<p>"Measuring the quality of their expertise is "really down to previous work we have seen them do". R6, SME non owner manager</p>	<p>Previous work and case studies</p>	
<p>Researcher: "So how do you recognise the right expertise to solve your issues?" R4: "It might be the basis of word of mouth", SME non-owner manager</p>	<p>Word of mouth</p>	
<p>"So consultancy X is well known in City ABC. They have got a really good reputation and we have worked with them. We have helped them in a project, fairly recently. So we knew them. We decided that we could go to them to help us with the branding of product Y". R8, SME non owner manager</p> <p>"We know their reputation in Aberdeen, We knew the management director because we had worked with them". R7, SME owner-manager</p>	<p>Reputation and existing network</p>	
<p>"They find us through case studies on the website. Or they found us because such and such referred us." R21, Design consultant</p>	<p>Case studies and referrals</p>	
<p>"I think it's word of mouth as well, a lot of new business comes directly from word of mouth."R22, Design consultant</p>	<p>Word of mouth</p>	

Table E.4 How SMEs evaluate the result of design outcomes

SME1	"We have a project management template system. It includes financial evaluation of the projects and includes all design target and evaluation of the products."	Financial measures through a template
SME2	"So the most obvious one is financial. For a new product, the measure is how quickly it is adopted by the customers, is it performing well? There is usually a program in place once we launch a product, the testing phase with customer feedback"	Financial customer feed back
SME3	"We evaluate things basically in terms of cost and practicality. How simple is it to do it and what the risks are to do it. It is all summed up in SWOT analysis. Strengths, weaknesses opportunities and threats. What we do is quite incremental. We would never do something totally shocking in terms of what people expect how a house should look like."	Cost and practicality, SWOT analysis
SME4	"Well, I guess it happens so little that if I can see improvement in functionality and particularly, in terms of reference and objectives then it would be seen as success, if there is no achievement it would be a failure but I don't measure it in a linear scale."	Improvement in functionality and personal judgement
SME5	"You've got me in a corner about how we evaluate the value. Typically, what would you say, we work on a ... I don't know."	No evaluation
SME6	"For example and in terms of advertising and branding, it is very simple: 'will the customers get it? Do we like it? Do we think it represents us in a way we wanted to?"	Reaching for the customers, representing the company and personal judgement
SME7	"We never actually measured, for instance we don't say to people 'where did you find us? We haven't done that, have we?' "Being happy is our measure, [...] looking at the website and the rest of the material and saying that it looks professional to me, therefore I have the confidence to present it to other people, it [the design outcome] is doing its job by making us believe our brand is better than the competition and we believe it".	No regular evaluation and personal satisfaction

Table E.5 Differences amongst SMEs

Example quotation	Summary statement	Theme
<p>"Absolutely, SMEs is such a large term. Actually there are so many different types of SME, micro SME, small SME and medium SME. They are very very different in the way they operate; in the way they understand business strategy. Micros and small SMEs are generally one-man band, two-man band, five employees whatever". R13, DSP associate</p>	<p>SME is a large term, They differ in the way they operate regarding their size</p>	<p>All SMEs are different</p>
<p>"Family businesses in particular seemed to be very willing to accept it. And I think that is because they are absolutely in control of everything they do in the business. It is easy for them to simply instruct their staff that a week on Tuesday 'guys we are all going to take three hours off, we are just gonna go and do something'. R12, DSP associate</p>	<p>Family business are in control of everything</p>	
<p>"In slightly larger companies, where the structures are different, the approval process and everything else may be difficult." R12, DSP associate</p>	<p>Larger business are difficult to access</p>	
<p>"The larger ones [SMEs] are more receptive but also harder to get into with this kind of approach." R13, DSP associate</p>	<p>Larger business are difficult to access But they are more likely to create business impact</p>	
<p>"In small companies, directors are very important. I think." R26, Design consultant/facilitator</p>	<p>Directors are very important in SMEs</p>	
<p>"The larger ones [SMEs] are more prepared to spend money, so I mean, the smaller companies are certainly new businesses, they don't have that sort of budgets, you know, the larger oil companies for example do" R23, Design consultant</p>	<p>Larger SMEs are ready to invest</p>	
<p>"Larger companies have a marketing personnel and they'll have a sort of understanding of the way we work and how the industry works as a whole, and they'll also understand the benefits of what we do, hopefully." R23, Design consultant</p>	<p>The difference in knowledge and the way they approach design: larger SMEs know how industry works and their needs</p>	
<p>"Large companies can do bigger projects. Obviously, a small company is limited in terms of what it can do. But small companies are able to be more innovative. Because of the small scale, we are much more flexible than large companies. There is neither the same inertia nor momentum. Small companies can possibly change more quickly and adapt to address pressures." R19, Design consultant</p>	<p>Small companies are more adoptive to change but there is a limit</p>	

# Appendix F A taxonomy of innovation methods and tools

Innovation methods have been categorised from various perspectives: individual and group techniques by van Gundy (1992), analytical (step-by-step structure) and intuitive techniques (random stimulant) by Couger (1995) and problem solving techniques (models based on intelligence, design and choice) by Brightman (1988). If we build on models of problem solving we can reach a more comprehensive taxonomy. There are different approaches for solving problems such as starting from the solution rather than the problem, i.e. seeing the solution as the problem. Often, the problem as presented first needs to be 'deconstructed' (Hekkert et al., 2003) or opened up. Ackoff (1987) states that the steps of problem solving are solving-resolving and dissolving, or in other words 'framing' and 'reframing' (Schön, 1983). Ashby (1956) claims that the problem solving ability is an intellectual power, however it has been largely related to the ability of appropriate selection. Problems can be reduced to forms, sets and elements. 'Intellectual power' may be equivalent to 'power of appropriate selection'. Summer et al. (2009) provide examples of different scenarios leading to the development of design enablers in two major categories which are demand driven and internally derived.

Some authors classify the techniques regarding which stage they are utilised at (Silverstein et al., 2007). A more generic taxonomy can be developed by building on a widely accepted design process. It is possible to use some performance enhancer methods in each stage of the design process. These stages include problem discovery, idea generation-solving the problem, applying the solution, prototyping, selection and evaluation. Table F.1 outlines the steps and gives examples of tools under these stages. Table F.2 demonstrates the tools and methods regarding the detailed tasks in the research process (van Kleef et al., 2005). However, many of these techniques such as brainstorming, object stimulation could be used at different stages of the NPD process including problem analysis and idea generation and could be used with both individuals and groups. The Politecnico di Milano has worked on service design tools and categorised them as illustrated in Table F.3 (Service design tools, n.d.). Their categorisation builds on subject matter such as, tools for social sciences, business, design, and technology improvement. However, many of these tools are not specific to subjects such as design, design management, or business. They may be originated from engineering, management, or design but adopted by various fields logistics, information technology and manufacturing.

Schneiderman (2007) claims that the large body of literature on creativity, design and innovation can be sorted into three approaches, "structuralists, inspirationalists and situationalists". Table F.4 builds on Schneiderman's

classification on creativity and innovation and proposes to put innovation enablers under these categories. Putting these enablers into families, one can recognise the resemblances between them.

Table F.1 The stages of the design process and examples of tool used in those stages

<b>Stage of the design process</b>	<b>Method/tools used in that stage</b>
Analysing the environment: exploration of problem space	Catwoe, (Checkland & Scholes, 1990) Chunking (Miller, 1956), do nothing (Clegg & Birch, 2002), 5-Why (Bulsuk, 2009), why why why, (Löwgren & Stolterman, 2005) Jobs to be done (Siverstein et al., 2009) Outcome expectations (Siverstein et al., 2009) Ethnography (Siverstein et al., 2009) Value quotient (Siverstein et al., 2009)
Problem definition: understanding the origin of the problem, re-statement of the problem.	5-Why (Bulsuk, 2009), why why why (Löwgren & Stolterman, 2005) Heuristic redefinition (Siverstein et al., 2009) Nine windows (Siverstein et al., 2009) Job scoping (Siverstein et al., 2009)
Problem solution: ideation making assumptions, generating alternatives	Conjoint analysis (Siverstein et al., 2009) Random input (de Bono, 1992), Simplex (Basadur, 1995)
Idea implementation: prototyping solution	Cause-effect diagram (Ishikawa, 1990), Cause-effect matrix (Silverstein et al., 2009)
Idea selection: assessing solutions.	Anonymous voting, Idea advocate, sticking dots, NAF brainwriting pools (Geschka et al., 1973), Nominal group technique (Delbecq et al., 1975), Consensus mapping (Hart et al., 1985) Morphological matrix (Siverstein et al., 2009) Paired comparison analysis (Siverstein et al., 2009) Pugh matrix (Siverstein et al., 2009)

Table F.2 Categorisation with regards to tasks in the research process  
(adopted from von Kleef et al., 2005)

Opportunity identification	Understanding consumer needs and methods	Category appraisal (Richardson-Harman et al., 2000) Conjoint analysis (Green et al., 2001) Empathic design (Leonard & Sensiper, 1998) Focus group (McQuarrie & McIntyre, 1986) Free elicitation (Anderson, 1983) Information acceleration (Urban et al., 1996) Kelly repertory grid (Kelly, 1955) Laddering (Walker & Olson, 1991) Lead user technique (Von Hippel, 1986) Opportunity identification ZMET (Zaltman & Coulter, 1995)
	Creativity enhancement techniques	Brainstorming (Osborn, 1963) Lateral Thinking (de Bono, 1992) Synectics (Gordon, 1961)
	Screening techniques	Coopers new product methods (Cooper & De Brentani, 1984) Idea scoring methods Analytic hierarchy process (AHP)
Development	Planning tools	
Optimisation	Product testing (Ozer, 1999)	

Table F.3 Service design tools (Source: Service Design Tools, n.d.)

Social Science	Narratology	Storytelling, Character profile, Metaphor, Role-play Role script
	Education	Training
	Ethnography	Situated interviews, Shadowing, Observation, Cultural probes
Business	Research	Focus group User surveys Market research
	Marketing	SWOT analysis, STEP analysis, Benchmarking, Feasibility Check, Business plans
	Promotion	Press release, Promotional sales, Naming Advertising
Design	Service design	Activity map Context panorama, Design direction Interaction table, Touch points, Customer journey maps, Guidelines Service specifications,

		Evaluation matrix, Blue print, Experience prototype, Tomorrow headline, System map, Motivation matrix, ADD poster
	Communication	Identity
	Design thinking	Group sketching, Mind map, Scenario, Affinity diagram, Moodboard issue cards, Personas
	Product design	Rough prototyping, Mock up
	Interface design	Evidences, Online information, Architecture, Wayfindings, Sales staff, Real time information
Technology	Human computer interaction	Wizard of Oz, Templates, Constructive interactions, Heuristic evaluation, Usability testing, Cognitive walk through, Use cases

Table F.4 Creativity tools developed by building on Schneiderman's (2007) approaches to creativity

	<b>Characteristics</b>	<b>Tools</b>
Structuralists:	Utilise orderly methods Explore step by step the possible solutions	Flow charts, precise decision trees, and structured diagrams, systematic discovery Methods such as: TRIZ (Altshuller, 1996) Cause effect diagrams/Fishbone diagram (Ishikawa 1990) Morphological analysis (Zwicky, 1967, 1969) Analytic hierarchy process (Saaty, 2008). 5Whys (Bulsuk, 2009) HIT matrix (Silverstein et al., 2009)
Inspirationalists:	Emphasise breaking away from familiar structures Elicit creative solutions. Chase unexpected relationships Emphasise seeing the big picture.	Image libraries, Random photos, inkblots dreaming-mediation Concept mapping, analogy, sketching Methods such as ZMET (Zaltman & Coulter, 1995) Synectics (Gordon, 1961) Brainstorming (Osborn, 1963) Lateral thinking (de Bono, 1992) Imaginary brainstorming Random stimulus
Situationalists	Propose that creative work is social Look for collaboration and competition. Rewards and recognition are part of motivation and efficiency.	Link to associated ideas, templates for initiating action Social platforms and internet mediated social groups Methods such as: Role play Group sketching Story telling Serious play (Statler et al., 2009.) Six (thinking) hats (de Bono, 1985) Nominal groups (Dunnette et al., 1963)

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# Appendix G Elements contributing to the effectiveness of DSPs

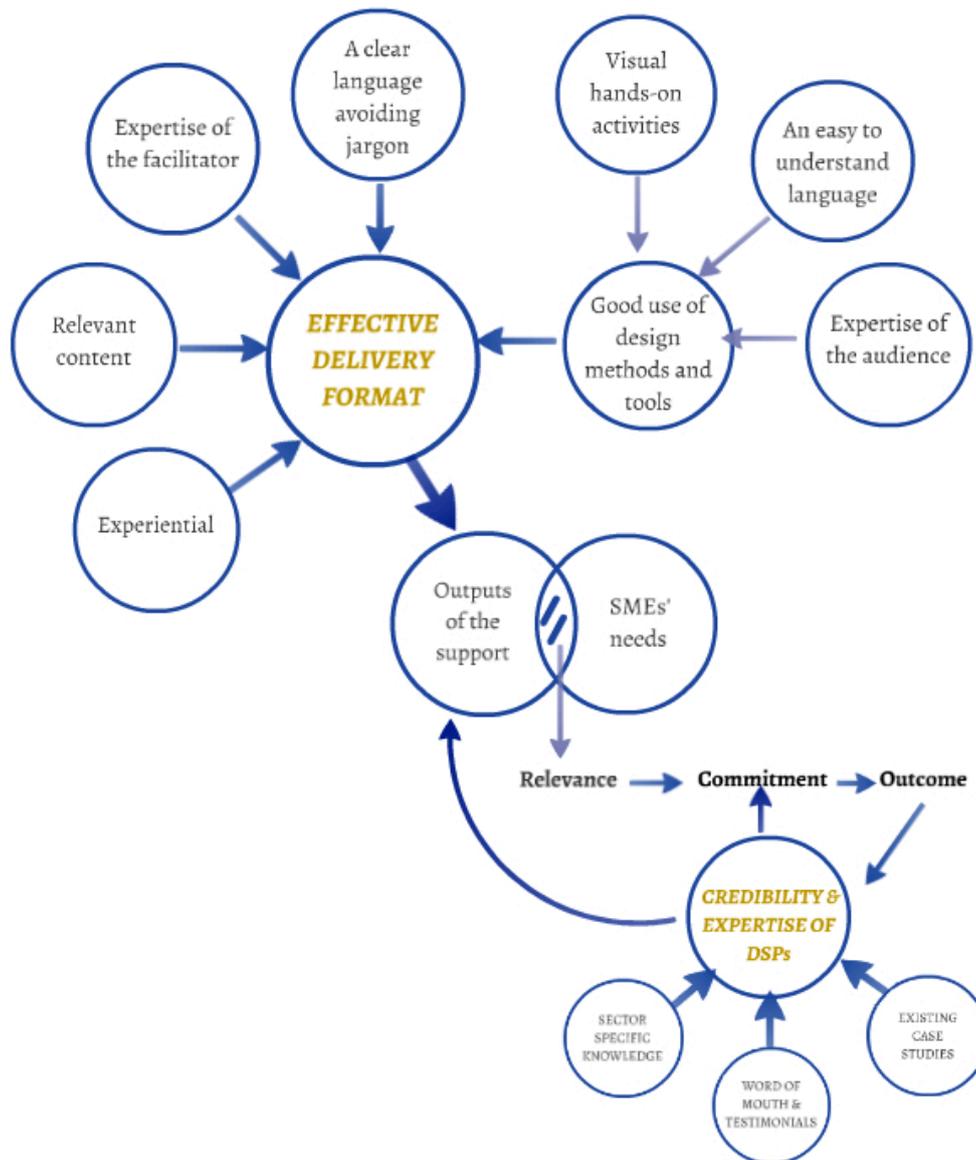


Figure G.1 Elements contributing to the effectiveness of DSPs

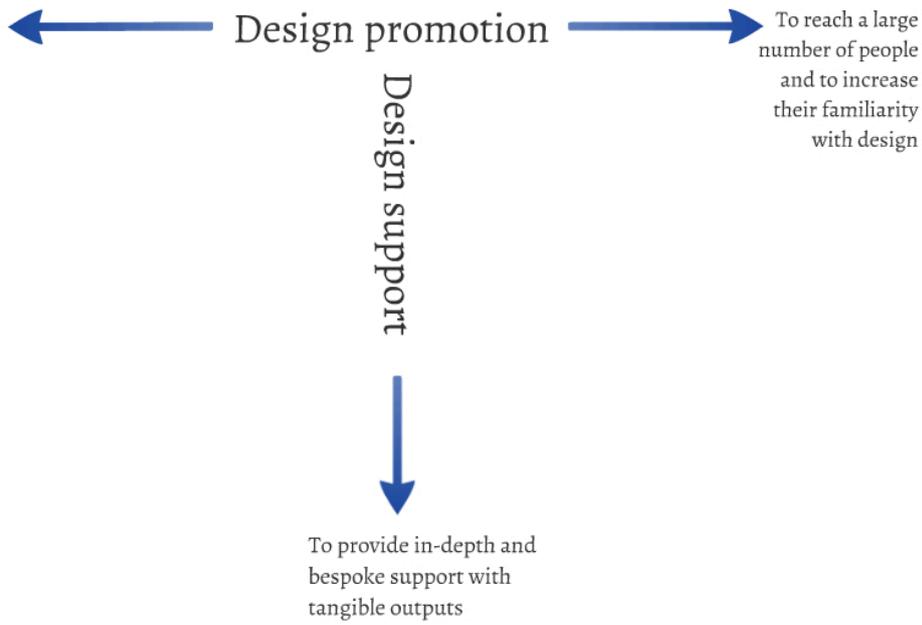


Figure G.2 The depth and breadth of design promotion

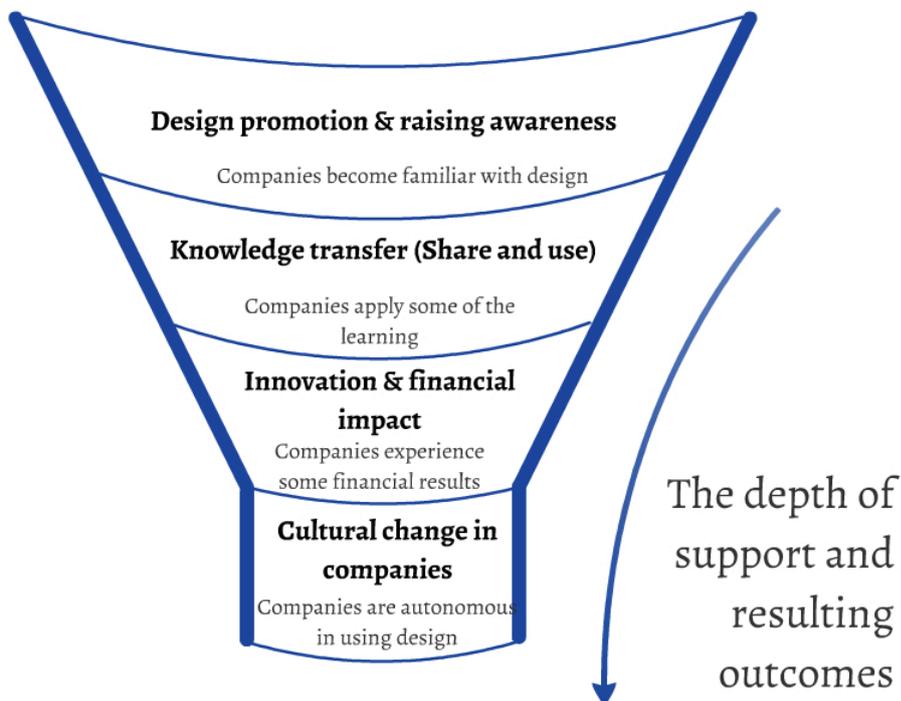
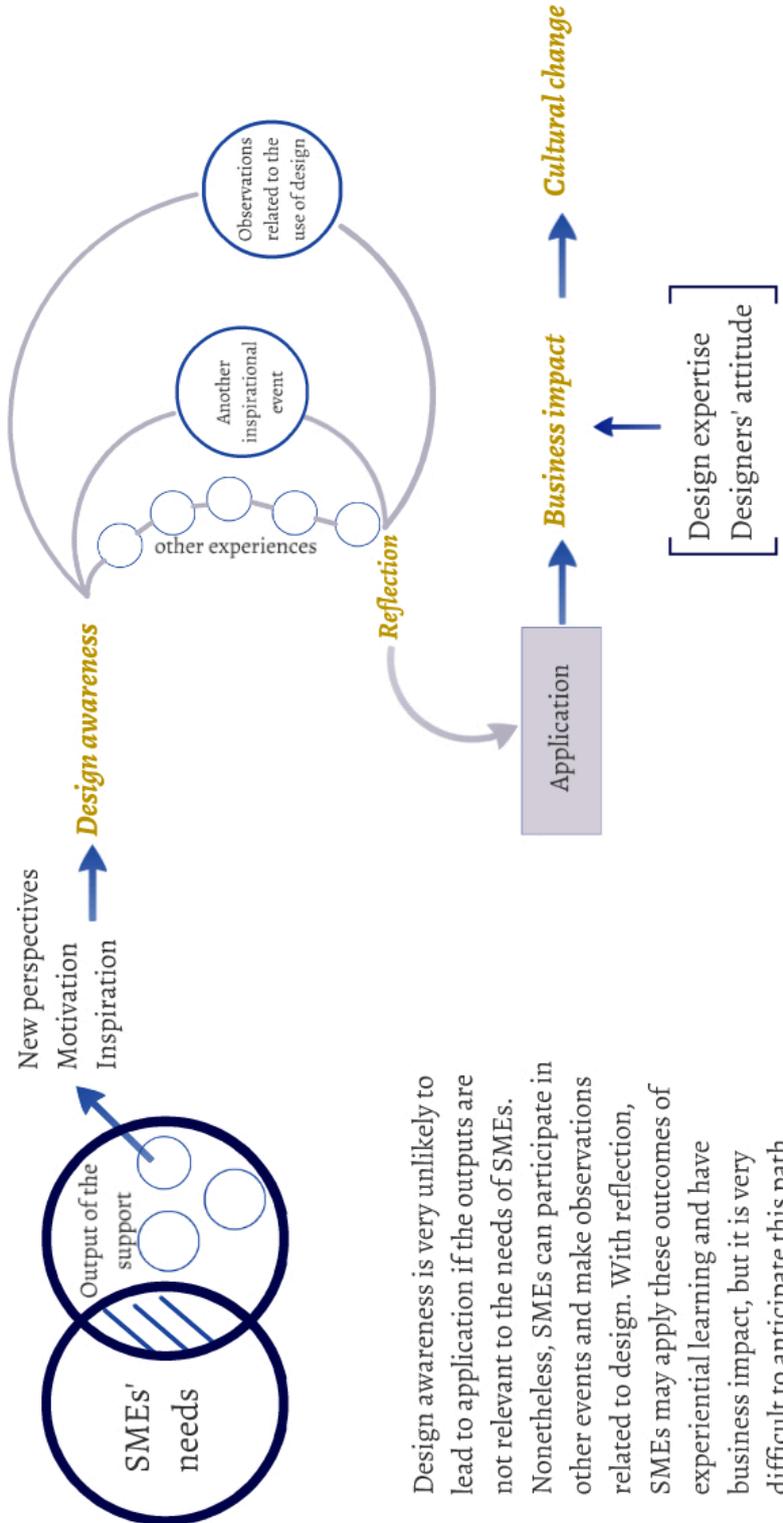


Figure G.3 The depths of design support and resulting outcomes



Design awareness is very unlikely to lead to application if the outputs are not relevant to the needs of SMEs. Nonetheless, SMEs can participate in other events and make observations related to design. With reflection, SMEs may apply these outcomes of experiential learning and have business impact, but it is very difficult to anticipate this path.

Figure G.4 An alternative map to reach business outcomes

